INTERNATIONAL CODE COUNCIL
2009/2010 CODE DEVELOPMENT CYCLE

2009/2010 FINAL ACTION AGENDA FOR THE PROPOSED CHANGES TO THE 2009 EDITIONS OF THE

INTERNATIONAL BUILDING CODE®

-FIRE SAFETY

-GENERAL

-MEANS OF EGRESS

STRUCTURAL

INTERNATIONAL EXISTING BUILDING CODE®

INTERNATIONAL FIRE CODE®

INTERNATIONAL FUEL/GAS CODE®

INTERNATIONAL MECHANICAL CODE®

INTERNATIONAL PLUMBING CODE®

INTERNATIONAL RESIDENTIAL CODE®

-BUILDING

-MECHANICAL

-PLUMBING

INTERNATIONAL WILDLAND-URBAN INTERFACE CODE®

ICC

INTERNATIONAL CODE COUNCIL®

May 15 – May 23, 2010

SHERATON DALLAS HOTEL

DALLAS, TX

First Printing

Publication Date: March 2010

PRINTED IN THE U.S.A.

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INTRODUCTION

This publication contains the Final Action Agenda for consideration at the Final Action Hearings of the International Code Council on May 15 – 23, 2010 at the Sheraton Dallas Hotel in Dallas, TX (see page viii). See page xxvii for hearing schedule.

This publication contains information necessary for final action consideration of the proposed code changes which have been considered in the ICC Code Development Hearings held on October 24 – November 11, 2009 at the Hilton Baltimore in Baltimore, MD. More specifically, this agenda addresses final action consideration for proposed code changes to the *International Building Code, International, International Existing Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Private Sewage Disposal Code, International Residential Code,* and *International Wildland-Urban Interface Code,* considered by the respective Code Committee at the Code Development Hearings.

ICC GOVERNMENTAL MEMBER REPRESENTATIVES

Council Policy #28-Code Development (page xiii) requires that ICC's membership records regarding ICC Governmental Member Representatives reflect the eligible voters **10 days prior** to the start of the Final Action Hearing. This includes new as well as changes to voting status. Section 7.4 of CP #28 (page xxiii) reads as follows:

> **7.4** **Eligible voters:** ICC Governmental Member Representatives and Honorary Members in attendance at the Final Action Hearing shall have one vote per eligible attendee on all International Codes. Applications, whether new or updated, for governmental member voting representative status must be received by the Code Council ten days prior to the commencement of the first day of the Final Action Hearing in order for any designated representative to be eligible to vote.

As such, new and updated eligible voter status must be received by ICC's Member Services Department by May 4, 2010. As noted in Section 2.1.1.1 of the Bylaws, this must be done in writing – via either a letter or a form which can be downloaded from the Members-Only area of the ICC website. This can be mailed, faxed to 205-591-0775 or emailed as an attachment to members@iccsafe.org. These records will be used to verify eligible voter status for the Final Action Hearing. Voting members are strongly encouraged to review their membership record for accuracy well in advance of the Final Action Hearing so that any necessary changes are made prior to the May 4, 2010 deadline.

ADVANCE REGISTRATION

In addition to the Final Action Hearings, ICC will be presenting an educational opportunity on Friday, May 14. Please see p. ix for the registration form and information on the Dallas Tour. **All attendees to the Final Action Hearings are required to register. Registration (see page ix) for the Final Action Hearings is FREE, and is necessary to verify voting status (see above). You are encouraged to register prior to the Final Action Hearings.**

NOTICE: If you or your companion require special accommodations to participate fully, please advise ICC of your needs.

AGENDA FORMAT

The Final Action Agenda includes the Consent Agenda and the Individual Consideration Agenda. The Consent Agenda is comprised of proposed changes to the 2009 editions of the International Codes which did not receive a successful assembly action or public comment, and therefore are not listed on the Individual Consideration Agenda.

The Individual Consideration Agenda is comprised of proposed changes to the 2009 editions of the International Codes which received a successful assembly action or received a public comment in response to the Code Committee's action at the Code Development Hearings.

Items on the Individual Consideration Agenda are published with information as originally published for the Code Development Hearing as well as the published hearing results. Following the hearing results is the reason that the item is on the Individual Consideration Agenda followed by the public comments which were received.

Public testimony will follow the *CP#28-05 Code Development* as published on page xiii. Refer to the tentative hearing order on page xxvii.

MODIFICATIONS BY ASSEMBLY ACTION AND PUBLIC COMMENT

CP#28-05 Code Development allows modifications to be proposed by the assembly at the Code Development Hearings and by a public comment to code changes for consideration on the Individual Consideration Agenda at the Final Action Hearings. Therefore, some proposed changes may have up to five possible motions - Approval as Submitted, Approval as Modified by the Code Committee, Approval as Modified by a successful Assembly Action, Approval as Modified by a Public Comment, or Disapproval.

CONSENT AGENDA

The Final Action Consent Agenda consists of proposals which have neither an assembly action nor public comments. The Final Action Consent Agenda for each code or segment of code changes will be placed before the assembly with a single motion for final action in accordance with the results of the Code Development Hearing at the beginning of the respective portion of the hearings. For codes which have no code change proposals on the Individual Consideration Agenda, a motion for the final action in accordance with the results of the Code Development Hearing will be placed before the assembly at the beginning of the hearings.

INDIVIDUAL CONSIDERATION AGENDA

The Final Action Individual Consideration Agenda is comprised of proposals which have an assembly action or public comment. This includes code changes which affect only one code (i.e. FG12-09/10) and code changes which affect multiple codes and were considered individually at the Code Development Hearings by the respective Code Committee (i.e. F120-09/10: Part I-Fire Committee; Part II-IRC Building/Energy Committee). Where a public comment was submitted to more than one part of the code change proposal (i.e. FS156-09/10), each part of the code change is heard with the code in which the proposal was originally published, but each part is published separately (F1S156-09/10 Part I and FS156-09/10 Part II) and considered separately. In some cases, code change proposals which affect multiple codes received a public comment to only one code (i.e. FS107-09/10 Part II). In such cases, the public comment to the code change is heard with the code that is the subject of the public comment (in this case, the IFC). All proposed changes on the Individual Consideration Agenda shall be placed before the assembly for individual consideration of each item. The hearing order is found on page xxvii and the agenda starts on page 1. There are some exceptions in the hearing order for the placement of code change proposals. Please review the hearing order on pages xxviii-xxx to see these exceptions.

ICC WEBSITE - WWW.ICCSAFE.ORG

While great care has been exercised in the publication of this document, there may be errata posted for the Final Action Agenda. Errata, if any, identified prior to the Final Action Hearings will be posted on the ICC website at www.iccsafe.org. Users are encouraged to periodically review the ICC Website for updates to errata to the 2009/2010 Final Action Agenda.

ELECTRONIC VOTING

Electronic voting by the ICC Governmental Member Representative in attendance at the Final Action Hearings which was first tried in Rochester during the 2007 Final Action Hearings, will continue to be used in Dallas, TX. Eligible voters will be issued a handheld device to be used to cast their vote.

VIEW THE FINAL ACTION HEARINGS ON YOUR PC

The Final Action Hearings are scheduled to be “webcast”. Streaming video broadcast over the Internet will provide a gateway for all International Code Council members, the construction industry and other interested parties anywhere in the world to view and listen to the hearings. Logging on to the Internet broadcast will be as simple as going to the International Code Council web site, www.iccsafe.org, and clicking on a link. [Actual site to be determined - be sure to check the ICC web site for further details].

The hearings can be seen free by anyone with Internet access. Minimum specifications for viewing the hearings are an Internet connection, sound card and Microsoft Windows Media Player. DSL, ISDN, Cable Modems or other leased-line connections are recommended for the best viewing experience. A dial-up modem connection will work, but with reduced video performance.

INTERNATIONAL CODE COUNCIL

People Helping People Build a Safer World™

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Spring 2010 Group A Final Action Hearings

May 14-23 - Sheraton Dallas Hotel - Dallas, TX

The Sheraton Dallas Downtown will be the host for the 2010 Group A Final Action Hearings. This downtown Dallas location is located in the Arts and Financial District near the American Airlines Center, the historic 6th Floor Museum and great dining options.

Group A Final Action Hearings will include IBC (all groups), IEBC, IFC, IFGC, IMC IPC, IRC (only Building, Mechanical and Plumbing) and IWUIC.

HEARING SCHEDULE NOW AVAILABLE!

Dallas Building Tour - Friday, May 14

Come learn about the architecture and local code challenges by attending an educational and exciting Dallas Building Tour. Students will see firsthand how architects and builders are bringing more sustainable buildings and housing to Dallas. There will be two different tours hosted by individuals who have extensive local code knowledge. **Students can earn up to .5 ICC CEUs & AIA CEU's for participating in this educational tour. The fee is $63 for each tour.**

1st Tour: 9:00 am-11:30 am

Location #1: This 3,500 square-foot home takes the shape of a two story box. Around two sides an engawa, a veranda of Japanese origin, anchors a liner garden and morphs into an enclosed porch on the upper level. Innovate building materials include cast-in-place board-form concrete, red-painted hardy plank (over conventional wood frame), foam insulation and more. Explore this home with the architect involved in the project.

Location #2: An existing 7,500 sq-ft PowerStation built in the 1920's is being converted to a single-family residence/exhibition space. A new stair and elevator tower are being added along with other mep upgrades inside.

2nd Tour: 1:00 pm - 3:30 pm

Location #1: This LEED gold home, built to exceptional standards less than a year ago, is located in a developed, gated community in Dallas. The owner, a retired engineer, and his wife were very active in all aspects of the design/construction process. From the metal roof, providing lasting durability and insurance savings, to the strategically sited windows, filling the home with natural light without the unwanted solar heat gain, to the flexible HVAC system, functioning efficiently either for the small family or large social gatherings, to the exquisite furnishings, thoughtfully chosen sustainable materials throughout, the design strategies were carefully examined and implemented. The landscaping has incorporated a buried 1700 gallon tank, collecting storm water and roof runoff and used to support the drip irrigation system. The turf area was reduced to less than 15%, and there is extensive use of native plantings which results in less need for additional municipal water. You will have the opportunity to tour this exciting LEED Gold home with the owner, architect and builder.

Location #2: This exciting NetZero home will take your breath away. NetZero energy buildings are very energy efficient. From the energy efficient windows to the solar hot water heater, this home is an extrordinary green house. Please check back on this website for more information about this exciting home.

When	Where	RSVP
Event Starts: **Friday, May 14 2010** Event End: **Sunday, May 23 2010**	Sheraton Dallas Downtown Dallas, TX	April 30, 2010 REGISTER NOW

Registration

Spring 2010 Group A Final Action Hearings
May 14 – 23
Sheraton Downtown Dallas
Dallas, Texas

FIRST NAME | MI | LAST NAME/SURNAME

JOB TITLE

JURISDICTION/ORGANIZATION

MAILING ADDRESS

CITY | STATE/PROVINCE | ZIP/POSTAL CODE

COUNTRY | E-MAIL (MUST PROVIDE TO RECEIVE CONFIRMATION)

PHONE (SPECIFY COUNTRY AND CITY CODE IF OUTSIDE THE U.S.) | FAX (SPECIFY COUNTRY AND CITY CODE IF OUTSIDE THE U.S.)

Are you an ICC Governmental Voting Member or an ICC Member? ☐ NO ☐ YES If yes, indicate your ICC Membership Number: ____________

☐ I give ICC permission to exchange my contact information with other participants from this event for the purpose of future networking and consultation.

ICC requires that facilities are in compliance with the Americans with Disabilities Act regulations. ICC will provide auxiliary aids and special need services upon request.

Type of Registration

☐ Spring 2010 Group A Final Action Hearings (Required to verify voting status)	**FREE REGISTRATION**
☐ Dallas Building Tour #1 (9am–11:30am)	**$63**
☐ Dallas Building Tour #2 (1pm–3:30pm)	**$63**

Payment Options: Bill Me is only available to ICC members. Please make checks payable to ICC.

☐ BILL ME ☐ CHECK ☐ VISA ☐ MASTERCARD ☐ AMERICAN EXPRESS

SIGNATURE

CREDIT CARD NUMBER | EXP. DATE

The Code Council reserves the right to photograph or videotape events for promotional purposes. Your registration serves as permission for ICC to copyright, publish and use your likeness in print, online or in other media. If you do not wish to be photographed or videotaped, please tell the camera operator.

Cancellation Policy: *All cancellation requests must be received in writing. Cancellations for the Spring Hearings received prior to April 15 will receive a full refund. Requests received between April 16 – May 6 will be refunded, less a $50 administrative charge. Cancellations received after May 7 will not be eligible for a refund.*

Quick And Easy Registration Online!

Online: www.iccsafe.org/springhearings
Fax to: (708) 799-2307
Mail to: 2010 ICC Spring Hearings
International Code Council
4051 W. Flossmoor Road
Country Club Hills, IL 60478

REGISTER ONLINE NOW!

Phone registrations are not accepted.
Please do not fax AND mail your registration.

If you have any questions, please call 1-888-ICC-SAFE, x4226 or x4229.

Lodging and other information:
www.iccsafe.org/springhearings

DALLAS BUILDING TOURS: Friday, May 14

Come learn about the architecture and local code challenges by attending an educational and exciting Dallas Building Tour. Students will see firsthand how architects and builders are bringing more sustainable buildings and housing to Dallas. There will be two different tours hosted by individuals who have extensive local code knowledge. Students can earn up to .5 ICC CEU for participating in each educational tour.

1st Tour: 9 am–11:30 am 2nd Tour: 1 pm–3:30 pm **$63 each tour**

GROUP A FINAL ACTION HEARINGS: Saturday, May 15 – Sunday, May 23

Sessions will include IBC (all groups), IEBC, IFC, IFGC, IMC, IPC, IRC (only Building, Mechanical, Plumbing), and IWUIC.

REGISTER TODAY! www.iccsafe.org/springhearings

2009/2010 ICC CODE DEVELOPMENT SCHEDULE

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<tr><td>DEADLINE FOR RECEIPT OF CODE CHANGE PROPOSALS</td><td colspan="2">June 1, 2009</td></tr>
<tr><td>WEB POSTING OF “PROPOSED CHANGES TO THE I-CODES”</td><td colspan="2">August 24, 2009</td></tr>
<tr><td>DISTRIBUTION DATE OF “PROPOSED CHANGES TO THE I-CODES” (Limited distribution – see notes)</td><td colspan="2">October 3, 2009</td></tr>
<tr><td>CODE DEVELOPMENT HEARING (CDH)

ALL CODES – see notes</td><td colspan="2">October 24 2009 – November 11, 2009
Hilton Baltimore
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<tr><td>WEB POSTING OF “REPORT OF THE PUBLIC HEARING”</td><td colspan="2">December 16, 2009</td></tr>
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2009 ICC Annual Conference and Code Development Hearing
Balitmore, MD

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<tr><td>RESULTING PUBLICATION</td><td colspan="2">2012 – I-Codes
(available April, 2011)</td></tr>
</table>

(1) See “Call for Committees” on page xi.

Publication dates indicate when the printed copy of the document will be available. These documents will be posted on the ICC website approximately 4 weeks prior to availability of the printed version.

GET INVOLVED—ICC COMMITTEES

The ICC relies upon the work and expertise of volunteers to develop and maintain the I-Codes and the ICC Standards. The ICC does this through committees that review and approve code change proposals, interpret the codes, draft standards, and review code correlation issues.

Code Committees

The ICC Code Committees are an instrumental part of the ICC Code Development Process. There are currently 16 Code Committees, responsible for the review and evaluation of code change proposals submitted to 14 *International Codes*. The Code Committees for the 2012/2013 Code Development Cycle will hear the code change proposals at the 2012 or 2013 Code Development Hearings, depending upon the Group into which the code committee is placed. Deadline for application to all code committees is June 1, 2011. Current Code Committee members interested in serving are required to re-apply.

Interpretation Committees

The purpose of the ICC Interpretation Committees is to provide technical support for adopting jurisdictions by processing official interpretations for the *International Codes*. Committee Interpretations represent the official position of the ICC but in all cases, the final authority on matters of interpretation is the code official. There are currently 5 ICC Interpretation Committees. Committee travel is not anticipated - the committee conducts its business via correspondence. Current Interpretation Committee members interested in serving are required to re-apply.

Code Correlation Committee

The Code Correlation Committee is responsible for evaluating matters of consistency, coordination and format in the *International Codes*. This includes determining matters of maintenance responsibility of Code Committees and identification of technical and editorial revisions necessary in the *International Codes*. Committee travel is anticipated. Current Code Correlation Committee members interested in serving are required to re-apply.

STAFF SECRETARIES

To contact a staff secretary, please call: 888-ICC-SAFE followed by the extension listed below.

IBC-General Chapters 1-6, 12, 13, 27-34	IBC-Fire Safety Chapters 7, 8, 9, 14, 26	IBC-Means of Egress Chapters 10, 11	IBC-Structural Chapters 15-25
Kermit Robinson ICC Whittier District Office X3317 FAX: 562/699-4522 krobinson@iccsafe.org	Ed Wirtschoreck ICC Chicago District Office X4317 FAX: 913/888-4526 ewirtschoreck@iccsafe.org	Kim Paarlberg ICC Chicago District Office x4306 FAX: 708/799-0320 kpaarlberg@iccsafe.org	Alan Carr ICC Washington Field Office x7601 FAX: 425-637-8939 acarr@iccsafe.org
IECC	**IEBC**	**IFC**	**IFGC**
Dave Bowman ICC Chicago District Office X4323 FAX:708/ 799-0320 dbowman@iccsafe.org	Beth Tubbs ICC Massachusetts Field Office X7708 FAX: 419/730-6531 btubbs@iccsafe.org	Bill Rehr ICC Chicago District Office x4342 FAX: 708/799-0320 brehr@iccsafe.org	Gregg Gress ICC Chicago District Office x4343 FAX: 708/799-0320 ggress@iccsafe.org
IMC	**ICC PC**	**IPC/IPSDC**	**IPMC**
Gregg Gress ICC Chicago District Office x4343 FAX: 708/799-0320 ggress@iccsafe.org	Beth Tubbs ICC Massachusetts Field Office X7708 FAX: 419/730-6531 btubbs@iccsafe.org	Fred Grable ICC Chicago District Office X4349 FAX: 708/799-0320 fgrable@iccsafe.org	Ed Wirtschoreck ICC Chicago District Office X4317 FAX: 708/799-0320 ewirtschoreck@iccsafe.org
IRC-Building/Energy	**IRC-Mechanical**	**IRC-Plumbing**	**IWUIC**
Larry Franks and Dave Bowman ICC Birmingham District Office LF-x5279; MN-x4216 FAX: 205/592-7001 lfranks@iccsafe.org dbowman@iccsafe.org	Gregg Gress ICC Chicago District Office x4343 FAX: 708/799-0320 ggress@iccsafe.org	Fred Grable ICC Chicago District Office x4349 FAX: 708/799-0320 fgrable@iccsafe.org	Bill Rehr ICC Chicago District Office x4342 FAX: 708/799-0320 brehr@iccsafe.org
IZC	**IADMIN Chapter 1 (All codes except IRC)**		
Ed Wirtschoreck ICC Chicago District Office X4317 FAX: 708/799-0320 ewirtschoreck@iccsafe.org	Dave Bowman ICC Chicago District Office X4323 FAX: 708/299-0320 dbowman@iccsafe.org		

CP# 28-05 CODE DEVELOPMENT

Approved: 9/24/05
Revised: 2/27/09

CP # 28-05 is an update to *ICC's Code Development Process for the International Codes* dated May 15, 2004.

1.0 Introduction

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

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

1.2.1 The timely evaluation and recognition of technological developments pertaining to construction regulations.

1.2.2 The open discussion of proposals by all parties desiring to participate.

1.2.3 The final determination of Code text by officials representing code enforcement and regulatory agencies and by honorary members.

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

1.3.1 Code Correlation: The provisions of all Codes shall be consistent with one another so that conflicts between the Codes do not occur. Where a given subject matter or code text could appear in more than one Code, the ICC Board shall determine which Code shall be the primary document, and therefore which code development committee shall be responsible for review and maintenance of the code text. Duplication of content or text between Codes shall be limited to the minimum extent necessary for practical usability of the Codes, as determined in accordance with Section 4.4.

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

1.5 Secretariat: The Chief Executive Officer shall assign a Secretariat for each of the Codes. All correspondence relating to code change proposals and public comments shall be addressed to the Secretariat.

1.6 Video Taping: Individuals requesting permission to video tape any meeting, or portion thereof, shall be required to provide the ICC with a release of responsibility disclaimer and shall acknowledge that they have insurance coverage for liability and misuse of video tape materials. Equipment and the process used to video tape shall, in the judgment of the ICC Secretariat, be conducted in a manner that is not disruptive to the meeting. The ICC shall not be responsible for equipment, personnel or any other provision necessary to accomplish the videotaping. An unedited copy of the video tape shall be forwarded to ICC within 30 days of the meeting.

2.0 Code Development Cycle

2.1 Intent: The code development cycle shall consist of the complete consideration of code change proposals in accordance with the procedures herein specified, commencing with the deadline for submission of code change proposals (see Section 3.5) and ending with publication of final action on the code change proposals (see Section 7.6).

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

2.3 Supplements: The results of code development activity between editions may be published.

2.4 Emergency Procedures: In the event that the ICC Board determines that an emergency

amendment to any Code is warranted, the same may be adopted by the ICC Board. Such action shall require an affirmative vote of at least two-thirds of the ICC Board.
The ICC membership shall be notified within ten days after the ICC Boards' official action of any emergency amendment. At the next Annual Business Meeting, any emergency amendment shall be presented to the members for ratification by a majority of the ICC Governmental Member Representatives and Honorary Members present and voting.

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

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

3.0 Submittal of Code Change Proposals

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

3.2 Withdrawal of Proposal: A code change proposal may be withdrawn by the proponent (WP) at any time prior to Final Action Consideration of that proposal. A withdrawn code change proposal shall not be subject to a public hearing, motions, or Final Action Consideration.

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

3.3.1 Proponent: Each code change proposal shall include the name, title, mailing address, telephone number, and email address of the proponent.

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

3.3.1.2 If a proponent submits a code change on behalf of a client, group, organization or committee, the name and mailing address of the client, group, organization or committee shall be indicated.

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

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

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

3.3.3 Multiple code change proposals to a code section. A proponent shall not submit multiple code change proposals to the same code section. When a proponent submits multiple code change proposals to the same section, the proposals shall be considered as incomplete proposals and processed in accordance with Section 4.3. This restriction shall not apply to code change proposals that attempt to address differing subject matter within a code section.

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

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

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

3.3.4.3 Each proposal shall be in proper code format and terminology.

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

3.3.4.5 The proposed text shall be in mandatory terms.

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

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

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

3.3.5.3 Substantiation: The proponent shall substantiate the proposed code change based on technical information and substantiation. Substantiation provided which is reviewed in accordance with Section 4.2 and determined as not germane to the technical issues addressed in the proposed code change shall be identified as such. The proponent shall be notified that the proposal is considered an incomplete proposal in accordance with Section 4.3 and the proposal shall be held until the deficiencies are corrected. The proponent shall have the right to appeal this action in accordance with the policy of the ICC Board. The burden of providing substantiating material lies with the proponent of the code change proposal.

3.3.5.4 Bibliography: The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change and the proponent shall make the substantiating materials available for review at the appropriate ICC office and during the public hearing.

3.3.5.5 Copyright Release: The proponent of code change proposals, floor modifications and public comments shall sign a copyright release reading: "I hereby grant and assign to ICC all rights in copyright I may have in any authorship contributions I make to ICC in connection with any proposal and public comment, in its original form submitted or revised form, including written and verbal modifications submitted in accordance Section 5.5.2. I understand that I will have no rights in any ICC publications that use such contributions in the form submitted by me or another similar form and certify that such contributions are not protected by the copyright of any other person or entity."

3.3.5.6 Cost Impact: The proponent shall indicate one of the following regarding the cost impact of the code change proposal: 1) the code change proposal will increase the cost of construction; or 2) the code change proposal will not increase the cost of construction. This information will be included in the published code change proposal.

3.4 Number: One copy of each code change proposal, two copies of each proposed new referenced standard and one copy of all substantiating information shall be submitted. Additional copies may be requested when determined necessary by the Secretariat to allow such information to be distributed to the code development committee. Where such additional copies are requested, it shall be the responsibility of the proponent to send such copies to the respective code development committee. A copy of the code change proposal in electronic form is preferred.

3.5 Submittal Deadline: Each code change proposal shall be received at the office of the Secretariat by the posted deadline. Such posting shall occur no later than 120 days prior to the code change deadline. The submitter of a proposed code change is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

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

3.6.1 Code References:

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

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

3.6.2 Standard Content:

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

3.6.2.2 The standard shall be appropriate for the subject covered.

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

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

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

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

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

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

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

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

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

3.6.3 Standard Promulgation:

3.6.3.1 Code change proposals with corresponding changes to the code text which include a reference to a proposed new standard or a proposed update of an existing referenced shall comply with this section. The standard shall be completed and readily available prior to Final Action Consideration based on the cycle of code development which includes the proposed code change proposal. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. Updating of standards without corresponding code text changes shall be accomplished administratively in accordance with Section 4.5.

3.6.3.2 The standard shall be developed and maintained through a consensus process such as ASTM or ANSI.

4.0 Processing of Proposals

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

4.2 Review: Upon receipt in the Secretariat's office, the code change proposals will be checked for compliance with these Rules of Procedure as to division, separation, number of copies, form, language, terminology, supporting statements and substantiating data. Where a code change proposal consists of multiple parts which fall under the maintenance responsibilities of different code committees, the Secretariat shall determine the code committee responsible for determining the committee action in accordance with Section 5.6.

4.3 Incomplete Proposals: When a code change proposal is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the Secretariat shall notify the proponent of the specific deficiencies and the proposal shall be held until the deficiencies are corrected, with a final date set for receipt of a corrected submittal. If the Secretariat receives the corrected proposal after the final date, the proposal shall be held over until the next code development cycle. Where there are otherwise no deficiencies addressed by this section, a proposal that incorporates a new referenced standard shall be processed with an analysis of referenced standard's compliance with the criteria set forth in Section 3.6.

4.4 Editorial: The Chief Executive Officer shall have the authority at all times to make editorial and format changes to the Code text, or any approved changes, consistent with the intent, provisions and style of the Code. An editorial or format change is a text change that does not affect the scope or application of the code requirements.

4.5 Updating Standards:

4.5.1 Standards referenced in the 2012 Edition of the I-Codes: The updating of standards referenced by the Codes shall be accomplished administratively by the Administrative code development committee in accordance with these full procedures except that the deadline for availability of the updated standard and receipt by the Secretariat shall be December 1, 2011. The published version of the 2012 Code which references the standard will refer to the updated edition of the standard. If the standard is not available by the deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued Multiple standards to be updated may be included in a single proposal.

4.5.2 Standards referenced in the 2015 Edition and following Editions of the I-Codes: The updating of standards referenced by the Codes shall be accomplished administratively by the Administrative code development committee in accordance with these full procedures except that multiple standards to be updated may be included in a single proposal. The standard shall be completed and readily available prior to Final Action Consideration of the Administrative code change proposal which includes the proposed update.

4.6 Preparation: All code change proposals in compliance with these procedures shall be prepared in a standard manner by the Secretariat and be assigned separate, distinct and consecutive numbers. The Secretariat shall coordinate related proposals submitted in accordance with Section 3.3.2 to facilitate the hearing process.

4.7 Publication: All code change proposals shall be posted on the ICC website at least 30 days prior to the public hearing on those proposals and shall constitute the agenda for the public hearing. Code change proposals which have not been published shall not be considered.

5.0 Public Hearing

5.1 Intent: The intent of the public hearing is to permit interested parties to present their views including the cost and benefits on the code change proposals on the published agenda. The code development committee will consider such comments as may be presented in the development of their action on the disposition of such proposals. At the conclusion of the code development committee deliberations, the committee action on each code change proposal shall be placed before the hearing assembly for consideration in accordance with Section 5.7.

5.2 Committee: The Code Development Committees shall be appointed by the applicable ICC Council.

5.2.1 Chairman/Moderator: The Chairman and Vice-Chairman shall be appointed by the Steering Committee on Councils from the appointed members of the committee. The ICC President shall appoint one or more Moderators who shall act as presiding officer for the public hearing.

5.2.2 Conflict of Interest: A committee member shall withdraw from and take no part in those matters with which the committee member has an undisclosed financial, business or property interest. The committee member shall not participate in any committee discussion on the matter or any committee vote. Violation thereof shall result in the immediate removal of the committee member from the committee. A committee member who is a proponent of a proposal shall not participate in any committee discussion on the matter or any committee vote. Such committee member shall be permitted to participate in the floor discussion in accordance with Section 5.5 by stepping down from the dais.

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

5.2.4 Committee Composition: The committee may consist of representation from multiple interests. A minimum of thirty-three and one-third percent (33.3%) of the committee members shall be regulators.

5.3 Date and Location: The date and location of each public hearing shall be announced not less than 60 days prior to the date of the public hearing.

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

5.4.1 Chair Voting: The Chairman of the committee shall vote only when the vote cast will break a tie vote of the committee.

5.4.2 Open Meetings: Public hearings of the Code Development Committees are open meetings. Any interested person may attend and participate in the Floor Discussion and Assembly Consideration portions of the hearing. Only eligible voters (see Section 5.7.4) are permitted to vote on Assembly Considerations. Only Code Development Committee members may participate in the Committee Action portion of the hearings (see Section 5.6).

5.4.3 Presentation of Material at the Public Hearing: Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 5.5.2. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 3.3.4.4 and other material submitted in response to a code change proposal shall be located in a designated area in the hearing room and shall not be distributed to the code development committee at the public hearing.

5.4.4 Agenda Order: The Secretariat shall publish an agenda for each public hearing, placing individual code change proposals in a logical order to facilitate the hearing. Any public hearing attendee may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another proposal is being discussed. Preference shall be given to grouping like subjects together, and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position. A motion to revise the agenda order is subject to a 2/3 vote of those present and voting.

5.4.5 Reconsideration: There shall be no reconsideration of a proposed code change after it has been voted on by the committee in accordance with Section 5.6; or, in the case of assembly consideration, there shall be no reconsideration of a proposed code change after it has been voted on by the assembly in accordance with Section 5.7.

5.4.6 Time Limits: Time limits shall be established as part of the agenda for testimony on all proposed changes at the beginning of each hearing session. Each person requesting to testify on a change shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall have limited authority to modify time limitations on debate. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

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

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

5.4.7 Points of Order: Any person participating in the public hearing may challenge a procedural ruling of the Moderator or the Chairman. A majority vote of the eligible voters as determined in Section 5.7.4 shall determine the decision.

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

5.5.1 Discussion Order:

1. *Proponents.* The Moderator shall begin by asking the proponent and then others in support of the proposal for their comments.
2. *Opponents.* After discussion by those in support of a proposal, those opposed hereto, if any, shall have the opportunity to present their views.
3. *Rebuttal in support.* Proponents shall then have the opportunity to rebut points raised by the opponents.
4. *Rerebuttal in opposition.* Opponents shall then have the opportunity to respond to the proponent's rebuttal.

5.5.2 Modifications: Modifications to proposals may be suggested from the floor by any person participating in the public hearing. The person proposing the modification is deemed to be the proponent of the modification.

5.5.2.1 Submission and Written Copies. All modifications must be written, unless determined by the Chairman to be either editorial or minor in nature. The modification proponent shall provide 20 copies to the Secretariat for distribution to the committee.

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

1. is not legible, unless not required to be written in accordance with Section 5.5.2.1; or
2. changes the scope of the original proposal; or
3. is not readily understood to allow a proper assessment of its impact on the original proposal or the code.

The ruling of the Chairman on whether or not the modification is in or out of order shall be final and is not subject to a point of order in accordance with Section 5.4.7.

5.5.2.3 Testimony. When a modification is offered from the floor and ruled in order by the Chairman, a specific floor discussion on that modification is to commence in accordance with the procedures listed in Section 5.5.1.

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

1. Approve the code change proposal as submitted (AS) or
2. Approve the code change proposal as modified with specific modifications (AM), or
3. Disapprove the code change proposal (D)

Discussion on this motion shall be limited to Code Development Committee members. If a committee member proposes a modification which had not been proposed during floor discussion, the Chairman shall rule on the modification in accordance with Section 5.5.2.2 If a committee member raises a matter of issue, including a proposed modification, which has not been proposed or discussed during the floor discussion, the Moderator shall suspend the committee discussion and shall reopen the floor discussion for comments on the specific matter or issue. Upon receipt of all comments from the floor, the Moderator shall resume committee discussion.

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

The Code Development Committee shall maintain a record of its proceedings including the action on each code change proposal.

5.7 Assembly Consideration: At the conclusion of the committee's action on a code change proposal and before the next code change proposal is called to the floor, the Moderator shall ask for a motion from the public hearing attendees who may object to the committee's action. If a motion in accordance with Section 5.7.1 is not brought forward on the committee's action, the results of the public hearing shall be established by the committee's action. If a motion in accordance with Section 5.7.1 is brought forward and is sustained in accordance with Section 5.7.3, both the committee's action and the assemblies' action shall be reported as the results of the public hearing. Where a motion is sustained in accordance with Section 5.7.3, such action shall be the initial motion considered at Final Action Consideration in accordance with Section 7.3.8.2.

5.7.1 Floor Motion: Any attendee may raise an objection to the committee's action in which case the attendee will be able to make a motion to:

1. Approve the code change proposal as submitted from the floor (ASF), or
2. Approve the code change proposal as modified from the floor (AMF) with a specific modification that has been previously offered from the floor and ruled in order by the Chairman during floor discussion (see Section 5.5.2) or has been offered by a member of the Committee and ruled in order by the Chairman during committee discussion (see Section 5.6), or
3. Disapprove the code change proposal from the floor (DF).

5.7.2 Discussion: On receipt of a second to the floor motion, the Moderator shall place the otion before the assembly for a vote. No additional testimony shall be permitted.

5.7.3 Assembly Action: The assembly action shall be in accordance with the following majorities based on the number of votes cast by eligible voters (See 5.7.4).

Committee Action	**Desired Assembly Action**		
	ASF	**AMF**	**DF**
AS	**--**	**2/3 Majority**	**2/3 Majority**
AM	**2/3 Majority**	**2/3 Majority**	**2/3 Majority**
D	**2/3 Majority**	**2/3 Majority**	--

5.7.4 Eligible Voters: All members of ICC in attendance at the public hearing shall be eligible to vote on floor motions. Only one vote authorized for each eligible attendee. Code Development Committee members shall be eligible to vote on floor motions. Application, whether new or updated, for ICC membership must be received by the Code Council ten days prior to the commencement of the first day of the public hearing.

5.8 Report of the Public Hearing: The results of the public hearing, including committee action and successful assembly action, shall be posted on the ICC website not less than 60 days prior to Final Action Consideration except as approved by the ICC Board.

6.0 Public Comments

6.1 Intent: The public comment process gives attendees at the Final Action Hearing an opportunity to consider specific objections to the results of the public hearing and more thoughtfully prepare for the discussion for Final Action Consideration. The public comment process expedites the Final Action Consideration at the Final Action Hearing by limiting the items discussed to the following:

6.1.1 Consideration of items for which a public comment has been submitted; and
6.1.2 Consideration of items which received a successful assembly action at the public hearing.

6.2 Deadline: The deadline for receipt of a public comment to the results of the public hearing shall be announced at the public hearing but shall not be less than 30 days from the availability of the report of the results of the public hearing (see Section 5.8).

6.3 Withdrawal of Public Comment: A public comment may be withdrawn by the public commenter at any time prior to Final Action Consideration of that comment. A withdrawn public comment shall not be subject to Final Action Consideration. If the only public comment to a code change proposal is withdrawn by the public commenter prior to the vote on the consent agenda in accordance with Section 7.3.4, the proposal shall be considered as part of the consent agenda. If the only public comment to a code change proposal is withdrawn by the public commenter after the vote on the consent agenda in accordance with Section 7.3.4, the proposal shall continue as part of the individual consent agenda in accordance with Section 7.3.5, however the public comment shall not be subject to Final Action Consideration.

6.4 Form and Content of Public Comments: Any interested person, persons, or group may submit a public comment to the results of the public hearing which will be considered when in conformance to these requirements. Each public comment to a code change proposal shall be submitted separately and shall be complete in itself. Each public comment shall contain the following information:

6.4.1 Public comment: Each public comment shall include the name, title, mailing address, telephone number and email address of the public commenter. If group, organization, or committee submits a public comment, an individual with prime responsibility shall be indicated. If a public comment is submitted on behalf a client, group, organization or committee, the name and mailing address of the client, group, organization or committee shall be indicated. The scope of the public comment shall be consistent with the scope of the original code change proposal, committee action or successful assembly action. Public comments which are determined as not within the scope of the code change proposal, committee action or successful assembly action shall be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. A copyright release in accordance with Section 3.3.4.5 shall be provided with the public comment.

6.4.2 **Code Reference:** Each public comment shall include the code change proposal number and the results of the public hearing, including successful assembly actions, on the code change proposal to which the public comment is directed.

6.4.3 **Multiple public comments to a code change proposal.** A proponent shall not submit multiple public comments to the same code change proposal. When a proponent submits multiple public comments to the same code change proposal, the public comments shall be considered as incomplete public comments and processed in accordance with Section 6.5.1. This restriction shall not apply to public comments that attempt to address differing subject matter within a code section.

6.4.4 **Desired Final Action:** The public comment shall indicate the desired final action as one of the following:

1. Approve the code change proposal as submitted (AS), or
2. Approve the code change proposal as modified (AM) by one or more specific modifications published in the Results of the Public Hearing or published in a public comment, or
3. Disapprove the code change proposal (D)

6.4.5 **Supporting Information:** The public comment shall include in a statement containing a reason and justification for the desired final action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 6.4 and determined as not germane to the technical issues addressed in the code change proposal or committee action shall be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. The public commenter shall have the right to appeal this action in accordance with the policy of the ICC Board. A bibliography of any substantiating material submitted with a public comment shall be published with the public comment and the substantiating material shall be made available at the Final Action Hearing.

6.4.6 **Number:** One copy of each public comment and one copy of all substantiating information shall be submitted. Additional copies may be requested when determined necessary by the Secretariat. A copy of the public comment in electronic form is preferred.

6.5 **Review:** The Secretariat shall be responsible for reviewing all submitted public comments from an editorial and technical viewpoint similar to the review of code change proposals (See Section 4.2).

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

6.5.2 **Duplications**: On receipt of duplicate or parallel public comments, the Secretariat may consolidate such public comments for Final Action Consideration. Each public commenter shall be notified of this action when it occurs.

6.5.3 **Deadline:** Public comments received by the Secretariat after the deadline set for receipt shall not be published and shall not be considered as part of the Final Action Consideration.

6.6 **Publication:** The public hearing results on code change proposals that have not been public commented and the code change proposals with public commented public hearing results and successful assembly actions shall constitute the Final Action Agenda. The Final Action Agenda shall be posted on the ICC website at least 30 days prior to Final Action consideration.

7.0 Final Action Consideration

7.1 Intent: The purpose of Final Action Consideration is to make a final determination of all code change proposals which have been considered in a code development cycle by a vote cast by eligible voters (see Section 7.4).

7.2 Agenda: The final action consent agenda shall be comprised of proposals which have neither an assembly action nor public comment. The agenda for public testimony and individual consideration shall be comprised of proposals which have a successful assembly action or public comment (see Sections 5.7 and 6.0).

7.3 Procedure: *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Final Action Consideration except as these Rules of Procedure may otherwise dictate.

7.3.1 Open Meetings: Public hearings for Final Action Consideration are open meetings. Any interested person may attend and participate in the Floor Discussion.

7.3.2 Agenda Order: The Secretariat shall publish an agenda for Final Action Consideration, placing individual code change proposals and public comments in a logical order to facilitate the hearing. The proponents or opponents of any proposal or public comment may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another proposal is being discussed. Preference shall be given to grouping like subjects together and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position. A motion to revise the agenda order is subject to a 2/3 vote of those present and voting.

7.3.3 Presentation of Material at the Public Hearing: Information to be provided at the hearing shall be limited to verbal presentations. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 6.4.4 and other material submitted in response to a code change proposal or public comment shall be located in a designated area in the hearing room.

7.3.4 Final Action Consent Agenda: The final action consent agenda (see Section 7.2) shall be placed before the assembly with a single motion for final action in accordance with the results of the public hearing. When the motion has been seconded, the vote shall be taken with no testimony being allowed. A simple majority (50% plus one) based on the number of votes cast by eligible voters shall decide the motion.

7.3.5 Individual Consideration Agenda: Upon completion of the final action consent vote, all proposed changes not on the final action consent agenda shall be placed before the assembly for individual consideration of each item (see Section 7.2).

7.3.6 Reconsideration: There shall be no reconsideration of a proposed code change after it has been voted on in accordance with Section 7.3.8.

7.3.7 Time Limits: Time limits shall be established as part of the agenda for testimony on all proposed changes at the beginning of each hearing session. Each person requesting to testify on a change shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall have limited authority to modify time limitations on debate. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

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

7.3.8 Discussion and Voting: Discussion and voting on proposals being individually considered shall be in accordance with the following procedures:

7.3.8.1 Allowable Final Action Motions: The only allowable motions for final action are Approval as Submitted, Approval as Modified by one or more modifications published in the Final Action Agenda, and Disapproval.

7.3.8.2 Initial Motion: The Code Development Committee action shall be the initial motion considered, unless there was a successful assembly action in accordance with Section 5.7.3. If there was a successful assembly action, it shall be the initial motion considered. If the assembly action motion fails, the code development committee action shall become the next motion considered.

7.3.8.3 **Motions for Modifications:** Whenever a motion under consideration is for Approval as Submitted or Approval as Modified, a subsequent motion and second for a modification published in the Final Action Agenda may be made (see Section 6.4.3). Each subsequent motion for modification, if any, shall be individually discussed and voted before returning to the main motion. A two-thirds majority based on the number of votes cast by eligible voters shall be required for a successful motion on all modifications.

7.3.8.4 **Voting:** After dispensing with all motions for modifications, if any, and upon completion of discussion on the main motion, the Moderator shall then ask for the vote on the main motion. If the motion fails to receive the majority required in Section 7.5, the Moderator shall ask for a new motion.

7.3.8.5 **Subsequent Motion:** If the initial motion is unsuccessful, a motion for one of the other allowable final actions shall be made (see Section 7.3.8.1) and dispensed with until a successful final action is achieved. If a successful final action is not achieved, Section 7.5.1 shall apply.

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

7.3.10 **Points of Order:** Any person participating in the public hearing may challenge a procedural ruling of the Moderator. A majority vote of the eligible voters as determined in Section 5.7.4 shall determine the decision.

7.4 **Eligible voters:** ICC Governmental Member Representatives and Honorary Members in attendance at the Final Action Hearing shall have one vote per eligible attendee on all International Codes. Applications, whether new or updated, for governmental member voting representative status must be received by the Code Council ten days prior to the commencement of the first day of the Final Action Hearing in order for any designated representative to be eligible to vote.

7.5 **Majorities for Final Action:** The required voting majority based on the number of votes cast of eligible voters shall be in accordance with the following table:

Public Hearing Action (see note)	**Desired Final Action**		
	AS	**AM**	**D**
AS	Simple Majority	2/3 Majority	Simple Majority
AM	2/3 Majority	Simple Majority to sustain the Public Hearing Action or; 2/3 Majority on additional modifications and 2/3 on overall AM	Simple Majority
D	2/3 Majority	2/3 Majority	Simple Majority

Note: The Public Hearing Action includes the committee action and successful assembly action.

7.5.1 **Failure to Achieve Majority Vote:** In the event that a code change proposal does not receive any of the required majorities for final action in Section 7.5, final action on the code change proposal in question shall be disapproval.

7.6 **Publication:** The Final action on all proposed code changes shall be published as soon as practicable after the determination of final action. The exact wording of any resulting text modifications shall be made available to any interested party.

8.0 **Appeals**

8.1 **Right to Appeal:** Any person may appeal an action or inaction in accordance with CP-1.

2009-2010 ICC CODE DEVELOPMENT CYCLE
ERRATA TO THE 2009
REPORT OF THE PUBLIC HEARING

INTERNATIONAL FIRE CODE

F69-09/10 Replace as follows:

Committee Action: Approved as Modified

Modify the proposal as follows:

903.2.4 (IBC [F] 903.2.4) Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. Where a Group F-1 fire area exceeds 12,000 square feet (1115 m^2);
2. Where a Group F-1 fire area is located more than three stories above grade plane; or
3. Where the combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. Where a Group F-1 occupancy ~~is~~ used for the manufacture of upholstered furniture or mattresses <u>exceeds 2,500 square feet (232 m^2).</u>

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903.2.7 (IBC [F] 903.2.7) Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. Where a Group M fire area exceeds 12,000 square feet (1115 m^2);
2. Where a Group M fire area is located more than three stories above grade plane; or
3. Where the combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2). ; or
4. Where a Group M occupancy ~~is~~ used for the display and sale of upholstered furniture or mattresses <u>exceeds 5,000 square feet (464 m^2).</u>

903.2.9 (IBC [F] 903.2.9) Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 fire area exceeds 12,000 square feet (1115 m^2);
2. A Group S-1 fire area is located more than three stories above grade plane; or
3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. A Group S-1 fire area used for the storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m^2).
5. <u>Where</u> A Group S-1 occupancy ~~is~~ used for the storage of upholstered furniture or mattresses <u>exceeds 2,500 square feet (232 m^2).</u>

Committee Reason: The committee approved the proposal as they felt that Group F-1 and Group S-1 occupancies manufacturing and storing upholstered furnishings and mattresses pose the same hazard to occupants and fire fighters that Group M occupancies displaying and selling such materials. The proposal was modified to provide a reasonable threshold that would not penalize occupancies with very small amounts of such materials. These thresholds were based on the thresholds in Chapter 23 of the IFC with regard to size of high piled storage areas.

Assembly Action: None

IRC – PLUMBING

RP13-09/10

Committee Action: Approved as Modified

Modify Section 2904.2.3.2 of the proposal as follows:

P2904.2.4.2 Obstructions to coverage. Sprinkler discharge shall not be blocked by obstructions unless additional sprinklers are installed to protect the obstructed area. Additional sprinklers shall not be required where the sprinkler separation from obstructions complies with either of the minimum distance indicated in Table P2904.2.4.2 ~~and~~ or the minimum distances specified in the sprinkler manufacturer's instructions where the manufacturer's instructions permit a lesser distance.

Committee Reason: Modification made to clarify that the distance between a sprinkler and an obstruction can be less than that indicated in the table as long as manufacturer allows the lesser distance. Proposed change will provide greater flexibility in locating sprinklers.

Assembly Action: None

Reason: These changes were approved at the Baltimore hearing according to my notes, but they were not reflected in the Committee Report. They are intended to be editorial, and as written currently, the text makes no sense.

IBC – GENERAL

G28-09/10 Part II - See text at the end of Exception 2.

PART II – IRC – B/E

Committee Action: Disapproved

Committee Reason: The committee feels this is a good change but it needs more work. The term "to be constructed" implies new construction and renovations need to be addressed. Also, some of the distinctions would be better suited in the Zoning Code rather than the IRC.

Assembly Action: Approved as Modified

R101.2 Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, *alteration*, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures*.

Exceptions:

1. Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family *dwellings* or townhouses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section P2904 ~~903.3.1.3 of the *International Building Code*~~.
2. Owner occupied lodging houses with five or fewer guest rooms shall be permitted to be constructed in accordance with the *International Residential Code for One- and Two-family Dwellings* when equipped with a fire sprinkler system complying with Section P2904.

(Portions of proposal not shown remain unchanged)

Reason for modification: The modification adds the term "owner occupied" and would aid the misinterpretation about accessibility. The modification also will assure these units will be sprinklered.

IBC – STRUCTURAL

S22-09/10, Parts I & II: Modifications to read as follows:

Modify the proposal as follows:

PHOTOVOLTAIC MODULES/SHINGLES. A roof covering composed of flat-plate photovoltaic modules fabricated into ~~sheets that resemble three-tab composite~~ shingles.

1507.17.3 Wind resistance. Photovoltaic modules/shingles shall be tested in accordance with procedures ~~adapted from~~ and acceptance criteria in ASTM D 3161. Photovoltaic modules/shingles shall comply with the classification requirements of Table 1507.2.7.1(2) for the appropriate

maximum basic wind speed. Photovoltaic modules/shingle packaging shall bear a label to indicate compliance with the procedures ~~adapted from~~ in ASTM D 3161 and the required classification from Table 1507.2.7.1(2).
(Portions not proposal not shown are unchanged)

S67-09/10: Modification to Item 7 in Table 1607.1 to read as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
7. Catwalks ~~for maintenance access~~	40	300

(Portions of table not shown are unchanged)

2010 FINAL ACTION HEARING SCHEDULE
May 15 – 23, 2010
Sheraton Dallas Hotel, Dallas, TX

The hearings will start on Saturday, May 15 instead of the originally scheduled Friday, May 14.

Unless noted by "Start no earlier than X am/pm," the hearing on each code will begin immediately upon completion of the hearings for the prior code. This includes moving the hearing up or back from the day indicated based on hearing progress. Actual start times for the various codes cannot be stipulated due to uncertainties in hearing progress.

The schedule anticipates that the hearings will be completed no later than 12:00 p.m. on Sunday, May 23. This may require adjustments to the daily start/end times based on hearing progress. Be sure to review the published hearing order for code changes that are heard with a code other than that indicated by the code change prefix (see note 4).

In accordance with the revised ICC Code Development Procedures, this hearing is the first of two Final Action Hearings to be conducted in 2010. The Final Action Hearings for the following codes will occur October 28 – November 1, 2010: Administrative; IECC; IPMC; IRC – Energy; and IZC.

Saturday May 15	Sunday May 16	Monday May 17	Tuesday May 18	Wednesday May 19	Thursday May 20	Friday May 21	Saturday May 22	Sunday May 23
Start 8 am	**Start 12 pm**	**Start 8 am**	**Start 8 am**	**Start 8 am**	**Start 8 am**	**Start 8 am**	**Start 8 am**	**Start 8 am**
IFGC	**IPC**	**IBC – Means of Egress**	**IBC – General**	**IBC – Fire Safety**	**IFC**	**IRC – Building**	**IEBC (Start no earlier than 8 am)**	**IBC – Structural**
IMC	**IRC-P**							
IRC-M	**IBC – Means of Egress (Start no earlier than 3 pm)**	**IBC – General (Start no earlier than 3 pm)**	**IBC – Fire Safety (Start no earlier than 3 pm)**	**IWUIC/IFC (Start no earlier than 3 pm)**	**IRC – Building (Start no earlier than 3 pm)**		**IBC – Structural**	
IPC								
End 6 pm	**End 6 pm**	**End 6 pm**	**End 6 pm**	**End 6 pm**	**End 6 pm**	**End 6 pm**	**End 6 pm**	**End 12 pm**

Notes:

1. Daily start and end hearing times are subject to change based on progress.

2. Due to the uncertainties in the hearing process, start times indicated as "Start no earlier than x am/pm" are conservatively estimated and are not intended to be scheduled targets.

3. Lunch breaks to be announced. The hearings are scheduled without a dinner break.

4. Consult the hearing order for code changes to be heard with a code other than the code under which the code change

is designated. For example, accessibility related changes to the IEBC ("EB" code changes) will be heard with the agenda of the IBC - Means of Egress.

TENTATIVE HEARING ORDER FOR EACH INDIVIDUAL CONSIDERATION AGENDA

Note: Code changes to be heard out of numerical order or to be heard with a different code designation are indented. Be sure to review the cross index on page xxxvii for code change which affect codes other than those under their respective code change number prefix.

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FG12-09/10
FG14-09/10, Part I
FG14-09/10, Part II
FG14-09/10, Part III
FG15-09/10
FG16-09/10
FG18-09/10
FG23-09/10
FG25-09/10
FG30-09/10
FG32-09/10, Part I
FG32-09/10, Part II
FG32-09/10, Part III
FG33-09/10

IMC
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M1-09/10, Part II
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M35-09/10, Part I
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M148-09/10, Part I
M148-09/10, Part II
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M150-09/10
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    E151-09/10, Part III
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P52-09/10, Part II
P57-09/10
P64-09/10, Part I
P64-09/10, Part II
P65-09/10, Part I
P65-09/10, Part II
P72-09/10, Part I
P72-09/10, Part II
P73-09/10, Part I
P73-09/10, Part II
P79-09/10
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P84-09/10, Part II
P85-09/10, Part I
P85-09/10, Part II
P86-09/10, Part I
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P93-09/10, Part II
P94-09/10, Part I
P94-09/10, Part II
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P158-09/10, Part II
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IRC-Plumbing
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IBC-Means of Egress
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E47-09/10
    EB10-09/10, Part I
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2009/2010 ICC CODE DEVELOPMENT CYCLE
CROSS INDEX OF PROPOSED CODE CHANGES WITH PUBLIC COMMENTS

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

Listed in this index are proposed code changes that include sections or codes other than those listed on page xiii. For example, International Building Code Section 307.2 is proposed for revision in code changes F186-09/10, F190-09/10, and F196-09/10. The International Building Code Chapter 3 is the responsibility of the IBC General Code Committee as listed in the table of Staff Secretaries. It is therefore identified in this index. Another example is Section 403.1 of the International Fuel Gas Code. The IFGC is maintained by the IFGC code committee, and the proposed revision to Section 403.1 was considered for revision in code change G16-09/10. In some instances, there are other subsections that are revised by an identified code change that are not included in the list. For example, numerous sections in Chapter 10 of the International Fire Code would be revised by the proposed changes to Chapter 10 of the IBC. This was done to keep the list brief enough for easy reference.

This information is provided to assist users in locating all of the proposed code changes that would affect a certain section or chapter. For example, to find all of the proposed code changes that would affect the IMC, review the proposed code changes for the IMC Code Committee (listed with a M prefix) then review this cross reference for the IMC for proposed code changes published in other code change groups. While care has been taken to be accurate, there may be some omissions in this list.

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

PREFIX	PROPOSED CHANGE GROUP (see Table of Contents on page xliiii for location)
E	**International Building Code - Means of Egress**
EC	**International Energy Conservation Code**
EB	**International Existing Building Code**
F	**International Fire Code**
FG	**International Fuel Gas Code**
FS	**International Building Code - Fire Safety**
G	**International Building Code - General**
M	**International Mechanical Code**
P	**International Plumbing Code**
PM	**International Property Maintenance Code**
RB	**International Residential Code - Building**
RE	**International Residential Code - Energy**
RM	**International Residential Code - Mechanical**
RP	**International Residential Code - Plumbing**
S	**International Building Code - Structural**
WUIC	**International Wildland-Urban Interface Code**

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NOTE: There were no public comments received for the ICC Performance Code, the Private Sewage Disposal Code or the International Zoning Code.

INTERNATIONAL FUEL GAS CODE

FG2-09/10
202

Proposed Change as Submitted

Proponent: Guy Tomberlin, Bluemont, VA, representing self

Add new definitions follows:

COMBUSTIBLE ASSEMBLY. Wall, floor, ceiling or other assembly constructed of one or more component materials that are not defined as noncombustible.

COMBUSTIBLE MATERIAL. Any material not defined as noncombustible.

NONCOMBUSTIBLE MATERIALS. Materials that, when tested in accordance with ASTM E 136, have at least three of four specimens tested meeting all of the following criteria:

1. The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54ºF (30ºC) above the furnace temperature at the beginning of the test.
2. There shall not be flaming from the specimen after the first 30 seconds.
3. If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.

Reason: These are the exact terms and definitions found in the IMC. They have been used for many years as the guiding principals for the installation of mechanical equipment. Please recall the first edition of the IMC which included fuel gas provisions, these were the definitions used. Since the IFGC fails to provide the definitions of these terms they are applied inconsistently and non-uniformly. Gypsum is a non combustible product according to the IBC however the application of gypsum in the IMC and IFGC is quite different. The IBC addresses gypsum when used to construct walls ceilings, etc.. In the IFGC, the only reference to gypsum would be when dealing with clearance to combustibles. It is common knowledge that gypsum is typically covered with a paper product which will in fact burn. It is not uncommon to see a brown or charred section of gypsum when it has been installed within the prohibited dimension of 6" for a single wall or 1" for a double wall chimney or vent (or connecter). You wouldn't want this situation any more than a wood stove installed to close to gypsum, there is no difference. Excessive heat next to paper will cause fire.

The testimony on this proposal has done nothing but create confusion in fact some actually want a third definition to be added to the IFGC. That is ridiculous. The current definition in the IMC is exactly what the IFGC needs to say. Yes, gypsum is noncombustible according to the IBC but as previously stated the reference to gypsum is entirely a different application in the IFGC. Paper burns and needs to be installed outside the allowable distances according to Section 308.

Cost Impact: This code change proposal will not increase the cost of construction.

ICCFILENAME: TOMBERLIN-FG5-202

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The 3 criteria in the definition of noncombustible are unenforceable. It is inappropriate to state testing requirements in a definition. The definition of noncombustible could cause code officials to require ASTM E136 testing of all materials commonly known to be noncombustible.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.

Public Comment:

Richard Grace representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII request Approval as Submitted. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.

Commenter's Reason: The confusing testimony on this subject is merely smoke and mirrors for no good reason. Gypsum board when used around fuel gas equipment such as venting systems is a combustible. This fundamental philosophy has been in the codes many years prior the International codes inception. Who hasn't seen charred gypsum board when installed to close to a heat source? It is covered with paper! This is not an over regulation, it only requires that when a clearance to a combustible is required, that gypsum board shall not be installed within those dimensions. This isn't about checking the testing or listing and labeling. This will not create any hardship on any installation, because this is already common practice. This gains consistency within the I codes, specifically the IMC, because that is the other code that identifies with the exact same applications.

Gypsum board is not necessarily a combustible according to the IBC for the reason that it is being used for a totally different purpose. This isn't about constructing walls and ceilings it is about safely installed systems and protection from fire.

Final Action: AS AM AMPC____ D

FG9-09/10
202

Proposed Change as Submitted

Proponents: James Ranfone, representing American Gas Association; Don Surrena, CBO, representing National Association of Home Builders (NAHB)

Revise definition as follows:

ROOM LARGE IN COMPARISON WITH SIZE OF THE APPLIANCE. Rooms having a volume equal to at least 12 times the total volume of a furnace, ~~water heater~~ or air-conditioning appliance and at least 16 times the total volume of a boiler. Total volume of the appliance is determined from exterior dimensions and is to include fan compartments and burner vestibules, when used. When the actual ceiling height of a room is greater than 8 feet (2438 mm), the volume of the room is figured on the basis of a ceiling height of 8 feet (2438 mm).

Reason:
(RANFONE)- The definition phrase "Room Large in Comparison with Size of the Appliance" is not used in relation to the installation of water heaters and therefore the term "water heater" is not technically appropriate for the definition. The phrase is only used in section 308.3(that covers air conditioning appliances) and section 308.4 (that covers central-heating boilers and furnaces).
(SURRENA)- In the 2009 IFGC the words "water heater" were added to this definition. There already exist requirements in the IFGC to cover the issue of volume of space for fuel fired appliances. Specifically, Section 304.5 covers indoor combustion air, relating to the required volume of the room. The change to this definition does not take into consideration compensation for the use of outside air, nor does it defer to manufactures installation instructions. By adding "Water Heater" to the definition, the size of the room will increase to 12 times the volume of the water heater.

This change in the sizing of rooms for water heaters is inconsistent with conventional building practices. Sizing principles and methods for providing adequate combustion air, and clearances for appliances in closets and other rooms already exist within the IFGC. Also by the definition requiring oversized rooms for water heaters, goes directly against the instructions of many manufacturers. Requiring spaces that are current code requirements for providing combustion air and clearances are unsafe or otherwise unacceptable. Manufacturer's instructions and Section 304.5 adequately cover the installation without requiring a random volume ratio.

Cost Impact: The code change proposal will not increase the cost of construction.

RANFONE-FG17-202; SURRENA-FG2-202 DOC:

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: There is no text addressing water heaters in association with this definition.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action. Note that the assembly action, Disapproved, will be the initial motion on the floor for consideration when this item is called.

Public Comment:

Richard Grace representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII requests Disapproval. Note that the assembly action, Disapproved, will be the initial motion on the floor for consideration when this item is called.

Commenter's Reason: The term water heater must remain in the *large in comparison* definition, otherwise the code fails to identify what is a closet. In that case, all appliance listings for installation within closets become a mystery. Why would a water heater not have to comply with the same provisions as any other gas appliance? Please look at this proposal and do the math, these are relatively small areas that are required for the safe and proper operation of a water heater. The manufactures are not putting these dimensions in their installation instructions, they just say to install per local code. If the code does not specify, then adequate clearance is not required.

Final Action: AS AM AMPC____ D

FG10-09/10, Part III

IRC M1303.1

NOTE: PART I & II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART I AND II REPRODUCED ONLY FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART III.

Proposed Change as Submitted

Proponent: Edward A. Spiers, representing Delaware County

PART III- IRC-M

Revise as follows:

M1303.1 Label information. A permanent factory-applied nameplate(s) shall be affixed to *appliances*, <u>heat pump units and condensing units</u> on which shall appear, in legible lettering, the manufacturer's name or trademark, the model number, a serial number <u>the energy efficiency rating</u> and the seal or *mark* of the testing agency. A *label* shall also include the following:

1. Electrical *appliances*. Electrical rating in volts, amperes and motor phase; identification of individual electrical components in volts, amperes or watts and motor phase; and in Btu/h (W) output and required clearances.
2. Absorption units. Hourly rating in Btu/h (W), minimum hourly rating for units having step or automatic modulating controls, type of fuel, type of refrigerant, cooling capacity in Btu/h (W) and required clearances.
3. Fuel-burning units. Hourly rating in Btu/h (W), type of fuel *approved* for use with the *appliance* and required clearances.
4. Electric comfort heating *appliances*. Name and trademark of the manufacturer; the model number or equivalent; the electric rating in volts, amperes and phase; Btu/h (W) output rating; individual marking for each electrical component in amperes or watts, volts and phase; required clearances from combustibles and a seal indicating approval of the *appliance* by an *approved agency*.

5. Maintenance instructions. Required regular maintenance actions and title or publication number for the operation and maintenance manual for that particular model and type of product.

Reason: The change is necessitated by the enforcement of the current conservation codes. We have been instructed to verify the efficiency ratings of the equipment that is used on any particular project; it must match the RES check report or the approved plans. The information in question is currently not being put on the units themselves. The problem being, that if the box that the unit has been delivered in is gone or the efficiency sticker (with the rating on it) has been removed the information is not readily available. With most heat pumps the information is hidden in the model or serial number, but that would mean that all inspectors would have to have special knowledge of every manufacturer's information coding in order to decipher the needed information. The efficiency of a gas furnace can be figured as well if one has the knowledge to do so, but becomes problematic when multistage, variable, and modulating units are employed. This leaves the inspector to have to possess special knowledge once again, and homeowners for that matter as well. It would seem a minor cost to print this information on a unit's label, rather than having code enforcement personnel calling different contractors or suppliers to find out what EER rating a heat pump might have or the rating of a geothermal unit.

It is not a problem when the minimum rating is specified on a RES check. However, when a job is only 1% or 0.6% better than required by the IECC and a 20 SEER heat pump is called for under the heating equipment. How does one find out what has been installed to verify this information. If a 13 SEER unit is installed instead, the job would then fall short of it's required RES compliance. My understanding is that with the 2006 IECC the scenario above could be quite normal. Contractors may be tempted to spec equipment with very high efficiency ratings to be able to pass the RES compliance form and then actually use the less efficient unit(s) on the job. Or, when the process of cost trade-offs begins to take place on the project it is very normal for items that are not absolutely necessary to get chopped, efficiency ratings to get dropped. Ampacity relates to wire sizing and amperes was the intended term as used in M1303.1, Item 4.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: SPIERS-FG2-301.6

Public Hearing Results

PART III- IRC-M
Committee Action: **Approved as Submitted**

Committee Reason: It is difficult or impossible for the code official to verify in the field whether a piece of equipment such as a heat pump unit or a condensing unit meets the energy efficiency rating required by the IECC. Heat pump and condensing units are typically not referred to as appliances, but, need to be included in what is required to bear the prescribed nameplate information.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Frank A. Stanonik, requests Disapproval

Commenter's Reason: The IFGC and IMC disapproved this proposal. The IRC-M approved it. It should be disapproved for the reasons noted by the IFGC.

Final Action: AS AM AMPC____ D

NOTE: PART I & II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

FG10–09/10
301.5; IMC 301.6

PART I – IMC
Revise as follows:

301.6 Label information. A permanent factory-applied nameplate(s) shall be affixed to appliances, heat pump units and condensing units on which shall appear in legible lettering, the manufacturer's name or trademark, the model number, serial number, the energy efficiency rating and the seal or mark of the *approved* agency. A label shall also include the following:

1. Electrical *equipment* and appliances: Electrical rating in volts, amperes and motor phase; identification of individual electrical components in volts, amperes or watts, motor phase; Btu/h (W) output; and required clearances.
2. Absorption units: Hourly rating in Btu/h (W); minimum hourly rating for units having step or automatic modulating controls; type of fuel; type of refrigerant; cooling capacity in Btu/h (W); and required clearances.
3. Fuel-burning units: Hourly rating in Btu/h (W); type of fuel *approved* for use with the *appliance*; and required clearances.
4. Electric comfort heating appliances: Name and trade-mark of the manufacturer; the model number or equivalent; the electric rating in volts, ~~ampacity~~ amperes and phase; Btu/h (W) output rating; individual marking for each electrical component in amperes or watts, volts and phase; required clearances from combustibles; and a seal indicating approval of the *appliance* by an *approved* agency.

PART II – IFGC

Revise as follows:

301.5 Label information. A permanent factory-applied nameplate(s) shall be affixed to appliances, heat pump units and condensing units on which shall appear in legible lettering, the manufacturer's name or trademark, the model number, serial number, the energy efficiency rating and, for listed appliances, the seal or mark of the testing agency. A label shall also include the hourly rating in British thermal units per hour (BTU/h) (W); the type of fuel approved for use with the appliance; and the minimum clearance requirements.

Reason: The change is necessitated by the enforcement of the current conservation codes. We have been instructed to verify the efficiency ratings of the equipment that is used on any particular project; it must match the RES check report or the approved plans. The information in question is currently not being put on the units themselves. The problem being, that if the box that the unit has been delivered in is gone or the efficiency sticker (with the rating on it) has been removed the information is not readily available. With most heat pumps the information is hidden in the model or serial number, but that would mean that all inspectors would have to have special knowledge of every manufacturer's information coding in order to decipher the needed information. The efficiency of a gas furnace can be figured as well if one has the knowledge to do so, but becomes problematic when multistage, variable, and modulating units are employed. This leaves the inspector to have to possess special knowledge once again, and homeowners for that matter as well. It would seem a minor cost to print this information on a unit's label, rather than having code enforcement personnel calling different contractors or suppliers to find out what EER rating a heat pump might have or the rating of a geothermal unit.

It is not a problem when the minimum rating is specified on a RES check. However, when a job is only 1% or 0.6% better than required by the IECC and a 20 SEER heat pump is called for under the heating equipment. How does one find out what has been installed to verify this information. If a 13 SEER unit is installed instead, the job would then fall short of it's required RES compliance. My understanding is that with the 2006 IECC the scenario above could be quite normal. Contractors may be tempted to spec equipment with very high efficiency ratings to be able to pass the RES compliance form and then actually use the less efficient unit(s) on the job. Or, when the process of cost trade-offs begins to take place on the project it is very normal for items that are not absolutely necessary to get chopped, efficiency ratings to get dropped. Ampacity relates to wire sizing and amperes was the intended term as used in M1303.1, Item 4.

Cost Impact: The code change proposal will not increase the cost of construction.

PART I- IMC
Committee Action: **Disapproved**

Committee Reason: Rating plate information is prescribed by the listing process or federal law, not by the code.

Assembly Action: **None**

PART II- IFGC
Committee Action: **Disapproved**

Committee Reason: Disapproval is consistent with the action taken on FG10-09/10 Part I.

Assembly Action: **None**

FG12-09/10
308.1

Proposed Change as Submitted

Proponent: Guy Tomberlin, representing self

Revise as follows:

308.1 Scope. This section shall govern the reduction in required clearances to combustible materials, including gypsum board, and combustible assemblies for chimneys, vents, appliances, devices and equipment. Clearance requirements for air-conditioning equipment and central heating boilers and furnaces shall comply with Sections 308.3 and 308.4.

Reason: This adds clarification that gypsum has a combustible covering and therefore must be considered a combustible product. The clearances prescribed by manufacturers are typically directed to allow for adequate heat dissipation, and prevent potential fire. Paper coated products are a prime candidate for these clearances.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: This section is an IFGS section and IFGS sections are normally subject to the process that maintains the NFGC, ANSI Z223.1, however, the proposed revision affects only the IFGC, therefore, the proposal is subject to the ICC process that maintains the IFGC.

ICCFILENAME: TOMBERLIN-FG2-308.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed revision would not recognize gypsum board made with noncombustible facings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII, requests Approval as Submitted.

Commenter's Reason: This is a companion change to coordinate with FG 2 and prevent any possible confusion that gypsum board shall not be allowed within the spaces that require clearance to combustibles. Gypsum board when used around fuel gas equipment such as venting systems is a combustible. This fundamental philosophy has been in the codes many years prior the International codes inception. Who hasn't seen charred gypsum when installed too close to a heat source? It is covered with paper! This is not an over regulation, it only requires that when a clearance to a combustible is required, that gypsum board shall not be installed within those dimensions. This will not create any hardship on any installation, because this is already common practice. This gains consistency within the I codes, specifically the IMC, because that is the other code that identifies with the exact same applications.

Gypsum board is not necessarily a combustible according to the IBC for the reason that it is being used for a totally different purpose. This isn't about constructing walls and ceilings it is about safely installed systems and protection from fire.

Final Action: AS AM AMPC____ D

FG14-09/10, Part I
202, 401.9 (New), 401.10 (New), 404.1 (New)

Proposed Change as Submitted

Proponent: Guy Tomberlin representing VA Plumbing and Mechanical Inspectors/VA Building and Code Officials and ICC Region 7.

PART I-IFGC

1. Add new definitions as follows:

SECTION 202

THIRD-PARTY CERTIFICATION AGENCY. An approved agency operating a product or material certification system that incorporates initial product testing, assessment and surveillance of a manufacturer's quality control system.

THIRD-PARTY CERTIFIED. Certification obtained by the manufacturer indicating that the function and performance characteristics of a product or material have been determined by testing and ongoing surveillance by an approved third-party certification agency. Assertion of certification is in the form of identification in accordance with the requirements of the third-party certification agency.

THIRD-PARTY TESTED. Procedure by which an approved testing laboratory provides documentation that a product, material or system conforms to specified requirements.

2. Add new text as follows:

401.9 Identification. Each length of pipe and tubing and each pipe fitting, utilized in a fuel gas system shall bear the identification of the manufacturer.

401.10 Third-party testing and certification. All piping, tubing and fittings shall comply with the applicable referenced standards, specifications and performance criteria of this code and shall be identified in accordance with Section 401.9. Piping, tubing and fittings shall either be tested by an approved third-party testing agency or certified by an approved third-party certification agency.

404.1 Installation of materials. All materials used shall be installed in strict accordance with the standards under which the materials are accepted and approved. In the absence of such installation procedures, the manufacturer's installation instructions shall be followed. Where the requirements of referenced standards or manufacturer's installation instructions do not conform to minimum provisions of this code, the provisions of this code shall apply.

Reason:
PART I-Current IFGC contains several pipe, tube and fitting standards but never indicates how the industry must verify compliance with these standards. The proposed text is taken from the IPC and altered slightly to fit fuel gas system applications. This is the current typical industry method to demonstrate compliance with the appropriate standards. The new text provides guidance on how to achieve code compliance as intended.
PART II & III- Current IMC and IRC mechanical sections contain several pipe, tube and fitting standards but never indicates how the industry must verify compliance with these standards. The proposed text is taken from the IPC and altered slightly to fit mechanical system applications. This is the current typical industry method to demonstrate compliance with the appropriate standards. The new text provides guidance on how to achieve code compliance as intended.

Cost Impact: The code proposal will not increase the cost of construction. Tomberlin-M-5-303-RM-1-R1303

ICC FILENAME: TOMBERLIN -FG1-202.M5-303-RM1-R1303

Public Hearing Results

PART I- IFGC
Committee Action: **Disapproved**

Committee Reason: The proposed text does accomplish the proponent's intent as it does not guarantee compliance with any product standard. There is no evidence of problems with fittings that do not comply with the proposed text.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy Tomberlin representing VA Plumbing and Mechanical Inspectors Association, VA Building and Code Officials Association and ICC Region VII, requests Approval as Submitted.

Commenter's Reason: This is current code language taken directly from the IPC and was approved, by committee, to be included in the IRC during the public hearings in Baltimore. Opposing comments came from the gas industry, which appeared to stem from a general misunderstanding of the implementation of regulations when attempting to verify if approved products have been used. One commenter asked if we expect each ½ inch 90 degree elbow to be marked? The answer is quite simple and if they had been familiar with the requirements of the IPC they would have already known the answer is clearly yes. Each manufacturer identifies their product in their own way and each fitting gets its ID mark. This is the method the plumbing pipe and fitting industry has used for years and years. In fact, the manufacturing community assisted with crafting the original language. The plumbing code requires these appropriate measures be taken and unfortunately, the IFGC and IMC only insinuate that it is to be done. Right now there is no minimum guidance as to who can certify or list pipe and fittings for gas pipe service and hydronic systems covered under the IFGC and IMC. This proposal utilizes the industry accepted, and commonly practiced, provisions from the IPC and incorporates them into the other appropriate I codes. It would only seem reasonable that gas pipe and fittings along with hydronic pipe and fittings require the same level of certification that water systems currently require.

Another commenter said "this is already required, all pipes and fittings are already required to be listed." This comment makes the point of the misunderstanding with the current code text that I previously outlined in the first paragraph. Some pipe/fitting systems, such as CSST are in fact required to be listed, but that's not true for other pipes and fittings such as steel or copper. So why is CSST required to be listed and steel pipe not? The answer is simple; it is because the steel pipe industry elects to get their products certified not listed. There is a huge difference between certification and listing that apparently many people just don't understand. Listing is a much more rigorous process. This proposal actually lessens the burden for the folks that believe all pipe and fittings must be listed.

The reality is that the majority of pipe and fitting manufactures already perform this necessary function to protect their best interest. The problem arises when products are manufactured and no oversight is provided. Some overseas manufacturers actually consider self- certification as an acceptable form of certification. This is just not the case. This is where the code is lacking the appropriate provisions and without the additional text we have proposed, the end user could easily end up getting a less than satisfactory product and possibly even unsafe. The IMC committee disapproved this with no supporting reason, the ROP simply says based on the IFGC Committee's disapproval. This is an unfortunate situation because the same situation exists for hydronic systems and more and more manufacturers are making new pipe and fitting systems for hydronics.

Final Action: AS AM AMPC____ D

FG14-09/10, Part II
IMC 202, 301.3 (New), 301.4 (New), 301.5 (New)

Proposed Change as Submitted

Proponent: Guy Tomberlin representing VA Plumbing and Mechanical Inspectors/VA Building and Code Officials and ICC Region 7.

PART II - IMC

1. Add new definitions as follows:

THIRD-PARTY CERTIFICATION AGENCY. An approved agency operating a product or material certification system that incorporates initial product testing, assessment and surveillance of a manufacturer's quality control system.

THIRD-PARTY CERTIFIED. Certification obtained by the manufacturer indicating that the function and performance characteristics of a product or material have been determined by testing and ongoing surveillance by an approved third-party certification agency. Assertion of certification is in the form of identification in accordance with the requirements of the third-party certification agency.

THIRD-PARTY TESTED. Procedure by which an approved testing laboratory provides documentation that a product, material or system conforms to specified requirements.

2. Add new text as follows:

301.3 Identification. Each length of pipe and tubing and each pipe fitting, utilized in a mechanical system shall bear the identification of the manufacturer.

301.4 Plastic pipe, fittings and components. Plastic pipe, fittings and components shall be third-party certified as conforming to NSF 14.

301.5 Third-party testing and certification. Piping, tubing and fittings shall comply with the applicable referenced standards, specifications and performance criteria of this code and shall be identified in accordance with Section 301.3. Piping, tubing and fittings shall either be tested by an approved third-party testing agency or certified by an approved third-party certification agency.

Reason:
PART I-Current IFGC contains several pipe, tube and fitting standards but never indicates how the industry must verify compliance with these standards. The proposed text is taken from the IPC and altered slightly to fit fuel gas system applications. This is the current typical industry method to demonstrate compliance with the appropriate standards. The new text provides guidance on how to achieve code compliance as intended.
PART II & III- Current IMC and IRC mechanical sections contain several pipe, tube and fitting standards but never indicates how the industry must verify compliance with these standards. The proposed text is taken from the IPC and altered slightly to fit mechanical system applications. This is the current typical industry method to demonstrate compliance with the appropriate standards. The new text provides guidance on how to achieve code compliance as intended.

Cost Impact: The code proposal will not increase the cost of construction. Tomberlin-M-5-303-RM-1-R1303

ICC FILENAME: TOMBERLIN -FG1-202.M5-303-RM1-R1303

Public Hearing Results

PART I- IFGC
Committee Action: **Disapproved**

Committee Reason: The proposed text does accomplish the proponent's intent as it does not guarantee compliance with any product standard. There is no evidence of problems with fittings that do not comply with the proposed text.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy Tomberlin representing VA Plumbing and Mechanical Inspectors Association , VA Building and Code Officials Association And ICC Region VII, requests Approval as Submitted.

Commenter's Reason: See FG14-09/10, Part I

Final Action: AS AM AMPC____ D

FG14-09/10, Part III

IRC R202, M1301.2 (New), M1301.3 (New), M1301.4 (New), M1301.5 (New)

Proposed Change as Submitted

Proponent: Guy Tomberlin representing VA Plumbing and Mechanical Inspectors/VA Building and Code Officials and ICC Region 7.

PART III – IRC

1. Add new definitions as follows:

THIRD-PARTY CERTIFICATION AGENCY. An approved agency operating a product or material certification system that incorporates initial product testing, assessment and surveillance of a manufacturer's quality control system.

THIRD-PARTY CERTIFIED. Certification obtained by the manufacturer indicating that the function and performance characteristics of a product or material have been determined by testing and ongoing surveillance by an approved third-party certification agency. Assertion of certification is in the form of identification in accordance with the requirements of the third-party certification agency.

THIRD-PARTY TESTED. Procedure by which an approved testing laboratory provides documentation that a product, material or system conforms to specified requirements.

2. Add new text as follows:

M1301.2 Identification. Each length of pipe and tubing and each pipe fitting, utilized in a mechanical system shall bear the identification of the manufacturer.

M1301.3 Installation of materials. All materials used shall be installed in strict accordance with the standards under which the materials are accepted and approved. In the absence of such installation procedures, the manufacturer's installation instructions shall be followed. Where the requirements of referenced standards or manufacturer's installation instructions do not conform to minimum provisions of this code, the provisions of this code shall apply.

M1301.4 Plastic pipe, fittings and components. Plastic pipe, fittings and components shall be third-party certified as conforming to NSF 14.

M1301.5 Third-party testing and certification. Piping, tubing and fittings shall comply with the applicable referenced standards, specifications and performance criteria of this code and shall be identified in accordance with Section M1301.2. Piping, tubing and fittings shall either be tested by an approved third-party testing agency or certified by an approved third-party certification agency.

Reason:
PART I-Current IFGC contains several pipe, tube and fitting standards but never indicates how the industry must verify compliance with these standards. The proposed text is taken from the IPC and altered slightly to fit fuel gas system applications. This is the current typical industry

method to demonstrate compliance with the appropriate standards. The new text provides guidance on how to achieve code compliance as intended.
PART II & III- Current IMC and IRC mechanical sections contain several pipe, tube and fitting standards but never indicates how the industry must verify compliance with these standards. The proposed text is taken from the IPC and altered slightly to fit mechanical system applications. This is the current typical industry method to demonstrate compliance with the appropriate standards. The new text provides guidance on how to achieve code compliance as intended.

Cost Impact: The code proposal will not increase the cost of construction. Tomberlin-M-5-303-RM-1-R1303

ICC FILENAME: TOMBERLIN -FG1-202.M5-303-RM1-R1303

Public Hearing Results

PART III-IRC-M
Committee Action: **Approved as Submitted**

Committee Reason: The proposed text provides the means by which compliance with the code referenced product standards is demonstrated and verified.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Frank A. Stanonik, requests Disapproval.

Commenter's Reason: The IFGC and IMC disapproved this proposal. The IRC-M approved it. It should be disapproved for the reasons noted by the IFGC.

Final Action: AS AM AMPC____ D

FG15-09/10
404.2 (New)

Proposed Change as Submitted

Proponent: James Ranfone representing American Gas Association

Add new text as follows:

<u>**404.2 CSST.** CSST piping systems shall be installed in accordance with the terms of their approval, the conditions of listing, the manufacturer's installation instructions and this code.</u>

Reason: The code requires that equipment and appliances be listed. Section 305.1 requires that equipment and appliances be installed by the terms of their approval, in accordance with the conditions of listing, the manufacturer's installation and this code. The terms equipment and appliance do not necessarily cover CSST which is the only gas piping system that is required to be listed to an ANSI standard. Therefore, the code is missing a specific statement regarding the installation of CSST as a listed system.

Cost Impact: The code change proposal will not increase the cost of construction.

RANFONE-FG12-404.2_NEW.DOC:

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Current code text requires appliances and equipment to be installed in accordance with the listing, manufacturer's instructions and the code, but, a listed piping system such as CSST is not accurately described as equipment or an appliance. The proposed text will provide coverage for CSST systems to make sure that they are installed as is required for other listed products.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tim Manz representing Association of Minnesota Building Officials (AMBO), requests Disapproval.

Commenter's Reason: This proposed code change is not necessary because CSST falls under the definition of equipment, which is defined in the IFGC as "apparatus and devices other than appliances." Merriam Webster dictionary defines apparatus as "a set of materials or equipment designed for a particular use" and this adequately describes products such as CSST.

Final Action: AS AM AMPC____ D

FG16-09/10
404.4

Proposed Change as Submitted

Proponents: James Ranfone, representing American Gas Association; Don Surrena, CBO, representing National Association of Home Builders (NAHB)

Delete and substitute as follows:

~~**404.4 Underground penetrations prohibited.** Gas piping shall not penetrate building foundation walls at any point below grade. Gas piping shall enter and exit a building at a point above grade and the annular space between the pipe and the wall shall be sealed.~~

404.4 Piping through foundation wall. Underground piping, where installed below grade through the outer foundation or basement wall of a building, shall be encased in a protective pipe sleeve or shall be protected by an approved device or method. The annular space between the gas piping and the sleeve and between the sleeve and the wall shall be sealed.

Reason:
(RANFONE)- No evidence was provided during the 2007-2008 revision cycle that justified adding the prohibition of customer-owned gas piping from penetrating a foundation wall below grade. Testimony centered on the possibility that gas from an underground leak would be significant enough to cause gas migration along the buried gas piping and entry into the building. No statistics were presented and AGA does not know of any incidents of gas migrating along a customer-owned underground piping that has resulted in an explosion. Section 404.4 covers only customer-owned piping, most of which would be low pressure (the remaining would be a maximum of 2 psi) that does not result , in the event of a underground leak, in significant gas leakage and migration. The low number of incidences AGA is aware of were traced to utility-owned gas service lines that operate at much higher pressures (often up to 40 psi). The proposed language combines the 2006 IFGC language with the approved changes FG20-07/08 and FG21-07/08.
(SURRENA)- The purpose of this proposal is to allow gas piping to enter a foundation below grade as it has done in the past. Without this change, gas piping will have to come above ground before entering a building.

The conventional installation practice of allowing piping to go through foundation walls below grade should not be prohibited. This is an installation method that has been used for decades. No data was ever presented that would show a safety problem or inadequacy when a proper installation and sealing of the opening was installed in accordance with the IFGC.

Requiring above grade entry points into the foundation will require extra piping and joints, both inside and outside, exposing the piping system to physical damage and increased risk of leakage on the outside of buildings as well as within the building. This increase in outside exposure will be particularly significant in a city or at congested commercial locations where piping must come above grade at times through sidewalks at the front or rear of the building or come through the ground in public ways before turning to enter the foundation or building. This will also present practical issues of locating the exterior and interior piping system to have entry points that are compatible with the building design, i.e., doorways, loading docks, accessible entry systems (ramps) etc. There will also be additional costs in these circumstances when the underground piping must be relocated to miss one of the items just mentioned.

Accepting this change will coordinate the IFGC provisions with all other industry Fuel Gas Codes.

Cost Impact: The code change proposal will not increase the cost of construction.

RANFONE-FG13-404.4-SURRENA-FG3-404.4DOC:

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Customer-owned piping would operate at 2 psi and less and such pressure would not result in significant migration of gas leakage. No documentation was provided to justify the current prohibition on underground penetrations. The proposed new text restores previous code text that prescribed the method of protecting and sealing underground penetrations of foundation walls. The current text will require extra piping, fittings and joints that will be exposed to physical damage with increased risk of leakage. The proposed text is consistent with other fuel gas codes.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Disapproval.

Commenter's Reason: There have been many cases throughout the country where damage has occurred as a result of a gas leakage that originated underground and made its way into the building. One of the reasons this occurs is because natural gas will follow the pipe in its ditch due to less resistance. Piping entering foundations below grade provides a path for gas to follow. The safety of residents should not be left up to how well a bead of caulking has been applied. Plastic piping is also subject to the same scenario, especially when the 8-inch burial depth is taken into consideration. Plastic will not hold up to common tools such as shovels, spades, picks and roto-tillers. Also think about expansive soil and the potential effect it can have on the piping. The heaving soil will have a devastating effect on a caulked sleeve. It's not uncommon to have a gas line snapped off completely at the foundation wall due to the overwhelming force of expansive soil. Only by requiring the pipe to enter the building above grade will we eliminate the likelihood that gas would enter the building. The protection of life, limb, property and the potential threat of explosion should not be determined by the integrity of a sealed joint alone. Depending on how deep the ditch is, the weight of the back-fill alone could be significant enough to have an impact on a caulked joint. One should also consider that the joint could deteriorate over time**.** The perfect recipe for an explosion is a 4-15% gas to air ratio.

Final Action: AS AM AMPC____ D

FG18-09/10
407.2

Proposed Change as Submitted

Proponent: Don Surrena, CBO, representing National Association of Home Builders (NAHB)

Revise as follows:

407.2. Design and Installation. *Piping* shall be supported with ~~metal~~ pipe hooks, ~~metal~~ pipe straps, ~~metal~~ bands, ~~metal~~ brackets, or ~~metal~~ hangers, or building structural components, suitable for the size of *piping*, of adequate strength and quality, located at intervals so as to prevent or damp out excessive vibration. *Piping* shall be anchored to prevent undue strains on connected appliances and shall not be supported by other *piping*. Pipe hangers and supports shall conform to the requirements of MSS SP-58 and shall be spaced in accordance with Section 415. Supports, hangers, and anchors shall be installed so as not to interfere with the free expansion and contraction of the *piping* between anchors. All parts of the supporting equipment shall be designed and installed so they will not be disengaged by movement of the supported *piping*.

Reason: The purpose of this proposal is to retain the provisions of the 2006 International Code (IFGC) allowing for more than just metal to be used as pipe strapping.

This change from the 2006 International Fuel Gas Code (IFGC) is clearly proprietary in nature. To disallow any other material that is proven to meet the requirements for support is contrary to the spirit of the ICC family of codes (I-Codes). Favoring one type of material without reason is unacceptable. The change to the 2009 IFGC is too restrictive and eliminates other support materials that have been used successfully for years. The 2009 change will have a significant impact on several manufacturers that have established alternate materials other than metal supports. If the structural properties of a material is tested and proven to meet the structural specifications for supporting the piping it should be accepted for use. These other materials should be eliminated and the code allowed to become exclusionary. The I-Codes have railed from the exclusivity of other codes that limit the type of materials. These other materials have proven themselves acceptable over the years and should not be eliminated to prosper one type of material.

We encourage the adoption of this proposal to allow any and all materials that meet the requirements of the code to be used, not just a proprietary product or single material.

Cost Impact: The code change proposal will not increase the cost of construction.

SURRENA_FG1-407.2.DOC:

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The current text favors one material over others without reason. Other materials have been used successfully for many years. Other materials, besides metal, that have been tested and proven to have the structural strength necessary to support piping should be allowed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Robert Adkins representing VPMIA/VBCOA, requests Disapproval.

Commenter's Reason: In a fire scenario, metallic hangers will maintain the integrity of the gas piping installation, supporting it much longer than plastic or nylon hangers would. If the hangers fail to hold due to melting, softening or burning and the piping support fails, the piping system could break and contribute a gas fuel load to the fire, which in turn increases the potential for a much larger fire or explosion.

Public Comment 2:

Guy McMann representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Disapproval.

Commenter's Reason: Removing the word "metal" will result in inferior support installations permitting such materials as nylon straps such as one might encounter on a flex duct installation. There are many ways to hang piping and spelling out that hangers must be metal of some type ensures a safer installation. This proposed code change will also result in the IFGC being less stringent than ANSI Z 223.1/NFPA 54 (NFGC) as that standard still requires metal hangers. This is a step in the wrong direction for the IFGC and may result in support failures resulting in serious damage.

Public Comment 3:

Tim Manz, requests Disapproval.

Commenter's Reason: MSS SP-58 requires metallic pipe hangars and supports, so this code change proposal contradicts itself. It is critical to have metallic pipe hangars and supports to maintain the structural integrity of gas piping systems.

Final Action: AS AM AMPC____ D

FG23-09/10
409.5.3

Proposed Change as Submitted

Proponent: Brent Ursenbach, Salt Lake County, representing Utah Chapter of ICC

Revise text as follows:

409.5.3 Located at manifold. Where the *appliance* shutoff valve is installed at a manifold, such shutoff valve shall be located within 50 feet (15 240 mm) of the *appliance* served, <u>shall be located on the same building level,</u> and shall be readily accessible and permanently identified. The *piping* from the manifold to within 6 feet (1829 mm) of the *appliance* shall be designed, sized and installed in accordance with Sections 401 through 408.

Reason: It is common to have a gas manifold located in a basement level furnace room, with another furnace for an upper level of a 2 story home located in the attic. The commissioning/start-up, altitude or gas heat value adjustments that may be required on gas furnaces typically require the gas control valve and manifold to be removed from the furnace for orifice inspection and orifice changing, which requires the gas to be shut off outside the furnace. Performing an inlet gas pressure test at a furnace requires removal of a plug at the gas inlet of the gas control valve, which also requires the gas to be shut off outside the furnace to attach a test gauge adapter. It is unreasonable and may pose a safety hazard to expect a technician to make multiple trips from the upper attic mechanical room down a ladder, then down two flights of stairs to the basement furnace room where the manifold is located shut off the gas. The technician then returns to the upper furnace. Typically the gas needs to be turned on and off two, three or four times or more to complete these procedures. It is reasonable to expect a shut off valve to be located on the same level as the appliance.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: URSENBACH-FG1-409.5.3.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The current distance limit of 50 feet assures that convenient access is provided without requiring the valve to be located on the same floor level as the appliance served.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Brent Ursenbach representing Utah Chapter of ICC, requests Approval as Submitted.

Commenter's Reason: The reason given by the Committee for disapproval is that any appliance shutoff valve that is located within 50' of the appliance served is *convenient.*

The opening statement of the Preface of the IFGC reads: "Internationally, code officials recognize the need for a modern, up-to-date fuel gas code addressing the design and installation of fuel gas systems and gas-fired appliances through requirements emphasizing performance. The *International Fuel Gas Code*®, in this 2009 edition, is designed to meet these needs through model code regulations that safeguard the public health and safety in all communities, large and small."

The change made in the 2009 IFGC 409.5.3, allowing an appliance gas shutoff to be 50 feet from an appliance simply is not safe and does not safeguard public health and safety. Virtually every experienced gas technician has encountered multiple situations where upon complete of a repair of a gas appliance, he or she has discovered a gas leak upon turning the gas back on to the appliance. The leaks may be small, while other times it may be large. The leak may be a faulty pipe fitting, a leaking hose on test equipment, a missing plug in a control valve or a loose union, connector flare fitting or CSST fitting. A technician completes a repair, goes down several flights of stairs to the manifold and turns the gas back on. In the 30 to 40 seconds it takes to return to the upper level appliance location, considerable gas has leaked into the location. Upon discovery of the leak, the technician must return to the manifold to shut the gas off. If there is an ignition source in the area, such as another gas appliance, with gas leaking for 80 seconds or more, the possibility of a catastrophic fire or explosion is real.

The Rocky Mountain Gas Association of Utah Board of Directors unanimously agrees that this change to the 2009 IFGC is dangerous, and strongly supports this Code Change.

Consider a gas furnace is located in an attic of a two story home, which requires a ladder to access the attic, and the gas manifold with the shut-off valves located in the basement of the home. A service technician will often need to turn the gas off to the furnace, at a valve prior to the control valve inside the furnace. It is unreasonable to consider it ***convenient*** for the technician to go back to the attic access, down a ladder, down stairs to the main level, then down stairs again to the basement level, to the manifold, to turn the gas off. The shut-off valve is located within 50', however there is nothing convenient when needing to turn the gas off and then back on.

To place a new furnace in operation the gas may need to be shut off and turned on five or more times. Consider this sequence followed by a gas furnace service technician who has been dispatched to perform a start-up/adjustment on a new furnace located in the attic:

- One of the first steps is to check the input gas pressure. The 1/8th inch pipe thread test port for testing is located on the inlet side of the control valve in the furnace. The technician makes a trip down to the manifold, turns of the gas, and then returns to the attic.
- The plug is removed from the test port and the threaded adapter, hose and test gauge is connected. The tech then goes back down to the manifold in the basement to turn the gas on. He/she then goes back to the attic.
- The gas pressure is checked in the attic to insure it is within the required range. Adjustments as required are made. The tech then goes back to the basement to turn the gas off, and then returns back to the attic. The pressure testing gauge is removed and the plug re-installed in the control valve.
- The next step is to check the manifold pressure, on the outlet of the control valve. Another trip to the basement to turn the gas back on. The plug on the outlet/manifold side of the control valve can be isolated from the gas supply by operating the valve on the control valve.
- The manifold pressure is then checked with the furnace operating. The pressure is adjusted at the control valve as necessary. If the geographical location is several thousand feet above sea level, and/or if the heat content value for the gas supplied to the home is less than or more than 1000 BTU/cubic foot (for natural gas), the gas burner orifices typically must be changed to provide a clean complete combustion process.
- The tech goes back to the basement, turns off the gas, then back to the attic.
- The gas control valve manifold assembly is removed from the furnace, the orifices are changed, the manifold re-installed.

- The tech goes back to the basement and turns the gas back on, then back to the attic to test for leaks. He/she then checks the manifold pressure, clocks the meter, assuring the furnace is fired at the correct rate.

The count is 5 round trips from the attic, down through the upper and main levels to the basement. This is a typical procedure. The following also must be considered:

- If there is a leak in the pressure testing equipment or the re-assembled gas fittings during the start up procedure, considerable gas may escape while the tech travels from the basement, to the attic, realizes there is a leak, returns to the basement and turns the gas back off.
- Problems discovered while performing this procedure may add even more trips to the process.
- Whenever a long fuel gas line is opened, air enters the open line. The tech must then bleed the air out before the equipment will fire.
- No one would ever consider placing an electrical disconnect switch where it was not readily accessible, in a basement with the furnace in the attic. Why are we allowing this with gas appliances?

Final Action: AS AM AMPC____ D

FG25-09/10
202 (New), 410.4 (New)

Proposed Change as Submitted

Proponent: Sidney Cavanaugh, Cavanaugh Consulting, representing Brass Craft.

1. Add new text as follows:

410.4 Excess Flow Valve. Where automatic excess flow valves are installed, they shall be listed as complying with ANSI Z21.93/CSA 6.30 and shall be sized and installed in accordance with the manufacturer's installation instructions.

2. Add new definition as follows:

SECTION 202

EXCESS FLOW VALVE. A valve designed to activate when the fuel gas passing through it exceeds a prescribed flow rate.

3. Add new standard to Chapter 8 as follows:

ANSI/CSA

ANSI Z21.93/CSA 6.30-XX Excess Flow Valves for Natural and LP Gas Up to Pressures of 5 Psi.

Reason: These devices increase the protection of health and safety of consumers and meet appropriate standards CSA 3-92 and ANSI Z21.93-CSA 6.30. The code change provides guidance to installations that are already occurring in many local jurisdictions for EFVs which can be used on low pressure fuel lines to prevent the open flow of gas in the event of a pipe disconnect or rupture. It is a companion to other code changes. Similar wording has been adopted in the UPC, UMC and the NFGC/NFPA 42 ANSI Z223.1.

Cost Impact: Minimal.

Analysis: A review of the standard(s) proposed for inclusion in the code, ANSI Z21.93/CSA 6.30-xx, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: CAVANAUGH-FG2-202_410.4

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: The standard was not submitted for review.

Committee Action: **Disapproved**

Committee Reason: The proposed standard is not yet published and available.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sidney Cavanaugh representing Brass Craft, requests Approval as Submitted.

Commenter's Reason: The proposal was denied because the standard was not completed but it is hopeful that it will be by the public hearings in May.

Final Action: AS AM AMPC____ D

FG30-09/10
202, 603.1, Chapter 8

Proposed Change as Submitted

Proponent: James Ranfone representing American Gas Association

1. Revise definition as follows:

SECTION 202

~~**LOG LIGHTER**~~ **FIREPLACE ACCESSORY DEVICE.** A manually operated ~~solid fuel ignition appliance~~ fireplace accessory device ~~for installation~~ installed in a vented solid fuel-burning fireplace and used to ignite the solid fuel.

2. Revise text as follows:

603.1 General. Log lighter~~s~~ fireplace accessory devices shall be approved ~~tested in accordance with CSA 8~~ and shall be installed in accordance with the manufacturer's installation instructions.

3. Delete standard in Chapter 8 as follows:

CSA

~~CSA 8-93~~ ~~Requirements for Gas-fired Log Lighters for Wood Burning Fireplaces – with Revisions through January 1999~~

Reason: The following reasons support the proposed revised coverage for log lighters:
CSA Requirement No. 8 covering log lighters was withdrawn on January 1, 2009.
The definition is being revised since a log lighter is more typically viewed as a fireplace accessory then an appliance.
The revisions to section 608.1 allows for the installation of an unlisted log lighter fireplace accessory when approved by the code official. While section 105.2 can be used to approve these accessories, specific coverage in 608.1 is being proposed since unlisted log lighters are the only types available. The accessory's inherent simplicity is the reason for the lack of listing and the withdrawal of the CSA requirement. A typical log lighter is an iron pipe with drilled holes and shut off valve. They can be constructed on site from readily available materials or are available from small fabricators as complete units or kits. There is a lack of a mass market demand and thus the market is supplied by small fabricators.

Cost Impact: The code change proposal will not increase the cost of construction.

RANFONE-FG9-603.1_202.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: CSA 8 was withdrawn without replacement. Only the control valves were listed in the past. The proposed text provides code official guidance by accurately describing these devices.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Richard Grace representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

603.1 General. Log lighters shall be <u>listed and labeled</u> ~~tested in accordance with CSA 8~~ and installed in accordance with the manufacturer's installation instructions.

CSA
~~CSA 8-93 Requirements for Gas-fired Log Lighters for Wood Burning Fireplaces – with Revisions through January 1999~~

Commenter's Reason: These devices are appropriately defined as appliances in accordance with the current definition. The commenter mentions the simplicity of the device…yes, they are typically nothing more than a steel pipe with holes drilled in them that allow gas to escape uncontrollably in a fireplace, and then a small igniter creates ignition to get a fire started. Contrary to the original submitter's published comments, this is definitely not a simple device in fact quite the opposite it is a dangerous device. There are other methods that have worked well for years and years such as paper and matches. If the Standard has been withdrawn , the appliances cannot be listed and labeled, therefore, it cannot be installed until a standard or new testing criteria are developed. Section 301.states that all appliances shall be listed and labeled, the revised language originally proposed makes that very difficult to achieve.

Public Comment 2:

Robert Adkins representing VPMIA/VBCOA, requests Disapproval.

Commenter's Reason: A "log lighter" is by definition an appliance and should be treated as such. "APPLIANCE. Any apparatus or device that utilizes gas as a fuel or raw material to produce light, heat, power, refrigeration or *air conditioning*. " Without proper testing and approval there is no way to determine the potential risks and dangers of an installation.

Final Action: AS AM AMPC____ D

FG32-09/10, Part I
618.5

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanicals (CAPMO)

PART I- IFGC

Revise as follows:

618.5 Prohibited sources. ~~Outside~~ <u>Outdoor</u> or return air for forced-air heating and cooling systems shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) from an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm)above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration machinery room as defined in the *International Mechanical Code*.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Section 618.2, adjoining

rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A room or space containing an *appliance* where such a room or space serves as the sole source of return air.

   Exception: This shall not apply where:

   1. The *appliance* is a direct-vent *appliance* or an *appliance* not requiring a vent in accordance with Section 501.8.
   2. The room or space complies with the following requirements:
      2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6L/W) of combined input rating of all fuel-burning appliances therein.
      2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
      2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of <u>a draft hood in the same room or space or the combustion chamber of</u> any <u>atmospheric burner</u> *appliance* ~~firebox or draft hood~~ in the same room or space.
   3. Rooms or spaces containing solid fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

6. A closet, bathroom, toilet room, kitchen, garage, ~~mechanical room~~, boiler room, furnace room or <u>unconditioned</u> attic.

   Exception<u>s</u>:

   1. Where return air intakes are located not less than 10 feet (3048 mm) from cooking appliances and serve only the kitchen area, taking return air from a kitchen area shall not be prohibited.
   <u>2. Dedicated forced air systems serving only a garage shall not be prohibited from obtaining return air from the garage.</u>

7. A crawl space by means of direct connection to the return side of a forced-air system. Transfer openings in the crawl space enclosure shall not be prohibited.

Reason: The definition of "mechanical room" states that there are no fuel fired appliances located in the space, therefore pulling air thru one should not be an issue. This section precludes pulling return air from a garage but doesn't recognize a dedicated garage system where doing so is perfectly acceptable. Adding the word "atmospheric" differentiates between open and closed combustion chambers.

Cost Impact: The code change proposal will not increase the cost of construction.

MCMANN-FG2-618.5.DOC:

<u>Public Hearing Results</u>

PART I- IFGC
Committee Action: **Approved as Modified**
Modify the proposal as follows:

618.5 Prohibited sources. Outdoor or return air for a forced-air heating system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) from an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm)above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration machinery room as defined in the *International Mechanical Code*.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Section 618.2, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

   Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A room or space containing an *appliance* where such a room or space serves as the sole source of eturn air.

Exception: This shall not apply where:.

1. The *appliance* is a direct-vent *appliance* or an *appliance* not requiring a vent in accordance with Section 501.8.
2. The room or space complies with the following requirements:
   2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6L/W) of combined input rating of all fuel-burning appliances therein.
   2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
   2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of a draft hood in the same room or space or the combustion chamber of any atmospheric burner *appliance* in the same room or space.
3. Rooms or spaces containing solid fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

6. A closet, bathroom, toilet room, kitchen, garage, <u>mechanical room</u>, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Where return air intakes are located not less than 10 feet (3048 mm) from cooking appliances and serve only the kitchen area, taking return air from a kitchen area shall not be prohibited.
   <u>2.</u> ~~Dedicated~~ Forced air <u>heating</u> systems serving only a garage. ~~shall not be prohibited from obtaining return air from the garage.~~

7. A crawl space by means of direct connection to the return side of a forced-air system. Transfer openings in the crawl space enclosure shall not be prohibited.

Committee Reason: Current text unintentionally prohibits the taking of return air from a garage for a system that serves only a garage. Substituting "atmospheric burner" for "appliance firebox" differentiates between open and sealed combustion chamber appliances. The modification maintains the prohibition on taking return from a mechanical room and simplifies the proposed second exception.

Assembly Action: None

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows

618.5 Prohibited sources. Outdoor or return air for forced-air heating <u>and cooling</u> system<u>s</u> shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) from an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm)above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration machinery room as defined in the *International Mechanical Code*.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Section 618.2, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

   Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.
5. A room or space containing an *appliance* where such a room or space serves as the sole source of eturn air.

   Exception: This shall not apply where:
   1. The *appliance* is a direct-vent *appliance* or an *appliance* not requiring a vent in accordance with Section 501.8.
   2. The room or space complies with the following requirements:
      2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6L/W) of combined input rating of all fuel-burning appliances therein.
      2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
      2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of a draft hood in the same room or space or the combustion chamber of any atmospheric burner *appliance* in the same room or space.
   3. Rooms or spaces containing solid fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

6. A closet, bathroom, toilet room, kitchen, garage, ~~mechanical room~~, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Where return air intakes are located not less than 10 feet (3048 mm) from cooking appliances and serve only the kitchen area, taking return air from a kitchen area shall not be prohibited.
2. Dedicated Forced air ~~heating~~ systems serving only a garage. shall not be prohibited from obtaining return air from the garage.

7. A crawl space by means of direct connection to the return side of a forced-air system. Transfer openings in the crawl space enclosure shall not be prohibited.

Commenter's Reason: Although this was approved as modified it would be best that mechanical rooms are excluded as the code clearly permits them to be used as a plenum. Also, the committee offered a modification which mentions heating systems in Section 618.6 Item # 6, Exception # 2. This inadvertently leaves out cooling systems which was included in the original text. This modification essentially returns the proposal to what it was as originally submitted, and revises the main section to recognize that both heating and cooling systems should be addressed as they are in the IRC.

Final Action: AS AM AMPC____ D

FG32-09/10, Part II
IMC 918.6

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanicals (CAPMO)

PART II- IMC

Revise as follows:

918.6 Prohibited sources. Outdoor or return air for forced-air heating and cooling systems shall not be taken from the following locations:

1. Less than 10 feet (3048 mm) from an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outdoor air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm)above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration *machinery room* as defined in this code.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Sections 918.2 and 918.3, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

   Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A closet, bathroom, toilet room, kitchen, garage, ~~mechanical room,~~ boiler room, furnace room or unconditioned attic.

   Exceptions:

   5.1. Where return air intakes are located not less than 10 feet (3048 mm) from cooking appliances, and serve the kitchen area only, taking return air from a kitchen shall not be prohibited.
   5.2. Dedicated forced air systems serving only a garage shall not be prohibited from obtaining return air from the garage.

6. An unconditioned crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.
7. A room or space containing a fuel-burning *appliance* where such room or space serves as the sole source of return air.

Exceptions:

7.1. This shall not apply where the fuel-burning *appliance* is a direct-vent *appliance*.
7.2. This shall not apply where the room or space complies with the following requirements:
   7.2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
   7.2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
   7.2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of a draft hood in the same room or space or the combustion chamber of any atmospheric burner *appliance* ~~firebox or draft hood~~ in the same room or space.
7.3. This shall not apply to rooms or spaces containing solid-fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of the appliances.

Reason: The definition of "mechanical room" states that there are no fuel fired appliances located in the space, therefore pulling air thru one should not be an issue. This section precludes pulling return air from a garage but doesn't recognize a dedicated garage system where doing so is perfectly acceptable. Adding the word "atmospheric" differentiates between open and closed combustion chambers.

Cost Impact: The code change proposal will not increase the cost of construction.

MCMANN-FG2-618.5.DOC:

Public Hearing Results

PART II- IMC
Committee Action: **Approved as Modified**

Modify the proposal as follows:

918.6 Prohibited sources. Outdoor or return air for a forced-air heating system shall not be taken from the following locations:

1. Less than 10 feet (3048 mm) from an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outdoor air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm)above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration *machinery room* as defined in this code.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Sections 918.2 and 918.3, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

   Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

   Exceptions:

   5.1. Where return air intakes are located not less than 10 feet (3048 mm) from cooking appliances, and serve the kitchen area only, taking return air from a kitchen shall not be prohibited.
   5.2. ~~Dedicated~~ Forced air heating systems serving only a garage. ~~shall not be prohibited from obtaining return air from the garage~~

6. An unconditioned crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.
7. A room or space containing a fuel-burning *appliance* where such room or space serves as the sole source of return air.

   Exceptions:

   7.1. This shall not apply where the fuel-burning *appliance* is a direct-vent *appliance*.
   7.2. This shall not apply where the room or space complies with the following requirements:
      7.2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
      7.2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
      7.2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of a draft hood in the same room or space or the combustion chamber of any atmospheric burner *appliance* in the same room or space.
   7.3. This shall not apply to rooms or spaces containing solid-fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of the appliances.

Committee Reason: The reason is the same as given for FG32-09/10 Part I.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

918.6 Prohibited sources. Outdoor or return air for forced-air heating <u>and cooling</u> systems shall not be taken from the following locations:

1. Less than 10 feet (3048 mm) from an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outdoor air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm)above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration *machinery room* as defined in this code.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Sections 918.2 and 918.3, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

   Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A closet, bathroom, toilet room, kitchen, garage, ~~mechanical room~~, boiler room, furnace room or unconditioned attic.

   Exceptions:

   5.1. Where return air intakes are located not less than 10 feet (3048 mm) from cooking appliances, and serve the kitchen area only, taking return air from a kitchen shall not be prohibited.
   5.2. <u>Dedicated F</u>orced air ~~heating~~ systems serving only a garage. <u>shall not be prohibited from obtaining return air from the garage</u>

6. An unconditioned crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.
7. A room or space containing a fuel-burning *appliance* where such room or space serves as the sole source of return air.

   Exceptions:

   7.1. This shall not apply where the fuel-burning *appliance* is a direct-vent *appliance*.
   7.2. This shall not apply where the room or space complies with the following requirements:
   7.2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
   7.2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
   7.2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of a draft hood in the same room or space or the combustion chamber of any atmospheric burner *appliance* in the same room or space.
   7.3. This shall not apply to rooms or spaces containing solid-fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of the appliances.

Commenter's Reason: See FG32-09/10, Part I

Final Action: AS AM AMPC____ D

FG32-09/10, Part III
IRC M1602.2

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanicals (CAPMO)

PART III- IRC

M1602.2 Prohibited sources. Outdoor and return air for a forced-air heating or cooling system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) to an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where flammable vapors are present; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A room or space, the volume of which is less than 25 percent of the entire volume served by the system. Where connected by a permanent opening having an area sized in accordance with ACCA Manual D, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of the rooms or spaces.

   Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to the room or space.

4. A closet, bathroom, toilet room, kitchen, garage, ~~mechanical room~~, boiler room, furnace room, unconditioned *attic* or other *dwelling unit*.

   Exception: <u>Dedicated forced air systems serving only a garage shall not be prohibited from obtaining return air from the garage.</u>

5. A room or space containing a fuel-burning *appliance* where such room or space serves as the sole source of return air.

   Exceptions:

   1. The fuel-burning *appliance* is a direct-vent *appliance* or an *appliance* not requiring a vent in accordance with Section M1801.1 or Chapter 24.
   2. The room or space complies with the following requirements:
      2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning *appliances* therein.
      2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
      2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of <u>a draft hood in the same room or space</u> or <u>the combustion chamber of</u> any <u>atmospheric burner</u> *appliance* ~~firebox or draft hood~~ in the same room or space.
   3. Rooms or spaces containing solid-fuel burning *appliances*, if return-air inlets are located not less than 10 feet (3048 mm) from the firebox of those *appliances*.

6. An unconditioned crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.

Reason: The definition of "mechanical room" states that there are no fuel fired appliances located in the space, therefore pulling air thru one should not be an issue. This section precludes pulling return air from a garage but doesn't recognize a dedicated garage system where doing so is perfectly acceptable. Adding the word "atmospheric" differentiates between open and closed combustion chambers.

Cost Impact: The code change proposal will not increase the cost of construction.

<u>Public Hearing Results</u>

PART III-IRC-M
Committee Action: **Approved as Modified**

Modify the proposal as follows:

M1602.2 Prohibited sources. Outdoor and return air for a forced-air heating or cooling system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) to an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where flammable vapors are present; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.

3. A room or space, the volume of which is less than 25 percent of the entire volume served by the system. Where connected by a permanent opening having an area sized in accordance with ACCA Manual D, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of the rooms or spaces.

   Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to the room or space.

4. A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room, unconditioned *attic* or other *dwelling unit*.

   Exception: Dedicated forced air systems serving only a garage shall not be prohibited from obtaining return air from the garage.

5. A room or space containing a fuel-burning *appliance* where such room or space serves as the sole source of return air.

   Exceptions:

   1. The fuel-burning *appliance* is a direct-vent *appliance* or an *appliance* not requiring a vent in accordance with Section M1801.1 or Chapter 24.
   2. The room or space complies with the following requirements:
      2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning *appliances* therein.
      2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
      2.3 Return-air inlets shall not be located within 10 feet (3048 mm) of a draft hood in the same room or space or the combustion chamber of any atmospheric burner *appliance* in the same room or space.
   3. Rooms or spaces containing solid-fuel burning *appliances*, if return-air inlets are located not less than 10 feet (3048 mm) from the firebox of those *appliances*.

6. An unconditioned crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.

Committee Reason: The reason is the same as given for FG32-09/10 Part I.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: Although this was approved as submitted it would be best that mechanical rooms be excluded as the code clearly permits mechanical rooms to be used as plenums**.**

Final Action: AS AM AMPC____ D

FG33-09/10
621.2, 621.4

Proposed Change as Submitted

Proponent: Craig Conner, Building Quality representing self.

1. Delete without substitution.

~~**621.2 Prohibited use.** One or more unvented room heaters shall not be used as the sole source of comfort heating in a dwelling unit~~.

2. Revise as follows:

621.4 Prohibited locations. Unvented room heaters shall not be installed within occupancies in Groups A, E and I and shall not be installed within dwelling units. The location of unvented room heaters shall also comply with Section

303.3.

Reason: This proposal prohibits unvented gas room heaters in residences. Energy efficiency in buildings is becoming increasingly important. Reduced air infiltration from airtight new buildings is a key part of making buildings more energy efficient. Obviously all products of combustion from these heaters are vented directly into the building, including venting moisture and nitrous oxides. Airtight residences are not compatible with unvented room heaters.

The 2009 IRC and IECC were made significantly more energy efficient in the last code cycle. The added efficiency included a requirement for an air tightness inspection or an air tightness test (IRC N1102.4.2, IECC 402.4.2). Incoming code changes by multiple parties are likely to greatly increase residential air tightness. There may even be a Federal law requiring increased energy efficiency in energy codes, with the prospect of a "Federalized energy code" if there is not a substantial increase in IECC energy efficiency. The increased energy efficiency in the IRC and IECC is not compatible with unvented room heaters.

Manufacturers are pushing unvented heaters to provide a greater portion of the heating for residences. Unvented heaters are called the most efficient form of heating or touted as 99% efficient. Although they legalistically including the word "supplemental" in most literature, unvented heater manufacturers focus on encouraging unvented heaters as zone or room heaters. Manufacturers or their representatives, such as the Vent-Free Alliance, even suggest lowering the thermostat of the central heating system so that more space heating is provided by the unvented heater. Greater use of unvented heaters means increased venting of combustion products directly into the living space.

The addition of vents to room heaters and fireplaces solves the problem. The most effective strategy for limiting indoor pollutants and moisture is to prevent them from being released inside in the first place, which is a key principal of indoor air quality. For room heaters and fireplaces this means exhausting the combustion products outside. Diluting the combustion products by venting the whole house is an energy-wasteful way of dealing with combustion products. Over ventilation of the residence on the possibility that an unvented heater might be in some part of the home, or might be added at a future date, is especially wasteful of energy.

So where is the evidence of a problem? The best evidence of a problem is the programs, standards, and companies "voting with their feet". ICC's new National Green Building Standard (ICC-700) outright disqualifies a residence with an unvented heater from a green designation at any level. Similarly, Energy Star, LEED and the American Lung Association's Health House outright prohibit unvented heaters in any residence in their programs. Unvented room heaters are not "green", they are "brown".

Likewise codes and standards are singling out unvented heaters. The 2009 IRC and IECC require homes with unvented heaters to state "gas-fired unvented room heater" as part of the energy certificate required to be posted on each residence (IRC N1101.9, IECC 401.3). To prevent claims of high efficiency heating, the IRC and IECC prohibit listing an efficiency for unvented heaters on the energy certificate. ASHRAE 62.2, the standard for residential indoor air quality, does not even apply in residences with unvented heaters (see scope section).

Unvented heaters are prohibited in new manufactured (HUD-code) homes by both HUD's Manufactured Home Construction and Safety Standards (Section 3280.707) and NFPA 501, the "Standard for Mobile Homes". NFPA 501, Section 10.6 states:

> *"Fuel-burning, heat-producing appliances and refrigeration appliances shall be of the vented type and shall vent to the outside. Exception: Ranges and ovens."*

In spite of HUD and NFPA 501's regulation, unvented heaters are often sold for use in existing manufactured homes. The I-codes should not allow heating combustion products to be vented directly into an existing manufactured, as those homes were never designed to accommodate a heater's combustion products.

The trend among manufacturers is clear- several companies refuse to make unvented heaters (Hearth & Home Technologies, Jotul, Kozy Heat Fireplaces, Mendota Fireplaces, Travis Industries), including the largest maker of fireplaces and hearth products. Recently Renni went from being a Vent-Free Alliance member to not producing unvented heaters.

Unvented gas room heaters are an impediment to greater energy efficiency. Unvented gas room heaters do not belong in residences.

Cost Impact: This code change proposal will increase the cost of construction.

CONNOR-FG1-621.2.DOC:

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: No evidence was presented to prove that any harm is caused by these appliances. No evidence was presented to show that houses are excessively tight such that problems will result with the installation of these appliances.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Craig Conner, Building Quality, representing self, requests Approval as Submitted.

Commenter's Reason: Unvented room heaters produce water as a product of combustion. Water can be produced at a rate of between a cup and almost two quarts per hour of operation. Power humidifiers have similar rates of moisture production.

Unvented heaters are power humidifiers with out any humidity control. The simple addition of a vent to vent moisture outside removes the problem. Why would anyone put a power humidifier without controls into a new, tight, energy-efficient residence?

Public Comment 2:

Tim Manz representing Association of Minnesota Building Officials (AMBO), requests Approval as Submitted.

Commenter's Reason: The Minnesota Mechanical Code and NFPA 501, "Standard on Manufactured Housing" both prohibit unvented heaters due to the products of combustion and moisture that are generated during the combustion process, since there is no effective way to remove these contaminants from inside the structure when a venting system does not exist.

Public Comment 3:

Patrick A. McLaughlin, McLaughlin & Associates, representing The Air-Conditioning, Heating and Refrigeration Institute, requests Disapproval.

Commenter's Reason: The Air-Conditioning, Heating and Refrigeration Institute (AHRI) is the trade association representing more than 300 manufacturers of air conditioning, heating and commercial refrigeration equipment. Our product categories include many types of vented and unvented gas residential heating appliances.

AHRI endorses the judgment of the International Fuel Gas Code Committee in its unanimous disapproval of proposal FG33.

Unvented room heaters possess the highest energy efficiency of any gas appliance, providing consumers with comfort and warmth while saving energy and money. The federal government exempts them from energy labeling and higher efficiency targets, since it recognizes that they already perform at the highest achievable level.

The requirements for ventilation and combustion air are exactly the same as for vented gas appliances. As homes become tighter, unvented room heaters perform better with diminishing heat demand, and they include unique combustion control and gas control that provide extra safety for such conditions.

Independent, peer-reviewed scientific research performed by Gas Research Institute, AGA Research, Arthur D. Little, Wilson Environmental, and Risksciences have documented the acceptable indoor air quality (IAQ) performance of unvented room heaters through actual field testing and verified computer modeling, including the utilization of the Environmental Protection Agency's IAQ modeling platform.

With 20 million units installed over the last 30 years, unvented room heaters have a remarkable safety record compared to other gas appliance. They are certified by independent third-parties such as CSA and Underwriters Laboratories (UL) in accordance with the national product standard, ANSI Z21.11.2, for safety, performance, and construction.

Unvented room heaters have been allowed by ICC codes since the first editions were published. Over the years in state and local jurisdictions, the overall trend has been for acceptance based upon the safety record that has been achieved and health department evaluations that have been performed. They are recognized for green construction by the Naturally Green Natural Gas Home Program.

The national product standard, ANSI Z21.11.2, permits installation of unvented room heaters in site-located manufactured homes--an application acknowledged by the Manufactured Housing Institute.

Manufacturers of unvented room heaters also manufacture vented gas heating appliances, and they are highly knowledgeable on the acceptability of both technologies. A code should never be used to restrict consumer choice, especially for a proven appliance with such a remarkable history of safety, performance, and reliability.

Final Action: AS AM AMPC____ D

INTERNATIONAL MECHANICAL CODE

M1-09/10, Part I
202 (New)

Proposed Change as Submitted

Proponent: Guy Tomberlin, Fairfax County, VA, representing the Virginia Plumbing and Mechanical Inspectors/Virginia Building and Code Officials

PART I – IMC

Add new definitions as follows:

CONTINUOUS OPERATION. Automatically activated and operating 24 hours a day or whenever the space is occupied.

INTERMITTENT OPERATION. Manually activated.

Reason: Currently the IMC and the IRC has several sections that require continuous or intermittent operation but never provides the guidance for how either is to be achieved. This addition to the definition section clearly provides the guidance necessary to address these specific sections.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TOMBERLIN-M-4-M-13-202-RB-3-R202

Public Hearing Results

PART I - IMC
Committee Action: **Disapproved**

Committee Reason: The operation status of something is not dependent upon the type of controls whether intermittent or continuous. The dictionary definition is adequate for these terms. Spaces such as battery rooms and machine rooms are not occupied yet the ventilation is continuous. A ventilation shaft roof fan runs 24/7 and is manually operated, but, it would fit under the definition of intermittent. A continuously operating fan could be manually activated.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII, requests Approval as Submitted.

Commenter's Reason: Currently the IMC and the IRC have several sections that require continuous or intermittent operation but never provide the guidance for how either is to be achieved. This addition to the definition section clearly provides the guidance necessary to address these specific sections. The most prominent reason that both committees had for disapproval was that a manually operated switch could be used and be considered continuously operated. I disagree. Generally a manually operated switch is installed as a disconnecting means to service equipment. This switch is not designed to be used as a control mechanism for the equipment.

Final Action: AS AM AMPC____ D

M1-09/10, Part II
202 (New)

<u>Proposed Change as Submitted</u>

Proponent: Guy Tomberlin, Fairfax County, VA, representing the Virginia Plumbing and Mechanical Inspectors/Virginia Building and Code Officials

PART II – IRC MECHANICAL

Add new definitions as follows:

<u>**CONTINUOUS OPERATION.** Automatically activated and operating 24 hours a day or whenever the space is occupied.</u>

<u>**INTERMITTENT OPERATION.** Manually activated.</u>

Reason: Currently the IMC and the IRC has several sections that require continuous or intermittent operation but never provides the guidance for how either is to be achieved. This addition to the definition section clearly provides the guidance necessary to address these specific sections.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TOMBERLIN-M-4-M-13-202-RB-3-R202

<u>Public Hearing Results</u>

PART II - IRC
Committee Action: **Disapproved**

Committee Reason: Other ventilation proposals are not compatible with this proposal. Intermittent operation can be automatic and manual operation can be continuous. Need to bring back in a public comment to coordinate with other proposals.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII, requests Approval as Submitted.

Commenter's Reason: Currently the IMC and the IRC have several sections that require continuous or intermittent operation but never provide the guidance for how either is to be achieved. This addition to the definition section clearly provides the guidance necessary to address these specific sections. The most prominent reason that both committees had for disapproval was that a manually operated switch could be used and be considered continuously operated. I disagree. Generally a manually operated switch is installed as a disconnecting means to service equipment. This switch is not designed to be used as a control mechanism for the equipment.

Final Action: AS AM AMPC____ D

M11-09/10
306.5 (IFGC 306.5)

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

306.5 (IFGC 306.5) Equipment and appliances on roofs or elevated structures. <u>Where equipment requiring access or appliances are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet above grade to access such equipment or appliances, an interior or exterior means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders.\</u>

~~Where equipment requiring access and appliances are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope)~~ Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).
2. Ladders shall have rung spacing not to exceed 14 inches (356 mm) on center.
3. Ladders shall have a toe spacing not less than 6 inches (152 mm) deep.
4. There shall be a minimum of 18 inches (457 mm) between rails.
5. Rungs shall have a minimum 0.75-inch (19 mm) diameter and be capable of withstanding a 300-pound (136.1 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of with standing 100 pounds per square foot (488.2 kg/m2). Landing dimensions shall be not less than 18 inches (457 mm) and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Ladders shall be protected against corrosion by *approved* means.

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

Exception: This section shall not apply to Group R-3 occupancies.

Reason: This is an effort to stream-line and simplify this section and exclude unnecessary language. This text eliminates where roofs are to be measured by prescribing that if the roof is greater than 16 feet, inside or outdoor access is required regardless of how high parapets are. Prohibiting the use of portable ladders assures that the ladders associated with access are close enough to the ground or floor to access. There is nothing new in this text.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-33-306.5

Public Hearing Results

Modify the proposal as follows:

306.5 (IFGC 306.5) Equipment and appliances on roofs or elevated structures. Where equipment requiring access or appliances are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet above grade <u>or floor level</u> to access such equipment or appliances, an interior or exterior <u>permanent</u> means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders.

~~Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.~~

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).
2. Ladders shall have rung spacing not to exceed 14 inches (356 mm) on center.
3. Ladders shall have a toe spacing not less than 6 inches (152 mm) deep.

4. There shall be a minimum of 18 inches (457 mm) between rails.
5. Rungs shall have a minimum 0.75-inch (19 mm) diameter and be capable of withstanding a 300-pound (136.1 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of with standing 100 pounds per square foot (488.2 kg/m2). Landing dimensions shall be not less than 18 inches (457 mm) and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Ladders shall be protected against corrosion by *approved* means.

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

Exception: This section shall not apply to Group R-3 occupancies.

Reason: This is an effort to stream-line and simplify this section and exclude unnecessary language. This text eliminates where roofs are to be measured by prescribing that if the roof is greater than 16 feet, inside or outdoor access is required regardless of how high parapets are. Prohibiting the use of portable ladders assures that the ladders associated with access are close enough to the ground or floor to access. There is nothing new in this text.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-33-306.5

Public Hearing Results

Committee Action: **Approved as Modified**

Committee Reason: The proposed revision deletes unnecessary text and clarifies the intent which is to ban the use of portable ladders where a climb to the equipment/appliance is over 16 feet in height. The modification deletes the parapet text which is already addressed in the revised text; adds the adjective “permanent” to enforce to the intended ban on portable ladders and adds “or floor level” to address multi-story buildings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: The intent is if personnel must climb over 16 feet for any reason, which would include climbing a stairwell to an upper level, then a permanent ladder will need to be provided to an interior hatch even if it is 15 feet from the floor level. It is not safe or practical for fire or maintenance personal to haul long extension ladders up stairwells which may be many stories tall. The added term “permanent” is redundant with the last sentence which bans portable ladders. The stricken text related to parapets needs to be retained because the issue of roof height verses parapet height will be left unresolved without the text.

Final Action: AS AM AMPC____ D

M18-09/10
401.4

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

401.4 Intake opening location. Air intake openings shall comply with all the following:

1. Intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or buildings on the same lot. ~~Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way~~.

2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, ~~parking lots~~ and loading docks. Where openings front on a street or public way, the distance shall be measured from the ~~centerline~~ closest edge of the street or public way.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening.
4. Intake openings on structures in flood hazard areas shall be at or above the design flood level.

Reason: The second sentence seems to be misplaced as the dialogue concerning streets and alleys is in item # 2. Another problem here is that most streets are 20 feet wide. Measuring from the center places an opening directly on the side of the street which defeats the purpose. The contaminant sources listed make sense due to constant vehicle movement and idling but parking lots don't fit. Parking lots generally have vehicles that are not running and are open on all sides preventing an accumulating emission problem. An occasional vehicle entering or leaving a lot should not present a significant concern.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-35-401.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Parking lots should not be deleted because of the contaminants present in such locations. The current text is more clear.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Judson Collins, JULYCO, representing self, requests Approval as Submitted.

Commenter's Reason: The proponent has offered a logical modification to the section. If a measurement is taken from the middle of the street on a 4-lane street, the intake could be over the street or at least at the very edge of the street. Measuring from the edge of the public way or street seems to be more in line with the intent of this section to minimize the chance of contaminants entering the intake.

Public Comment 2:

Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

401.4 Intake opening location. Air intake openings shall comply with all the following:

1. Intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. 2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening.
4. Intake openings on structures in flood hazard areas shall be at or above the design flood level.

Commenter's Reason: There were concerns that parking lots should not have been removed. Most streets are 20 feet wide or more and measuring from the center could permit openings dangerously close to contaminants.

Final Action: AS AM AMPC____ D

M24-09/10
Table 403.3

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise table as follows:

TABLE 403.3
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE RP CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE RA CFM/FT2 [A]	DEFAULT OCCUPANT DENSITY #/1000 FT2[A]	EXHAUST AIRFLOW RATE CFM/FT2[A]
Beauty and nail salons– ~~[b,h]~~ Nail salon stations [h]	20 -	0.12 -	25 -	0.6 50 per station[h]

h. For Nail Salons, ~~the required exhaust shall include ventilation tables or other systems that capture the contaminants and odors at their source and are capable of exhausting a minimum of 50 cfm per station~~ <u>each nail station shall be provided with a *source capture system* capable of exhausting not less than 50 cfm per station.</u>

(Portions of table and notes not shown remain unchanged)

Reason: Beauty and nail salons should not be combined and treated the same way as it relates to exhaust. Beauty salons in general do not use the same chemicals as found in nail stations. When a properly installed source capture system is employed, as defined in this code, recirculation of air should not be an issue. Source capture systems may take many forms and include ventilation tables and small hood arraignments that are intended to capture the contaminants at their source. This is why some of the language in the footnote has been removed because source capture systems include all these. The definition also states that the exhaust must be discharged to the outdoors. The general area of a nail salon should not be prohibited from recirculation because the source capture system has solved the concerns involving contamination associated with the use of acetone and other chemicals. The exhaust requirements in the table take care of the mild odors commonly found in these occupancies.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-24-T. 403.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Note b should remain. The exhaust rate of 50 cfm per station is in addition to the exhaust rate of 0.6 cfm per sq. ft required for beauty and nail salons.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Judson Collins, JULYCO, representing self, requests Approval as Submitted.

Commenter's Reason: The proposal does not change the current requirements in the code. It just clarifies that each nail salon station is required to have a source capture system with a minimum exhaust rate of 50 cfm as currently required in footnote h.

Final Action: AS AM AMPC____ D

Public Comment 2:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 403.3
MINIMUM VENTILATION RATES

Occupancy Classification	People Outdoor Airflow Rate in Breathing Zone Rp cfm/person	Area Outdoor Airflow Rate in Breathing Zone Ra Cfm/ft2 (a)	Default Occupant Density #/1000 ft2 (a)	Exhaust Airflow Rate Cfm/ft2 (a)
Beauty ~~and nail~~ salons[b] Nail salons[b,h]	20 20	0.12 0.12	25 25	0.6 ~~50 per station[h]~~ 0.6

h. For Nail Salons, each nail station shall be provided with a *source capture system* capable of exhausting not less than 50 cfm per station.

Commenter's Reason: The committee said that footnote "b" should remain with beauty salons and they were correct, so, it has been restored. Generally, beauty and nail salons were separated into two categories for ease of understanding that footnote h would not apply to beauty salons that do not do nails. No new requirements are in this proposal. It is obvious that the current code requires a general exhaust system for nail salons in addition to the required source capture system and, so, the ventilation specifications have been inserted in the newly separated row for nail salons.

Final Action: AS AM AMPC____ D

M31-09/10, Part I
501.5 (New)

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

PART I – IMC

Add new text as follows:

501.5 Domestic exhaust fan manifolding prohibited. Domestic-type environmental air exhaust fans shall not be interconnected to a common discharge duct. Such fans shall be independently exhausted to the outdoors.

Reason: The code does not address the manifolding of residential type exhaust fans. This practice produces poor results for venting. Air, like water, will seek the path of least resistance and the back-draft dampers are not intended to be air tight. Once the duct is pressurized, air still makes it way back into the building. The practice of combining fans and enlarging ducts produces velocity issues as the manufacturers will agree with, resulting in poor performance which is just one of the reasons this type of arrangement is not printed in any of the instructions. Conversations with engineers at Braun/Nu Tone agree, the best performance is achieved when these fans are exhausted independently. Rarely when combined is it done correctly, which would require extra back-draft dampers at wye locations and the calculations required to properly size ducts and determine maximum lengths. The practice of throwing two, three or more fans together defeats the purpose from an effective ventilation standpoint. The excuse that multiple penetrations in the building are undesirable cannot be the reason for this practice. If a single penetration is desired for multiple bathrooms, then a central exhaust system properly designed for the load is the way to achieve it.

As we can see in this poor example, the code does not address this situation. There needs to be clear guidance in order to prevent this type of installation.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-31-501.5-RM-2-M1506.1

Public Hearing Results

PART I - IMC
Committee Action: Disapproved

Committee Reason: The proposal limits designer flexibility. The text could be misconstrued to prohibit common exhaust shaft arrangements with subducts. The term manifold is not defined.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

501.5 Multiple exhaust fan discharge interconnections prohibited. The discharge ducts from exhaust fans shall not be interconnected except where such interconnections are in accordance with accepted engineering practice or are in accordance with the manufacturers' installation instructions.

Commenter's Reason: This fix addresses the concerns raised by the committee and some members on the floor. The committee didn't care for the word "manifolding" so it was replaced with the word "interconnected". The revised wording clarifies that it does not intend to prohibit a common fan with multiple intakes. The proposed text prevents interconnection of discharge ducts on the outlet side of the fans and does not prevent connection of a fan to multiple intake ducts. This change in general is attempting to address the abuses of installers tying together multiple fans with no thought behind it, and as a result, exhausted air makes its way back into the building through leaky back-draft dampers. Tying fans together also decreases the flow performance and efficiency of the fans. There is no guidance in the code that inspectors can use to prevent these poor installations.

Final Action: AS AM AMPC____ D

M31-09/10, Part II
IRC M1506.1 (New)

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

PART II – IRC MECHANICAL

Add new text as follows:

M1506.1 Exhaust fan manifolding prohibited. Exhaust fans shall not be interconnected utilizing a common discharge duct. Exhaust fans shall be independently exhausted to the outdoors.

Reason: The code does not address the manifolding of residential type exhaust fans. This practice produces poor results for venting. Air, like water, will seek the path of least resistance and the back-draft dampers are not intended to be air tight. Once the duct is pressurized, air still makes it way back into the building. The practice of combining fans and enlarging ducts produces velocity issues as the manufacturers will agree with, resulting in poor performance which is just one of the reasons this type of arrangement is not printed in any of the instructions. Conversations with engineers at Braun/Nu Tone agree, the best performance is achieved when these fans are exhausted independently. Rarely when combined is it done correctly, which would require extra back-draft dampers at wye locations and the calculations required to properly size ducts and determine maximum lengths. The practice of throwing two, three or more fans together defeats the purpose from an effective ventilation standpoint. The excuse that multiple penetrations in the building are undesirable cannot be the reason for this practice. If a single penetration is desired for multiple bathrooms, then a central exhaust system properly designed for the load is the way to achieve it.

As we can see in this poor example, the code does not address this situation. There needs to be clear guidance in order to prevent this type of installation.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-31-501.5-RM-2-M1506.1

Public Hearing Results

PART II - IRC
Committee Action: Disapproved

Committee Reason: Disapproval is consistent with action taken on Part I. Text should be revised by a public comment so as not to prohibit systems that use a common fan with multiple exhaust inlets.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

M1506.1 Multiple exhaust fan discharge interconnections prohibited. The discharge ducts from exhaust fans shall not be interconnected except where such interconnections are in accordance with accepted engineering practice or are in accordance with the manufacturers' installation instructions.

Commenter's Reason: This fix addresses the concerns raised by the committee and some members on the floor. The committee didn't care for the word "manifolding" so it was replaced with the word "interconnected". The revised wording clarifies that it does not intend to prohibit a common fan with multiple intakes. The proposed text prevents interconnection of discharge ducts on the outlet side of the fans and does not prevent connection of a fan to multiple intake ducts. This change in general is attempting to address the abuses of installers tying together multiple fans with no thought behind it, and as a result, exhausted air makes its way back into the building through leaky back-draft dampers. Tying fans together also decreases the flow performance and efficiency of the fans. There is no guidance in the code that inspectors can use to prevent these poor installations.

Final Action: AS AM AMPC____ D

M35-09/10, Part I
504.4, 504.6.2

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED ONLY FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I.

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

PART I – IMC

Revise as follows:

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a back-draft damper. Screens shall not be installed at the duct termination. Ducts shall ~~not be connected or installed with sheet metal screws or other fasteners that will obstruct the exhaust flow.~~ be mechanically fastened in accordance with *SMACNA Duct Construction Standard- Metal and Flexible.* Fasteners shall not protrude into the duct more than 1/8 inch. Ducts shall be sealed in accordance with Section 603.9. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or chimney. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

504.6.2 Duct installation. Exhaust ducts shall be supported at ~~4~~ 12 foot intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. ~~Ducts shall not be joined with screws or similar fasteners that protrude into the inside of the duct.~~

Reason: (PART I) 504.4 and 504.6.2 conflict with the SMACNA Standard and contain conflicting or, at least, redundant text. Tape alone is no means of correctly fastening any duct. Code Officials may certainly permit this practice if they chose to do so but the code should not direct a practice that conflicts with the Standard it condones. There is nothing wrong with small fasteners as long as they don't extend too far into the duct. A maximum penetration of 1/8 inch will assure minimum lint buildup as much more than that collects on the duct walls. Duct cleaning firms are having difficulties because the ducts are coming apart, requiring them to open up finished walls to repair them, there by creating added expenses and unhappy customers. Duct separations in any location, especially in concealed locations, could result in a fire hazard and moisture and lint accumulation. Mechanically fastened ducts can tolerate a longer interval (12 feet) between supports and the current 4 feet interval is overkill.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-27-504.4-504.6.2-RM-6-M1502.4.1

Public Hearing Results

PART I - IMC
Committee Action: Disapproved

Committee Reason: Screws that protrude ¼ inch into ducts can create blockages and allowing 1/8 inch protrusions is not much safer.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a back-draft damper. Screens shall not be installed at the duct termination. Ducts shall be mechanically fastened<u>.</u> ~~in accordance with *SMACNA Duct Construction Standard- Metal and Flexible.*~~ Fasteners shall not protrude into the duct more than 1/8 inch. Ducts shall be sealed in accordance with Section 603.9. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or chimney. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

504.6.2 Duct installation. Exhaust ducts shall be supported at <u>intervals not to exceed</u> 12 <u>feet</u> ~~foot intervals~~ and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of flow.

Commenter's Reason:

The committee had concerns about the reference to SMACNA so it was removed**.** The modification to 504.6.2 is consistent with the SMACNA standard.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

M35–09/10
IRC M1502.4.1, M1502.4.2, M1502.4.4.1

Revise as follows:

M1502.4.1 Material and size Exhaust ducts shall have a smooth interior finish and be constructed of metal <u>having</u> a minimum <u>thickness</u> of ~~0.016 inch (0.4 mm)~~ 0.0157 inches (.3950 mm) (No. 28 gage). ~~thick~~. The duct shall be 4 inches nominal in diameter.

M1502.4.2 Duct installation. Exhaust ducts shall be supported at ~~4~~ <u>12</u> foot intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. <u>Exhaust duct joints shall be sealed in accordance with Section M1601.4.1 and shall be mechanically fastened.</u> Ducts shall not be joined with screws or similar fasteners that protrude <u>more than 1/8 inch (3.2 mm)</u> into the inside of the duct.

M1502.4.4.1 Specified length. The maximum length of the exhaust duct shall be ~~25 feet (7620 mm)~~ <u>35 feet (1068 mm)</u> from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are used, the maximum length of the exhaust duct shall be reduced in accordance with Table M1502.4.4.1.

Reason: (PART II) The language in M1502.4.1 is consistent with language in last cycles M-16 Part II which was approved. M1502.4.2 violates the SMACNA Standard for hanger spacing and the last sentence also violates M1502.5 in that tape alone is not a means of connection for dryer vents. Duct cleaning firms are having fits because the ducts are coming apart requiring them to open up finished walls to repair them thereby creating added expense and unhappy customers. The 35-foot dimension is consistent with what is already in the IMC and IFGC.

Cost Impact: The code change proposal will not increase the cost of construction.

PART II – IRC

Modify the proposal as follows:

Revise as follows:

M1502.4.1 Material and size Exhaust ducts shall have a smooth interior finish and be constructed of metal having a minimum thickness of 0.0157 inches (.3950 mm) (No. 28 gage). The duct shall be 4 inches nominal in diameter.

M1502.4.2 Duct installation. Exhaust ducts shall be supported at ~~12~~ ~~foot~~ intervals <u>not to</u> <u>exceed 12 feet</u> and shall be secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Exhaust duct joints shall be sealed in accordance with Section M1601.4.1 and shall be mechanically fastened. Ducts shall not be joined with screws or similar fasteners that protrude more than 1/8 inch (3.2 mm) into the inside of the duct.

M1502.4.4.1 Specified length. The maximum length of the exhaust duct shall be 35 feet (1068 mm) from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are used, the maximum length of the exhaust duct shall be reduced in accordance with Table M1502.4.4.1.

Committee Action: **Approved as Modified**

Modify the proposal as follows:

Committee Reason: Approval is based upon the proponent's printed reason. The modification clarifies that the 12 foot interval is a maximum interval.

Assembly Action: **None**

M39-09/10, Part I
504.6.4, 504.6.4.3

Proposed Change as Submitted

Proponent: Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing the Home Ventilating Institute

PART I – IMC

1. Revise as follows:

504.6.4 Duct length. The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections 504.6.4.1 ~~or~~ through ~~504.6.4.2~~ 504.6.4.3.

2. Add new text as follows:

504.6.4.3 Dryer exhaust duct power ventilator. The maximum length of the exhaust duct shall be determined by the manufacturer's installation instructions for the dryer exhaust duct power ventilator. Dryer exhaust duct power ventilators shall be listed and labeled for use in dryer exhaust duct systems and shall be installed in accordance with the manufacturer's installation instructions.

Reason: During the rewrite of this section, dryer exhaust duct power ventilators were originally a part of the requirements. The section was deleted when the Supplemental requirements were not completed prior to the final code change hearing. This proposed text is similar to the original language proposed during the last cycle.

Dryer exhaust duct power ventilators are now regulated by Supplemental requirements to UL 705. These supplemental requirements specify testing for ventilators used in this application. The requirements include many safety provisions for the ventilators. The ventilator manufacturer specifies the maximum length of the dryer exhaust duct. This length is used for testing and listing the ventilator, thus verifying the instructions.

ICCFILENAME: BALLANCO-M-1-504.6.4-RM-1-M1502.4.4

Public Hearing Results

PART I - IMC
Committee Action: **Disapproved**

Committee Reason: The UL standard for such units is not yet available. The proposed text lacks a requirement for a label stating that a power ventilator is part of the installed system. The proposed text would allow such units to be tested to any criteria or standard, thus allowing all units to be sold as dryer exhaust duct power ventilators without consistency in product safety.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing the Home Ventilating Institute, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

PART I – IMC

504.6.4 Duct length. The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections 504.6.4.1 through 504.6.4.3.

504.6.4.3 Dryer exhaust duct power ventilator. The maximum length of the exhaust duct shall be determined by the manufacturer's installation instructions for the dryer exhaust duct power ventilator. Dryer exhaust duct power ventilators shall be listed and labeled ~~for use in dryer exhaust duct systems~~ as complying with Supplement SA of UL 705 and shall be installed in accordance with the manufacturer's installation instructions.

Commenter's Reason: At the first hearing, the Supplement to UL 705 was out to ballot. Furthermore, the Committee thought a direct reference to Supplement SA of UL 705 was appropriate. I have made the changes to reference the standard that regulates dryer exhaust duct power ventilators. Supplement SA of UL 705 complies with the ICC Policy for referenced standards.

Analysis: The standard, UL 705, was not reviewed or considered by the IMC Code Development committee and it was not considered by the hearing attendees at the time of the code development hearings. Section 3.6.3.1 of Council Policy #28, *Code Development,* requires that new standards be introduced in the original code change proposal, therefore, the introduction of a new standard via a public comment is not in accordance with the process required by CP# 28 for adding new standards to the code.

Public Comment 2:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

504.6.4 Duct length. The maximum allowable exhaust duct length shall be determined by one of the methods specified in Section<u>s</u> 504.6.4.1 ~~or~~ <u>through</u> ~~504.6.4.2~~ <u>504.6.4.3.</u>

504.6.4.3 Dryer exhaust duct power ventilator. The maximum length of the exhaust duct shall be determined by the manufacturer's installation instructions for the dryer exhaust duct power ventilator. Dryer exhaust duct power ventilators shall be listed and labeled <u>in accordance with UL 705</u> for use in dryer exhaust duct systems and shall be installed in accordance with the manufacturer's installation instructions.

Commenter's Reason: The committee was concerned that the standard was not yet ready. UL 705 is currently being balloted for this application. The results of the ballot should be available prior to the Final Action Hearing.

Analysis: The standard, UL 705, was not reviewed or considered by the IMC Code Development committee and it was not considered by the hearing attendees at the time of the code development hearings. Section 3.6.3.1 of Council Policy #28, *Code Development,* requires that new standards be introduced in the original code change proposal, therefore, the introduction of a new standard via a public comment is not in accordance with the process required by CP# 28 for adding new standards to the code.

Final Action: AS AM AMPC____ D

M39-09/10, Part II
M1502.4.4, M1502.4.4.3

<u>Proposed Change as Submitted</u>

Proponent: Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing the Home Ventilating Institute

PART II – IRC MECHANICAL

1. Revise as follows:

M1502.4.4 Duct length. The maximum allowable exhaust duct length shall be determined by one of the methods specified in Section<u>s</u> M1502.4.4.1 ~~or~~ <u>through</u> ~~M1502.4.4.2~~ <u>M1502.4.4.3.</u>

2. Add new text as follows:

<u>**M1502.4.4.3 Dryer exhaust duct power ventilator.** The maximum length of the exhaust duct shall be determined by the manufacturer's installation instructions for the dryer exhaust duct power ventilator. Dryer exhaust duct power ventilators shall be listed and labeled for use in dryer exhaust duct systems and shall be installed in accordance with the manufacturer's installation instructions.</u>

Reason: During the rewrite of this section, dryer exhaust duct power ventilators were originally a part of the requirements. The section was deleted when the Supplemental requirements were not completed prior to the final code change hearing. This proposed text is similar to the original language proposed during the last cycle.

Dryer exhaust duct power ventilators are now regulated by Supplemental requirements to UL 705. These supplemental requirements specify testing for ventilators used in this application. The requirements include many safety provisions for the ventilators. The ventilator manufacturer specifies the maximum length of the dryer exhaust duct. This length is used for testing and listing the ventilator, thus verifying the instructions.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BALLANCO-M-1-504.6.4-RM-1-M1502.4.4

Public Hearing Results

PART II - IRC
Committee Action: Disapproved

Committee Reason: The proposed standard is not yet available.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing the Home Ventilating Institute, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

PART II – IRC MECHANICAL

M1502.4.4 Duct length. The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections M1502.4.4.1 through M1502.4.4.3.

M1502.4.4.3 Dryer exhaust duct power ventilator. The maximum length of the exhaust duct shall be determined by the manufacturer's installation instructions for the dryer exhaust duct power ventilator. Dryer exhaust duct power ventilators shall be listed and labeled ~~for use in dryer exhaust duct systems~~ as complying with Supplement SA of UL 705 and shall be installed in accordance with the manufacturer's installation instructions.

Commenter's Reason: At the first hearing, the Supplement to UL 705 was out to ballot. Furthermore, the Committee thought a direct reference to Supplement SA of UL 705 was appropriate. I have made the changes to reference the standard that regulates dryer exhaust duct power ventilators. Supplement SA of UL 705 complies with the ICC Policy for referenced standards.

Analysis: The standard, UL 705, was not reviewed or considered by the IRC Code Development committee and it was not considered by the hearing attendees at the time of the code development hearings. Section 3.6.3.1 of Council Policy #28, *Code Development,* requires that new standards be introduced in the original code change proposal, therefore, the introduction of a new standard via a public comment is not in accordance with the process required by CP# 28 for adding new standards to the code.

Public Comment 2:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

M1502.4.4 Duct length. The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections M1502.4.4.1 through M1502.4.4.3.

M1502.4.4.3 Dryer exhaust duct power ventilator. The maximum length of the exhaust duct shall be determined by the manufacturer's installation instructions for the dryer exhaust duct power ventilator. Dryer exhaust duct power ventilators shall be listed and labeled in accordance with UL 705 for use in dryer exhaust duct systems and shall be installed in accordance with the manufacturer's installation instructions.

Commenter's Reason: The committee was concerned that the standard was not yet ready. UL 705 is currently being balloted for this application. The results of the ballot should be available prior to the Final Action Hearing.

Analysis: The standard, UL 705, was not reviewed or considered by the IRC Code Development committee and it was not considered by the hearing attendees at the time of the code development hearings. Section 3.6.3.1 of Council Policy #28, *Code Development,* requires that new standards be introduced in the original code change proposal, therefore, the introduction of a new standard via a public comment is not in accordance with the process required by CP# 28 for adding new standards to the code.

Final Action: AS AM AMPC____ D

M54-09/10
506.3.9

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Delete and substitute as follows:

506.3.9 Grease duct horizontal cleanouts~~. Cleanouts located on horizontal sections of ducts shall be spaced not more than 20 feet (6096 mm) apart. The cleanouts shall be located on the side of the duct with the opening not less than 1.5 inches (38 mm) above the bottom of the duct, and not less than 1 inch (25 mm) below the top of the duct. The opening minimum dimensions shall be 12 inches (305 mm) on each side. Where the dimensions of the side of the duct prohibit the cleanout installation prescribed herein, the openings shall be on the top of the duct or the bottom of the duct. Where located on the top of the duct, the opening edges shall be a minimum of 1 inch (25 mm) from the edges of the duct. Where located in the bottom of the duct, cleanout openings shall be designed to provide internal damming around the opening, shall be provided with gasketing to preclude grease leakage, shall provide for drainage of grease down the duct around the dam, and shall be approved for the application. Where the dimensions of the sides, top or bottom of the duct preclude the installation of the prescribed minimum-size cleanout opening, the cleanout shall be located on the duct face that affords the largest opening dimension and shall be installed with the opening edges at the prescribed distances from the duct edges as previously set forth in this section~~.

Cleanouts serving horizontal sections of grease duct shall:

1. Be spaced not more than 20 feet apart.
2. Be located not more than 10 feet from changes in direction.
3. Be located on the bottom only where no other locations are available and shall be provided with internal damming of the opening such that grease will flow past the opening without pooling. Bottom cleanouts and openings shall be approved for the application and installed liquid tight.
4. Not be closer than 1 inch from the edges of the duct.
5. Have opening dimensions of not less than 12 inches by 12 inches. Where such dimensions preclude installation, the opening shall be not less than 12 inches on one side and shall be large enough to provide access for cleaning and maintenance.
6. Shall be located at grease reservoirs.

Reason: This is a novel of a section, packed with information and in need of updating. Item # 2 is somewhat new though already implied. There is nothing prohibiting only one cleanout installed in the middle of a 24 foot section of duct as the code is silent on minimum numbers. This text would require that two cleanouts be provided. In item # 5, although the National Standard calls for 1 1/2 inches, it is an arbitrary number. This 1 inch dimension will have no effect structurally on the door installation nor will it have an effect on the duct itself and as a result, will provide a little more flexibility. Item # 6 already provides for a minimum 12 X 12 door but some flexibility is required for smaller duct sizes, but in no case should one side be less than 12 inches. Item # 7 is new. This establishes that a cleanout needs to be installed at grease reservoir locations in order to properly inspect and maintain the reservoir.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-17-506.3.9

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The revised list version is easier to read than the original paragraph.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Shawn Strausbaugh, Arlington County, Virginia, representing VA Plumbing and Mechanical Inspectors Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

506.3.9 Grease duct horizontal cleanouts. Cleanouts serving horizontal sections of grease duct shall:

1. Be spaced not more than 20 feet apart.
2. Be located not more than 10 feet from changes in direction that are greater than 45 degrees.
3. Be located on the bottom only where no other locations are available and shall be provided with internal damming of the opening such that grease will flow past the opening without pooling. Bottom cleanouts and openings shall be approved for the application and installed liquid tight.
4. Not be closer than 1 inch from the edges of the duct.
5. Have opening dimensions of not less than 12 inches by 12 inches. Where such dimensions preclude installation, the opening shall be not less than 12 inches on one side and shall be large enough to provide access for cleaning and maintenance.
6. Shall be located at grease reservoirs.

Commenter's Reason: The only change is the language of #2 which previously did not state a specific degree of the change of direction meaning any slight change of direction would be required to be located not more than 10 feet from a cleanout. The added language specifies that a cleanout be located within 10 feet from changes in direction that are greater than 45 degrees.

Final Action: AS AM AMPC____ D

M57-09/10
506.3.10.2

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

506.3.10.2 Field applied enclosure. Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by field-applied grease duct enclosure that is a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E2336. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration fire-stop system classified in accordance with ASTM E814 or UL 1497 and having a "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions. Partial application of a field-applied grease duct enclosure system shall not be installed for the sole purpose of reducing clearance to combustibles at isolated sections of grease duct except where specifically listed and labeled for such partial application. Exposed duct-wrap systems shall be protected where subject to physical damage.

Reason: The true intent of duct wrap systems is that they be applied to an *entire* system, not just a portion of one. This comes into play when Section 506.3.10.4 is employed. This section usually works up to the point where the roof must be penetrated. Most of these structures are wood construction or there is combustible material on decking and so forth, that the duct must get by. A practice has been to only wrap the duct from a point 18 inches from the bottom of the roof deck up through the curb. If this material was intended to be used this way, it would be found in Table 308.6. This material must meet all 5 tests of ASTM E 2336 which includes the internal fire test and the external full engulfment test. The material would never pass the test under partial application and has never been tested in this fashion, that is, to reduce clearances in small sections of duct. The manufacturers will be the first to explain that their product is not approved for this application. The code does not specifically address this poor practice. The intent of the exception is for the duct to be able to exit the structure on its own ability and to not come within 18 inches of combustible construction.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-28-506.3.10.2

Public Hearing Results

Modify the proposal as follows:

Revise as follows:

506.3.10.2 Field applied enclosure. Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by field-applied grease duct enclosure that is a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E2336. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration fire-stop system classified in accordance with ASTM E814 or UL 1497 and having a "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions. Partial application of a field-applied grease duct enclosure system shall not be installed for the sole purpose of reducing clearance to combustibles at isolated sections of grease duct. ~~except where specifically listed and~~ ~~labeled for such partial application~~. Exposed duct-wrap systems shall be protected where subject to physical damage.

Committee Action: Approved as Modified

Committee Reason: This product is being misapplied in some cases and some product installation instructions are silent on partial application. The revision is consistent with the intent of the code to require a continuous duct enclosure (i.e. no partial enclosures) and consistent with Section 506.3.6, Exception # 3. The modification deletes text that suggests that there are methods of testing for partial applications because there are none.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tim Manz representing Association of Minnesota Building Officials (AMBO), requests Disapproval.

Commenter's Reason: This issue is already addressed adequately in Exception #3 of Section 506.3.6, as the Committee Reason states, so there is no need for the proposed change to Section 506.3.10.2.

Final Action: AS AM AMPC____ D

M58-09/10
506.3.10.4

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions, Inc., representing the International Firestop Council

Revise as follows:

506.3.10.4 Duct enclosure not required. A duct enclosure shall not be required for a grease duct that penetrates only a non fire-resistance-rated roof/ceiling assembly. <u>Grease duct systems and exhaust *equipment* serving Type I hoods shall comply with the requirements of section 506.3.6.</u>

Reason: The proposed change clarifies that while a duct enclosure is not required for a grease duct that penetrates only a non fire-resistance-rated roof/ceiling assembly, the clearances of grease duct systems and exhaust *equipment* serving a Type I hoods still need to comply with the requirements of section 506.3.6 to both combustible and non-combustible construction.

Justification: This proposal clarifies the need to apply the existing provision in 506.3.6 of the Code for a grease duct that penetrates a non- fire-resistance-rated roof/ceiling assembly.. The IMC differentiates between requirements for grease duct systems and exhaust equipment serving a Type I hoods to maintain clearances to combustible and non-combustible construction, and the requirements to provide a duct enclosure. Section 506.3.10 waives the requirement to provide a duct enclosure in this specific instance. However, it is important that users understand that the allowance to waive the enclosure does not also waive the need to maintain clearances between these grease ducts and combustible and non-combustible construction as specified in 506.3.6.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CRIMI-M-2-506.3.10.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There is no reason to refer to only one applicable provision because there are many.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, AC Consulting Solutions Inc, representing International Firestop Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

506.3.10.4 Duct enclosure not required. A duct enclosure shall not be required for a grease duct that penetrates only a non fire-resistance-rated roof/ceiling assembly. Grease duct systems and exhaust *equipment* serving a Type I hood shall comply with ~~the requirements of~~ Section 506.3.6.

Commenter's Reason: Section 506.3.10 waives the requirement to provide a duct enclosure in this specific instance. However, the allowance to waive the enclosure does not also waive the need to maintain clearances as specified in 506.3.6. The proposed change clarifies that when a grease duct penetrates a non fire-resistance-rated roof/ceiling assembly, the clearances of grease duct systems and exhaust *equipment* serving a Type I hoods still need to comply with the requirements of section 506.3.6 for clearances to combustible and non-combustible construction.

Final Action: AS AM AMPC____ D

M60-09/10
506.3.12.3

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

506.3.12.3 Termination location. Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from parts of the same or contiguous buildings, adjacent buildings and adjacent property lines and shall be located not less than 10 feet (3048 mm) above the adjoining grade level. Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from or not less than 3 feet (914 mm) above air intake openings into any building.

> **Exception:** Exhaust outlets shall terminate not less than 5 feet (1524 mm) <u>horizontally</u> from parts of the same or contiguous building, an adjacent building, adjacent property line and air intake openings into a building where ~~air from~~ the exhaust outlet discharge~~s away~~ <u>is not directed at any angle toward such points</u> ~~from such locations~~.

Reason: There is some confusion as to what exactly is meant by the term "away from the building" and what it actually permits. It would seem that the side of an up blast fan whether it is a utility set or centrifugal fan would be compliant with the 5-foot exception when the closest edge of the discharge is measured horizontally and no angle short of parallel would be compliant. This is a much needed clarification.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-20-506.3.12.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval is based upon the action taken on M59-09/10 which does a better job of clarifying the intent of this section.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: The committee never addressed why this change was disapproved with respect to the bulk of the change. This language eliminates interpretation confusion with regards to what is meant by "away from the building".

Final Action: AS AM AMPC____ D

M63-09/10
507.2

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

507.2 Where required. A Type I or Type II hood shall be installed at or above all *commercial cooking appliances* in accordance with Sections 507.2.1 and 507.2.2. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed.

> **Exception:** Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are listed and labeled for the application, a hood shall not be required at or above them.

Reason: This is an effort to recognize hoodless griddle type cooking appliances which are becoming more popular. Sometimes they are referred to as Hibachi Tables where generally smaller amounts of food are prepared in front of the customers directly at their table. These cooking tables have built-in downdraft exhaust systems running between 800 and 1000 cfm designed with two fans, one to push and one to draw air across the table. The cooking vapors are captured and delivered to a grease duct attached at the bottom of the table. All current IMC grease duct requirements apply at this point.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-25-507.2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Revise Committee action as follows:

507.2 Where required. A Type I or Type II hood shall be installed at or above all *commercial cooking appliances* in accordance with Sections 507.2.1 and 507.2.2. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed.

> **Exception:** Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are listed and labeled for the application in accordance with NFPA 96, a hood shall not be required at or above them.

Commenter's Reason: There's confusion over what the appropriate requirements are for these downdraft appliances and if an exception is to be provided, I believe the Code must specify the requirements used for listing. Chapter 15 of NFPA 96 was added to specifically address requirements for these systems.

Analysis: The standard, NFPA 96, was not reviewed or considered by the IMC Code Development committee and it was not considered by the hearing attendees at the time of the code development hearings. Section 3.6.3.1 of Council Policy #28, *Code Development,* requires that new standards be introduced in the original code change proposal, therefore, the introduction of a new standard via a public comment is not in accordance with the process required by CP# 28 for adding new standards to the code.

Final Action: AS AM AMPC____ D

M64-09/10
507.2.1, 507.2.2

Proposed Change as Submitted

Proponent: Douglas J. Horton, D.J. HORTON and Associates, Inc., representing Commercial Kitchen Ventilation Technical Interest Group

Revise as follows:

507.2.1 Type I hoods. Type I hoods shall be installed where cooking *appliances* produce grease or smoke. Type I hoods shall be installed over *medium-duty*, *heavy-duty* and *extra-heavy-duty cooking appliances*. Type I hoods shall be installed over *light-duty cooking appliances* that produce grease or smoke.

> **Exception**: A Type I hood shall not be required for an electric cooking appliance where an approved testing agency provides documentation that the appliance effluent contains 5 mg/m^3 or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m^3/s) in accordance with Section 17 of UL 710B.

507.2.2 Type II hoods. Type II hoods shall be installed above dishwashers and ~~*light-duty appliances*~~ appliances that produce heat or moisture and do not produce grease or smoke, except where the heat and moisture loads from such appliances are incorporated into the HVAC system design or into the design of a separate removal system. Type II hoods shall be installed above all ~~*light-duty appliances*~~ appliances that produce products of *combustion* and do not produce grease or smoke. Spaces containing cooking appliances that do not require Type II hoods shall be ventilated in accordance with Section 403.3. For the purpose of determining the floor area required to be ventilated, each individual *appliance* that is not required to be installed under a Type II hood shall be considered as occupying not less than 100 square feet (9.3 m^2).

Reason: A growing issue is the proliferation of small appliances and related cooking in which little or no grease is produced, such as in convenience stores and other venues. Thus, a minimum threshold should be provided in the IMC to eliminate the expense of first cost, and energy costs of fan energy and tempering makeup air, where grease emissions are minimal or nonexistent. Such a minimum threshold already exists in codes and standards, and this proposal is provided to harmonize the IMC with NFPA Standard 96 and UL Standard 710B. NFPA 96 contains the threshold requirement and UL 710B, Section 17, contains the applicable test procedure. NFPA 96, in sections 4.1.1.2 and 4.1.1.3, exempts from exhaust systems cooking equipment that has grease discharge that does not exceed 5 mg/m^3 when tested at an exhaust airflow rate of 500 cfm (0.236 m^3/s). Note that NFPA 96 is written entirely from a fire safety point of view, so only a Type I (in IMC terms) hood requirements are included in the standard.

State jurisdictions are beginning to pick up this exception in their adoptions of the IMC. For example, both Michigan and California mechanical codes either cite the grease test requirements explicitly or cite NFPA 96 for exhaust system requirements.

Editorial Note: The 2008 NFPA 96 cites UL 197 in sections 4.1.1.2 and 4.1.1.3, though the grease emissions test has been moved to Section 17 of UL 710B. Therefore, the proposed IMC exception should cite the actual grease emissions threshold requirement rather than citing NFPA 96, which contains the outdated reference.

In relation to Section 507.2.2, if a Type I hood is not required because of low grease emissions, per the first part of this proposal, the provisions of section 507.2.2 still apply, and a Type II hood may be required. This is problematic with the existing wording because Type II hoods are currently required only for dishwashers and light-duty appliances. Yet it is well known that appliances with duty ratings higher than light-duty produce heat and moisture while not producing grease or combustion products, such as electric ranges, electric pasta cookers, electricpizza ovens, and electric tilting skillets, for example. Accordingly, Type II hoods should be required for appliances based on their actual emissions of heat and moisture, regardless of duty. Of course, per current Section 507.2.2, additional HVAC capacity is still available as an alternative to use of a Type II hood.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HORTON-M-1-507.2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason. Having a measurable performance criteria is desired in applying the code. The proposed text is consistent with NFPA 96.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc , representing International Firestop Council, requests Disapproval.

Reason: The existing IMC requirement in 507.2.1 is very clear in requiring Type I hoods to be installed over *medium-duty*, *heavy-duty* and *extra-heavy-duty cooking appliances and* over *light-duty cooking appliances* that produce grease or smoke. The proposed change clouds the issue because it somehow gives credit for the power source of the appliance, when determining the need for the installation of a Type 1 hood for exhausting hazardous and flammable vapours emitting from the cooking medium (i.e. vegetable oils and fats).

There is insufficient justification provided as to the significance of the 5 mg/m^3 , and as to why this would apply only to electric heating appliances. The fact that the appliance is electric does not change the fact that it is a "*light-duty cooking appliances* that produce grease or smoke", as the current IMC requires.

Final Action: AS AM AMPC____ D

M72-09/10
507.3

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

507.3 Fuel-burning appliances. ~~Where vented fuel-burning appliances are located in the same room or space as the hood, provisions shall be made to prevent the hood system from interfering with normal operation of the appliance vents.~~ <u>Non-direct-vent appliances shall not be located in a room or space containing a Type I or Type II hood nor in a room or space that opens only into a room or space containing such hoods.</u>

<u>Exception:</u> <u>Non-direct-vent appliances shall be permitted in a room or space containing a Type I or Type II hood provided that the room or space is continuously maintained under positive pressure.</u>

Reason: 507.3 only states that "provisions" need to be made when dealing with these types of appliances but provides no guidance as what is really required. This only creates confusion in the enforcement community as to what needs to occur. Non direct vent appliances and those with draft hoods are subject to many factors that could result in improper venting. Losses in building pressure will cause improper venting. It only takes 5 Pascal's to overcome a gravity vent. These appliances are also in competition for air with other appliances and are no match for powered exhaust equipment such as hoods. The kitchen environment lends itself to negative pressure either by design or by accident. A perfectly balanced system never lasts very long as every minute detail affects them. Even kitchens with slight positive pressure can be subject to negative building pressures simply by opening doors. If kitchen pressures are even negative in the slightest or cannot be verified, then the appliance should be isolated. This text will provide the user with guidance that is more concise.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-15-507.3

<u>Public Hearing Results</u>

Committee Action: Disapproved

Committee Reason: The current text allows the designer to account for venting and pressure issues. Positive pressure maintenance could cause odor migration from the kitchen. The exception needs to identify the reference space to which the positive pressure is to be measured.

Assembly Action: None

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows

507.3. Fuel burning appliances. Non-direct vent appliances shall not be located in a room or space containing a Type I or Type II hood nor in a room or space that opens only into a room or space containing such hoods <u>except where such room or space is continuously maintained under positive pressure with respect to the outdoors.</u>

> ~~**Exception:** Non-direct vent appliances shall be permitted in a room or space containing a Type I or Type II hood provided that the room or space is continuously maintained under positive pressure~~.

Commenter's Reason: The committee had a concern about pressure and what it was relative to. The relation to the outdoors was the intent and was added. Non-direct vent appliances usually means appliances with draft hoods. The word "provisions" is subjective to the inspection community and this text provides guidance as to the intention of the word. This text in no way removes options from designers that will prevent draft hood back-drafting that may be acceptable to the code official. The exception was incorporated into the body of the text as a clean-up effort.

Final Action: AS AM AMPC____ D

M73-09/10
507.10

<u>Proposed Change as Submitted</u>

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

507.10 Hoods penetrating a ceiling. Type I hoods or portions thereof penetrating a ceiling, wall or furred space shall comply with ~~all the requirements of~~ Section 506.3.10. <u>Field-applied grease duct enclosure systems, as addressed in Section 506.3.10.2, shall not be utilized to satisfy the requirements of this section.</u>

Reason: Hoods penetrating ceilings that are also required to have the associated ductwork protected, are required to be enclosed in a 1 or 2 hour enclosure. Field applied duct-wrap systems are listed for ducts only, not hoods. Hoods have never been tested or listed to have duct-wrap materials placed over the hood as a replacement for a 1 or 2 hour enclosure. There is no standard for installation of duct-wrap systems on hoods. Nor is there a method of fastening or method of providing access to services located on top of the hood such as lights, J-boxes etc. To permit this practice only creates a false sense of security and code compliance. The manufacturers are aware that some jurisdictions allow this application but they don't condone the practice or seek to market their product in this fashion. The best practice is to not have the hood penetrate the ceiling in the first place. As currently written, 507.10 says that **all** the requirements of 506.3.10 should be met. This is misleading because two of the exceptions cannot be applied although they are part of the section. This is a much needed clarification that will provide concise guidance as to what exactly needs to occur when hoods are required to be protected when ceilings are penetrated.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-5-507.10

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The proposed text will prevent the misuse of such materials. ASTM E 2336 does address the application prohibited by the proposed text.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, AC Consulting Solutions Inc, representing International Firestop Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

507.10 Hoods penetrating a ceiling. Type I hoods or portions thereof penetrating a ceiling, wall or furred space shall comply with Section 506.3.10. ~~Field-applied grease duct enclosure systems, as addressed in Section 506.3.10.2, shall not be utilized to satisfy the requirements of this section.~~

Commenter's Reason: The language in the second sentence of this proposal targets a single technology, and prohibits its use in an application for which the IMC does not even provide a specific performance Standard or criterion. It is not entirely clear from the language of this proposal whether or not the use of Section 105.2 on Alternative materials, methods, equipment and
appliances would still be possible.

The Committee's reason statement identifies ASTM E2336 as having no specific performance or testing requirements for enclosure of a Type 1 hood. While this is correct, it is equally true for UL 2221 and ASTM E119. There are other options in Section 506.3.10 which would still be permitted in this application, even though they are also not specifically tested for this use.

The *International Mechanical Code* is a model code that regulates the design and installation of mechanical systems, including appliance venting, duct and ventilation systems. The purpose of the code is to establish the minimum acceptable level of safety and to protect life and property from the potential dangers associated with the installation and operation of mechanical systems. While the IMC is primarily a prescriptive code with some performance text, the code relies heavily on product testing, specifications and listings to provide much of the appliance and equipment installation requirements. The general Section 105.2 allows designs and installations to be performed by approved engineering methods as alternatives to the prescriptive methods in the code. Section 105.2 specifically states "The provisions of this code <u>are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*.</u> An alternative material or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety."

The proposal, as modified by this public comment, clarifies the application of 506.3.10 without infringing on the code officials authority to use Section 105.2 if desired.

Final Action: AS AM AMPC____ D

M78-09/10
510.8.1

Proposed Change as Submitted

Proponent: Eli P. Howard, III, Sheet Metal and Air Conditioning Contractors National Association, Inc.

Revise as follows:

510.8.1 Duct joints. Ducts shall be made tight with lap joints having a minimum lap of 1 inch (25 mm). <u>Joints used in ANSI/SMACNA Round Industrial Duct Construction Standards and ANSI/SMACNA Rectangular Industrial Duct Construction Standards are also acceptable</u>.

Reason: The types of joints used in either of these manuals have been used in industrial exhaust and conveyance systems for years and provide acceptable alternatives to lap joints.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HOWARD-M-7-510.8.1

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standards did not comply with ICC standards criteria, Sections 3.6.2.1, 3.6.3.2.

Committee Action: **Approved as Submitted**

Committee Reason: The proposed text will provide for new technology and options to current practice and will help reduce duct leakage.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble representing ICC Reference Standards Committee, requests Disapproval.

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.2.1 which requires reference standards be written in mandatory language, and Section 3.6.3 which requires standards be promulgated according to a consensus process.

We therefore propose to have this code change proposal disapproved.

Final Action: AS AM AMPC____ D

M83-09/10
515 (New), 515.1 (New)

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Add new text as follows:

SECTION 515
COMMON MULTISTORY EXHAUST SYSTEMS

515.1 Common bathroom and toilet room exhaust in multistory buildings. Where a common shaft is designed and installed to convey bathroom or toilet room exhaust, or both, in multiple story buildings, the construction of such system shall be in accordance with all of the following:

1. The building shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Building Code*.
2. Shaft construction shall conform to Section 708 of the *International Building Code*.
3. Volume dampers, fire dampers and smoke dampers shall be prohibited in the exhaust duct. Penetrations of the shaft be protected in accordance with Section 607.5.5, Exception 2.
4. The shaft shall be served by an exhaust fan located at the top of the shaft and such fan shall be specifically designed for the intended application.
5. The exhaust fan shall run continuously and maintain negative pressure in the shaft at all times.
6. The exhaust fan operation shall be monitored in an approved location and shall initiate an audible or visual signal when the fan is not in operation.
7. Makeup air shall be provided for the spaces served in accordance with Section 501.3.
8. A cleanout opening of an approved size shall be located at the base of the shaft to provide access for inspection.
9. Screens installed at termination points shall comply with Section 501.2.2.

Reason: This proposal provides guidance as to the correct way to construct a sub-duct system utilizing a shaft constructed in accordance with the building code as long as that building is sprinkled. This method has been around for years and is an economical way to provide a method of exhausting bathroom exhaust in multi-story buildings without having to install fire and smoke dampers in the shaft. Dryer and kitchen exhaust would be prohibited in this scenario. This method when installed correctly can be located in any occupancy. Normally this would be practical in buildings of 4 stories or more and most commonly be employed in hotels.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-26-515

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Volume dampers need to be allowed. A cleanout opening in the shaft is unnecessary for this application. The proposed text creates a conflict with Section 607.5.5 regarding fire damper options. Item # 3 is confusing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 515
Common Multistory Bathroom Sub Duct Exhaust Systems

515.1 Common bathroom exhaust sub-duct systems located in multi-story buildings. Where a common shaft is designed and installed to convey bathroom exhaust, ~~or~~ toilet room exhaust, or both, in multiple story buildings, the construction of such system shall be in accordance with all of the following:

~~1.~~ ~~The building shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Building Code*~~.
~~2.~~ 1. Shaft construction shall conform to Section 708 of the *International Building Code*.
~~3.~~ ~~Volume dampers, fire dampers and smoke dampers shall be prohibited in the exhaust duct. Penetrations of the shaft shall be protected in accordance with Section 607.5.5 Exception 2~~.
2. Shaft penetrations shall be accomplished utilizing steel exhaust sub ducts having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage) extending 22 inches vertically in the shaft. Shaft penetration protection shall be in accordance with Section 607.5.5.
~~4.~~ 3. The shaft shall be served by an exhaust fan located at the top of the shaft. ~~and s~~ Such fan shall be ~~specifically designed for the intended~~ listed and tested for the application.
~~5.~~ 4. The exhaust fan shall run continuously and maintain negative pressure in the shaft at all times.
~~6.~~ 5. The exhaust fan operation shall be monitored in an approved location and shall initiate an audible or visual signal when the fan is not in operation.
~~7.~~ 6. Makeup air shall be provided for the spaces served in accordance with Section 501.3.
~~8.~~ ~~A cleanout opening of an approved size shall be located at the base of the shaft to provide access for inspection.~~
~~9.~~ ~~Screens installed at termination points shall comply with Section 501.2.2~~

Commenter's Reason: The committee said to make the modifications and bring it back. One concern was that the word "sub duct" wasn't in the heading. Another was prohibiting volume dampers in which the committee was correct. Volume dampers may be needed for balancing. Another concern was a cleanout wasn't required so that provision was removed. The reference to sub ducts extending 22 inches in the shaft was also added along with some general cleanup. Not including kitchen exhaust here is intentional although the Building Code permits it. The affect grease might have on drywall is not apparent at this time.

Final Action: AS AM AMPC____ D

M85-09/10
202, 602.1, 603.18 (New)

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

1. Delete and substitute as follows:

~~**602.1 General.** Supply, return, exhaust, relief and ventilation air plenums shall be limited to uninhabited crawl spaces, areas above a ceiling or below the floor, attic spaces and mechanical equipment rooms. Plenums shall be limited to one fire area. Fuel-fired appliances shall not be installed within a plenum.~~

602.1 General. The following shall be considered to be an air plenum:

1. Interstitial spaces above ceilings and below floors.
2. Stud wall cavities and spaces between solid floor joists utilized in accordance with Section 602.3
3. Boxes or chambers constructed to support air handlers and furnaces and to collect return air for such furnaces and air-handlers.
4. Mechanical room enclosures used to convey return air to air-handlers therein.

Plenums shall be limited to one fire area. Fuel-fired appliances shall not be installed in plenums.

2. Add new definition and text as follows:

DUCT PLENUM A box or chamber constructed of duct materials and used to collect air from or supply air to other ducts. Such plenums typically connect to the inlets and outlets of furnaces and air handlers.

603.18 Duct plenums. Duct plenums shall be constructed as required for ducts in accordance with Section 603.

Reason: This is only an attempt for the body of the code to recognize the use of various plenums found in most HVAC systems. Currently the code only speaks of plenums that take the form of structural components. The word "plenum" has been used in the trade for many years and can be most commonly found in residential applications but applies to many commercial systems as well. Sometimes large plenums are built as "fan houses" employing vane axial equipment. Plenums can be very big or small and never be part of the structure. Furnaces sometimes sit on top of plenum boxes. Many attic installations employ a plenum for flex duct distribution and so on. Using an attic or crawl space as a plenum makes little sense. Some of the problems associated with these types of designs are leakage, plenum heat loss, mold and moisture control, acceptable outlet performance, cleanliness and odor control. Verifying these issues would be very difficult for any inspector and the smallest oversight could wreak havoc for a jurisdiction. This text will solve the duct plenum recognition issue.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-34-202-602.1-603.18

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed term "duct plenum" creates confusion with current plenum definitions. Item # 1 of proposed section 602.1 would classify all such spaces as plenums and then restrictions would apply to piping and other materials installed in such spaces.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.1 General. ~~The following shall be considered an air plenum:~~ Air plenums shall be limited to the following:

1. Interstitial spaces above ceilings and below floors.
2. Interior ~~S~~ stud wall cavities and spaces between solid floor joists utilized in accordance with Section 602.3
3. Duct plenums. ~~Boxes or chambers constructed to support air handlers and furnaces to collect return air for such furnaces and air-handlers~~.
4. Mechanical room enclosures used to convey return air to air-handlers therein.

Plenums shall be limited to one fire area. Fuel-fired appliance shall not be installed in plenums.

DUCT PLENUM A box or chamber constructed of duct materials and used to collect air from or supply air to other ducts, equipment or appliances. ~~Such plenums typically connect to the inlet and outlet sides of furnaces and air handlers.~~

603.18 Duct plenums. Duct plenums shall be constructed as required for ducts in accordance with Section 603.

Commenter's Reason: The committee didn't care for the word "considered" so it was removed. Exterior wall building cavities are no longer condoned to be utilized as an air plenum. # 3 now refers to the new definition as the definition explains how duct plenums are intended to be used. The words "equipment and appliances" was added for clarification and the last sentence of the definition could be construed as commentary. The intent of this proposal was to house all requirements for plenums in one place for convenience to the user. The current code text only acknowledges structural components as plenums. There are no definitions in the IMC defining what a duct plenum is.

Final Action: AS AM AMPC____ D

M87-09/10
602.2.1

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

Revise as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1through 602.2.1.6, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within one of the following:
   5.1. continuous noncombustible raceways or enclosures
   5.2. approved gypsum board assemblies
   5.3. ~~or within~~ materials listed and labeled ~~for such application~~ as part of a tested assembly or system.

Reason: The issue of what materials are considered acceptable for exposure in a plenum is a life safety issue. The proposed change format of Exception 5 is to clarify that any one of these three options are only permitted when the combustible material is fully enclosed. The third option in Exception 5 is not clear as to what is meant by "for such application". This "protecting" material needs to provide sufficient protection of the combustible material during the event of a fire. Thus, to determine if the "protecting" material will remain in place during the event of a fire and not expose the combustible material to the fire, then the "protecting material" and the combustible material needs to be tested as an assembly or system.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EUGENE-M-15-602.2.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The revised text is confusing. Other means such as smoke detection should be pursued to lessen the hazard in plenums. There is no standard for testing and listing the assemblies and systems referred to in item 5.3.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1through 602.2.1.6, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.

3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within one of the following:
   5.1. continuous noncombustible raceways or enclosures
   5.2. approved gypsum board assemblies
   5.3. materials listed and labeled ~~as part of a tested assembly or system~~ <u>for installation within a plenum</u>.

Commenter's Reason: The issue of what materials are considered acceptable for exposure in a plenum is a life safety issue. The proposed change format of Exception 5 is to clarify that any one of these three options are only permitted when the combustible material is fully enclosed. The third option in Exception 5 is not clear as to what is meant by "for such application". This "protecting" material needs to provide sufficient protection of the combustible material during the event of a fire.

Final Action: AS AM AMPC____ D

M88-09/10
602.2.1

<u>Proposed Change as Submitted</u>

Proponent: Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

Revise as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.6, materials within plenums<u>, and the exposed surfaces of the materials of construction of the plenums containing the materials,</u> shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, *approved* gypsum board assemblies or within materials *listed* and *labeled* for such application.

Reason: This code proposal is just clarification. Materials of construction of the plenum need to comply with the requirements to be noncombustible or to have a flame spread index of no more than 25 and a smoke developed index of no more than 50 when tested to ASTM E 84. Plenums cannot be constructed of combustible materials unless they comply with those requirements.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HIRSCHLER-M-4-602.2.1

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The proposed revision conflicts with current Section 602.2 and Section 602.2 is the appropriate place for such revision.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), representing American Fire Safety Council and Robert J. Davidson (Davidson Code Concepts, LLC) representing self, requests Approval as Modified.

Replace the proposal as follows:

602.2 Construction. *Plenum* enclosures for buildings of Types I and II construction shall be constructed of noncombustible materials. Plenum enclosures for all other buildings shall be constructed of materials that are noncombustible or that exhibit a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723 ~~permitted for the type of construction classification of the building~~.

The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

Commenter's Reason: The technical committee was concerned that the proposal was placed in the wrong location because the requirements conflicted with the requirements of section 602.2 which would appear to allow plenum enclosures to be constructed of wood or other combustible building materials. This permission is not logical since all materials within plenums have to be noncombustible or meet the flame spread index and smoke-developed index requirements (25/50). Therefore, if the plenum enclosures can be made of wood, any fire would be able to spread along the walls of the plenum (wood typically has a flame spread index of up to 200) even with the best materials contained within the plenum. The revised language takes care of this by requiring that plenum enclosures are constructed of noncombustible materials for plenums in buildings of Types I and II construction and of materials that meet the same fire test requirements as the materials in the plenum for all other types of buildings.

Final Action: AS AM AMPC____ D

M89-09/10
602.2.1, 602.2.1.6

Proposed Change as Submitted

Proponent: Bob Eugene, representing Underwriter Laboratories, Inc.

1. Revise as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1through 602.2.1.~~6~~5, materials within plenums shall be noncombustible or shall be listed and labeled as having ~~have~~ a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, approved gypsum board assemblies or within materials listed and labeled for such application.
6. Materials in Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area.

2. Delete without substitution:

~~**602.2.1.6 Semiconductor fabrication areas.** Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area shall not be subject to the provisions of Section 602.2.1~~.

Reason: Section 602.2.1.6 is an exception to Section 602.2.1. The issue of what materials are considered acceptable for exposure in a plenum is a life safety issue. Other combustible products in the plenum, such as wiring, fire sprinkler piping, pneumatic tubing, and electrical equipment, are required to be listed and labeled. Only listing and labeling of a product can verify that the product installed at a jobsite is composed of the same material originally tested.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EUGENE-M-3-602.2.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

David W Ash, Lubrizol Advanced Materials Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.5, materials within plenums shall be noncombustible or shall ~~be listed and labeled as having~~ have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, approved gypsum board assemblies or within materials listed and labeled for such application.
6. Materials in Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area.

Commenter's Reason: This modification would preserve the current language as it pertains to the substantiation required to demonstrate a flame spread index of 25 or less and a smoke developed index of 50 or less. The proposal approved by the Technical Committee would require that all materials in a plenum, regardless of the amount, be both listed and labeled. Listing and labeling would be an additional requirement for the manufacturer and the cost of that process would most certainly be an added cost of construction contrary to the proponent's statement in the proposal.

No data has been presented that substantiates the position that the current language has created a safety concern.

Public Comment 2:

Michael Cudahy representing PPFA (Plastic Pipe and Fittings Association), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1through 602.2.1.65, materials within plenums shall be noncombustible or shall ~~be listed and labeled as having~~ have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, approved gypsum board assemblies or within materials listed and labeled for such application.
6. Materials in Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area.

Commenters Reason: Adding "be listed and labeled as having" seems like a minor change in language, but it is a significant change in intent. That part of this change would increase the costs of construction and it is unclear if all manufacturers would chose to list and label every product that could potentially be used in a plenum space. Not every device or material is even described on how it should be tested to ASTM E84. This could unintentionally result in an inability to complete projects due to the lack of a few critical components and is a bad idea.

Redundant testing of existing products is simply unnecessary and a new burden on manufacturing at the worst possible time economically.

PPFA urges the FAH to accept this modification.

Final Action: AS AM AMPC____ D

M90-09/10
602.2.1, 602.2.1.7 (New)

Proposed Change as Submitted

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (PPFA)

1. Revise as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.~~6~~7, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, *approved* gypsum board assemblies or within materials *listed* and *labeled* for such application.

2. Add new text as follows:

602.2.1.7 Plastic plumbing pipe. Plastic drain, waste and vent piping exposed within a plenum shall comply with one or more of the following requirements:

1. The piping shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887.
2. The piping shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Reason: As many have noted, the current version of ASTM E-84, while having been used to evaluate plastic pipe fire related properties for use in plenums, is not an ideal test method for this use. Amongst the reasons for this are the contents of the current version of the E-84 standard which is vague as to mounting methods and other test conditions for evaluating such pipe. For that reason, UL 1887, an existing test method based on technology which has been evaluated with considerable scrutiny and was developed to test and rate combustible fire sprinkler piping systems for use in plenum spaces is recommended in this case by PPFA.

With regard to enhancing the ASTM E-84 language, the ASTM E-5 committee is currently voting on changes to the current standard which will clarify mounting methods for plastic pipe materials in the tunnel making its results more comparable between materials and from material to material within a generic group. PPFA is also supporting development of new text for the E-84 standard referring and recommending that flamespread properties of plastic pipe for plenum applications be tested according to UL – 1887. UL has been consulted on the proposed change and does not oppose it. UL 1887 is already referenced in the IMC and is not a new standard.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CUDAHY-M-2-602.2.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The UL 1887 standard is not appropriate for DWV piping as it is not filled with water. The proposed revision will lessen safety with regard to smoke production.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Michael Cudahy representing PPFA (Plastic Pipe and Fittings Association), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.7, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, *approved* gypsum board assemblies or within materials *listed* and *labeled* for such application.

602.2.1.7 Plastic water distribution ~~plumbing~~ pipe. Plastic water distribution ~~drain, waste and vent~~ piping exposed within a plenum shall comply with one or more of the following requirements:

1. The piping shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887.
2. The piping shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Commenter's Reason: The Committee's stated reasons for recommending disapproval were, "The UL 1887 standard is not appropriate for DWV piping as it is not filled with water. The proposed revision will lessen safety with regard to smoke production."

By making the modification above, the section would only apply to "wet" water distribution pipe and not DWV pipe. UL 1887 and the stated limits are ***already*** in the code, and are ***accepted*** parameters.

As many have noted, the current version of ASTM E-84, while having been used to evaluate plastic pipe for use in plenums, is not an ideal test method for this use. Amongst the reasons for this are the contents of the current version of the E-84 standard which is vague as to mounting methods and other test conditions for evaluating such pipe. For that reason, UL 1887, an existing test method based on technology which has been evaluated with considerable scrutiny and was developed to test and rate combustible fire sprinkler piping systems for use in plenum spaces is recommended in this case by PPFA. UL 1887 is simply a better tool in the tool box to rate plastic pipe of all kinds, not just plastic sprinkler pipe.

UL has been consulted on the proposed change and does not oppose it. UL 1887 is already referenced in the IMC and is not a new standard.

PPFA urges the FAH to support this modification, which answers the stated reasons of the committee.

Public Comment 2:

Marcelo M. Hirschler (GBH International), representing American Fire Safety Council and Robert J. Davidson (Davidson Code Concepts, LLC) representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.7, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, *approved* gypsum board assemblies or within materials *listed* and *labeled* for such application.

~~**602.2.1.7 Plastic plumbing pipe.** Plastic drain, waste and vent piping exposed within a plenum shall comply with one or more of the following requirements:~~

~~1. The piping shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887.~~
~~2. The piping shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.~~

602.2.1.7 Plastic drain, waste and vent piping. Plastic drain, waste and vent piping exposed within a *plenum* shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Such piping shall be *listed* and *labeled*.

Commenter's Reason: The IMC code is silent with regard to plastic piping because plastic piping qualifies for use in plenums under the general requirements that all materials exposed within plenums must be noncombustible or be tested to ASTM E 84/UL 723 and get the 25/50 flame and smoke requirements. In fact most plastic materials that are used to make pipe can't meet those requirements. Therefore, what most plastic pipe manufacturers do is something "clever" that pretends to comply with the code but does not comply with the letter of the way ASTM E 84 is written. What is typically done is that the tests are conducted in the ASTM E 84 Steiner tunnel by stringing one pipe along the center of the tunnel and either (a) filling the pipe with water during the test and closing both ends, or (b) having water continuously run through the pipe from an outside source. It is much easier, of course, to meet the requirements that way. It is also not what is intended by the code, because the code intends to protect the building/structure at the time there is construction or alterations and when the pipe is empty.

The code also requires plastic fire sprinkler piping to be tested in accordance with UL 1887, as follows:

602.2.1.2 Fire sprinkler piping. Plastic fire sprinkler piping exposed within a *plenum* shall be used only in wet pipe systems and shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Piping shall be *listed* and *labeled*.

UL 1887 uses the same apparatus as ASTM E 84: the Steiner tunnel. In UL 1887 one length of sprinkler pipe is placed in the middle of the tunnel to conduct the test. The sprinkler pipe is empty and dry, without stoppers and of the thickness and overall width intended for use. In fact, UL 1887 is a test that was developed because it has always been understood that there can't be hundreds of fire sprinkler pipes in a plenum, as the sprinkler design does not permit that. In fact, similarly there can't be hundreds of drain, waste and vent pipes in the same area because they would interfere with the plenum air supply. Therefore, it would be appropriate to require that drain, waste and vent pipes be tested in exactly the same way as sprinkler pipes. Information on the UL 1887 requirements are contained in the UL Guide on UL 1887 (VIWT GuideInfo - Chlorinated Polyvinyl Chloride Sprinkler Pipe and Fittings).

The original proposal gave two options for testing pipe, one of which was to continue what is being done now, namely to test via ASTM E 84 full of water: that is not safe. I submitted a code proposal at the last cycle where the proposal required that the report indicate that the test was conducted without water. The proposal failed at final action because testimony said that code officials would not see that detail in the report and that it would create confusion. Therefore, accepting the proposal as written would allow plastic pipe manufacturers to keep testing that way and that is unacceptable.

What this comment recommends is that only the other option of the proposal be accepted and that it be made more severe so that it becomes just as severe as plastic sprinkler piping, in that the pipes must be tested in accordance with UL 1887, without use of water during the test and that the pipes must be listed and labeled and that the pipes can only be used in wet pipe systems.

The scope of UL 1887 is limited to fire sprinkler piping but UL has stated publicly that a change in the scope can be done, but only after the code requires pipes to be tested the same way as fire sprinkler pipes.

Public Comment 3:

Joseph Zicherman, Fire Cause Analysis, representing Plastic Pipe and Fittings Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.7, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, *approved* gypsum board assemblies or within materials *listed* and *labeled* for such application.

602.2.1.7 Plastic plumbing pipe. Plastic ~~drain, waste and vent~~ water distribution piping used in wet systems and exposed within a plenum shall comply with one or more of the following requirements:

1. The piping shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887.
2. The piping shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Commenter's Reason: The intent of this proposal to the M-090 change text [as modified] is to provide a second, well known and widely accepted test method, UL-1887, to evaluate the acceptability of combustible supply piping to be used in plenum spaces. Such piping is used for hot and cold water supply but not as drain, waste and vent piping.

This action will complement the current standard, the ASTM E-84 test method, which is available to assess flamespread properties of combustible supply piping, and provide regulators and suppliers with the improved option of the UL test method to assess production of smoke by combustible piping.

While UL 1887 is specifically scoped for use with combustible sprinkler piping at the present time, it is my understanding from discussions with UL representatives that allowing for/requiring its utilization for combustible pressure piping, will not require modification of that standard. The membership should note that such piping is functionally equivalent to sprinkler piping in the application covered by the proposed code change.

In all cases testing according to UL 1887 is carried out on empty piping, i.e. piping NOT including water or any other liquid. This was a concern stated by the Committee in its earlier deliberations. This test condition insures that under the proposal combustible piping will be tested according to the most pessimistic scenario possible when comparing full or empty piping. This is because empty combustible piping is far more easily ignited and presents a greater smoke hazard than combustible piping that is full of water when they are compared directly.

The membership should also be aware that valid concerns have been raised that, on occasion, combustible piping has been tested develop flamespread and smoke developed indices in an E-84 furnace when it was full of water to.

Not surprisingly, such a testing condition yields lower E-84 flamespread results than when the same pipe is filled with water and then tested. The results of such testing practices are open to question.

As a result, currently a ballot measure assuring that piping materials shall not be tested containing water in the ASTM E-84 furnace is making its way thru the balloting process in the ASTM E-5 Committee (Fire Test Standards). In addition, mounting for E-84 testing conditions - in terms of amount of combustible pipe tested to provide E-84 data - have been under debate in ASTM. A change, requiring that tested items fill the furnace yielding full width testing in conjunction with the new requirement eliminating testing with liquid fill, will insure a more level playing field in testing combustible piping.

The combination of test methods that will result from enacting the proposed in the M-90 change as modified will enhance fire safety levels. At the same time the change will contribute to further the use of cost effective materials and installation techniques for users of the International Mechanical Code. Additionally, the inclusion of two test methods that eliminate the possibility of testing combustible pipe filled with water will reduce attendant possible levels of fire hazard when combustible pipe is used in air handling plenums. Adoption of the proposed change will also address the concerns of the committee in rejecting the original M-090 proposal.

Final Action: AS AM AMPC____ D

M93-09/10
602.2.1.2

Proposed Change as Submitted

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (PPFA)

Revise as follows:

602.2.1.2 Fire sprinkler <u>and water distribution</u> piping. Plastic fire sprinkler piping <u>and water distribution piping</u> exposed within a *plenum* shall <u>comply with one or more of the following requirements:</u> ~~be used only in wet pipe systems and shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Piping shall be *listed* and *labeled*.~~

1. <u>The piping shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887.</u>
2. <u>The piping shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.</u>

<u>Plastic fire sprinkler piping shall be listed and labeled. Plastic fire sprinkler piping exposed within a plenum shall be used only in wet pipe systems.</u>

Reason: As many have noted, the current version of ASTM E-84, while having been used to evaluate plastic pipe fire related properties for use in plenums, is not an ideal test method for this use. This change addresses that situation and also extends the use of the test methods to other plastic piping materials that are currently being used in plenum spaces.

Amongst the reasons that ASTM E-84 has been criticized as a means to assess the fire performance of plastic pipe for plenum applications are the contents of the current version of the E-84 standard which are vague as to pipe mounting methods and amount of pipe exposed as well as other test conditions for evaluating plastic pipe. For that reason, UL 1887, an existing test method based on technology which has been evaluated with considerable scrutiny and was developed to test and rate combustible fire sprinkler piping systems for use in plenum spaces is recommended in this case by PPFA.

With regard to enhancing the ASTM E-84 language, the ASTM E-5 committee is currently voting on changes to the current standard which will clarify mounting methods for plastic pipe materials in the tunnel making its results more comparable between materials and from material to material within a generic group. PPFA is also supporting development of new text for the E-84 standard referring and recommending that flamespread properties of plastic pipe for plenum applications be tested according to UL – 1887. UL has been consulted on the proposed change and does not oppose it. UL 1887 is already referenced in the IMC and is not a new standard.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CUDAHY-M-3-602.2.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval is consistent with the action taken on M90-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tim Manz representing Association of Minnesota Building Officials (AMBO) requests Approval as Submitted.

Modify the proposal as follows:

Commenter's Reason: UL 1887 is an appropriate test for water distribution piping as specified in code change proposal M93, since it is normally full of water--just like plastic sprinkler piping. Unlike M90, code change proposal M93 deals with water distribution piping, not DWV piping as the Committee Reason suggests.

Final Action: AS AM AMPC____ D

M96-09/10
602.2.1.7 (New)

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

Add new text as follows:

602.2.1.7 Plumbing and mechanical equipment in plenums. Where discrete plumbing and mechanical equipment, appurtenances and appliances are located in a plenum and have exposed combustible material, they shall be listed and labeled for such use in accordance with UL 2043.

Reason: There are combustible plumbing and mechanical equipment, such as plumbing appurtenances, pipe and duct supports, grilles and registers that are used in plenums, that cannot be effectively tested in accordance with standards ASTM E84 or UL 723. The UL 2043 standard was developed to test products and materials not able to be tested in accordance with ASTM E84 or UL 723, and is currently adopted by reference in Section 602.2.1.4.2. These products are individual distinct pieces and non-continuous (i.e. "discrete").
This proposal was presented last cycle and the Committee had questions about the term "discrete'. Per the dictionary, 'discrete' refers to products that are non-continuous, individual distinct pieces, as compared to non-discrete products such as cable or plastic pipe.
If adopted this proposal will provide consistency in how the ICC codes treat discrete components in plenums.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EUGENE-M-11-602.2.1.7

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The term "discrete" is subjective. UL 2043 is not equivalent to ASTM E 84 or UL 723. The proposed text is too broad in scope.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1.7 Plumbing and mechanical equipment in plenums. Where discrete, noncontinuous, plumbing and mechanical equipment, appurtenances and appliances are located in a plenum and have exposed combustible material, they shall be listed and labeled for such use in accordance with UL 2043.

Commenter's Reason: The term "noncontinuous" is added to clarify that individual distinct products or accessory pieces such as duct supports, grilles and registers are appropriate for installation within a plenum when compliant with the rate of heat release and the rate of smoke release of the burning product samples as they relate to the requirements for fire-resistant and low-smoke-producing characteristics in accordance with the provisions of the International Mechanical Code. These discrete, non-continuous products are not of a shape and design to be eligible for evaluation in accordance with ASTM E84 or UL723.

Final Action: AS AM AMPC____ D

M100-09/10
603.5.2 (New)

Proposed Change as Submitted

Proponent: James Karnes, representing Dura Tite Systems, LLC

Add new text as follows:

603.5.2 Nonmetallic duct fittings. Non-metallic forced air duct fittings that are considered discrete shall pass testing in accordance with UL 2043.

Reason: Under the current code, duct fittings are not addressed. It is assumed in most jurisdictions that a fitting is part of the duct system, and therefore nonmetallic fittings should be addressed under section 603.5 Nonmetallic Ducts. Section 603.5 states requirements for nonmetallic ducts to be constructed with Class 0 or Class 1 material as tested under UL 723 using ASTM E-84 method. This section generally pertains to duct board products, and are considered continuous building products. Fittings are not addressed, and cannot be tested using UL 723 (ASTM E-84) due to the size limitations of the test chamber. Discrete products can be alternately tested using UL2043.

Discrete is identified as a non-continuous building product, and the definition has been accepted by the IMC in the past for electrical products such as speaker boxes. The UL 2043 utilizes a test chamber that is 24 inches cubed. UL 2043 is the alternate test method to UL 723, for discrete products.

This new sub-section will address nonmetallic fittings and clarify the standards for compliance within the code.

Toxicity of smoke is not tested for under UL 2043, nor under any other test method used in the codes. Toxicity of smoke is not a required test for any building product.

This section does not address plumbing fittings, which are generally solvent welded together, creating a continuous building product.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KARNES-M-1-603.5.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: No pass/fail criteria is stated. The words "that are considered discrete" are subjective. There are no definitive limits stated in UL 2043. The words "forced air" used to describe fittings are odd because fittings are fittings regardless of the air type.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Karnes representing DuraTite Systems, LLC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

603.5.2 Nonmetallic Duct Fittings. Non-metallic ~~forced air~~ duct fittings ~~that are considered discrete~~ shall ~~pass testing~~ <u>be listed and labeled</u> in accordance with UL 2043.

Commenter's Reason: The proposed modification responds to the comments by the Committee. The section has been modified to require listing and labeling of nonmetallic duct fittings to UL 2043.

The Committee was confused by the reference to UL 2043. They thought that there needs to be end point criteria specified when you reference the standard. That is not true since the standard specifies a peak rate of heat release not greater than 100 kilowatts, a peak optical density not greater than 0.50, and an average optical density not greater than 0.15.

The requirements for nonmetallic duct fittings is unclear in the Mechanical Code. Without a specific reference, it is often thought that Section 603.5 is the applicable section. However, UL 181 is not the standard used for testing non-metallic duct fittings. UL 181 does refer to UL 2043 in its scope to deal with non-metallic mechanical fasteners which are discrete, non-continuous parts of the duct system.

UL 2043 ("Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces") is the appropriate testing standard for non-continuous building products ("discrete") and is accepted by reference in the code section 602.2.1.4 (Combustible Electrical Equipment). The UL 2043 Standard covers discrete electrical, plumbing, and mechanical products that are to be used within the air-handling space.

This new section is necessary to add the appropriate regulations and acceptance criteria for non-metallic duct fittings.

Final Action: AS AM AMPC____ D

M102-09/10, Part I
603.7 (New)

Proposed Change as Submitted

Proponent: Guy Tomberlin, Fairfax County, VA, representing the Virginia Plumbing and Mechanical Inspectors/Virginia Building and Code Officials

PART I – IMC

Add new text as follows:

<u>**603.7 Above ground plastic ducts**. Plastic ducts and fittings not listed in compliance with UL 181 shall be prohibited above grade.</u>

Reason: (**PART I**) Current code fails to say anything about the use of plastic ducts and fittings above grade. Section 603.8 is titled "underground ducts" and that's the only place that references an approved installation for plastic duct. Unfortunately, some believe that since they are not strictly prohibited they must be permitted, even absent code guidance for the installation. Until such time as industry comes out with an accepted standard and installation criteria similar to what is required for plumbing piping and fittings, the mechanical code needs to take a position on the use of the material.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:T OMBERLIN-M-10-603.7-RM-3-M1601.1.2

Public Hearing Results

PART I - IMC
Committee Action: Disapproved

Committee Reason: The proposed text limits plastic technologies. Fittings cannot be tested to UL 181 therefore the proposed text creates an impossibility.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), requests Approval as Submitted.

Commenter's Reason: Part of the committee's reason for disapproval stated that the fittings for these systems cannot be tested to UL 181. With that said, and the disapproval of the committee, we are to condone the installation of above ground plastic ducts that are not tested to a nationally recognized standard. That's completely contradictory to IMC 301.5.1 which requires mechanical equipment to be labeled to a relevant standard. UL 181 is the relevant standard for plastic duct systems, which of course would have to include any fittings used with that duct system.

Final Action: AS AM AMPC____ D

M102-09/10, Part II
IRC M1601.1.2 (New)

Proposed Change as Submitted

Proponent: Guy Tomberlin, Fairfax County, VA, representing the Virginia Plumbing and Mechanical Inspectors/Virginia Building and Code Officials

PART II – IRC MECHANICAL

Add new text as follows:

<u>**M1601.1.2 Prohibited ducts**. Plastic ducts and fittings not listed as in compliance with UL 181 shall be prohibited above grade.</u>

(**PART II**) Current code fails to say anything about the use of plastic ducts and fittings above grade. The only reference is existing Section 1601.1.2 titled "underground ducts," and that's the only place that references an approved installation for plastic duct. Unfortunately, some believe that since they are not strictly prohibited they must be permitted, even absent code guidance for the installation. Until such time as industry comes out with an accepted standard and installation criteria similar to what is required for plumbing piping and fittings, the mechanical code needs to take a position on the use of the material.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:T OMBERLIN-M-10-603.7-RM-3-M1601.1.2

Public Hearing Results

PART II - IRC
Committee Action: **Disapproved**

Committee Reason: Fittings cannot be tested to UL 181 and UL 181 is not the appropriate standard for plastic ducts. Plastic solvent-welded ducts should be encouraged for energy efficiency. Exposed DWV PVC plastic is acceptable, so why not PVC ducts ?

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), requests Approval as Submitted.

Commenter's Reason: Part of the committee's reason for disapproval stated that the fittings for these systems cannot be tested to UL 181. With that said, and the disapproval of the committee, we are to condone the installation of above ground plastic ducts that are not tested to a nationally recognized standard. That's completely contradictory to IMC 301.5.1 which requires mechanical equipment to be labeled to a relevant standard. UL 181 is the relevant standard for plastic duct systems, which of course would have to include any fittings used with that duct system.

Final Action: AS AM AMPC____ D

M106-09/10
603.10

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Delete and substitute as follows:

~~**603.10 Supports.** Ducts shall be supported with approved hangers at intervals not exceeding 10 feet (3048 mm) or by other approved duct support systems designed in accordance with the International Building Code. Flexible and other factory-made ducts shall be supported in accordance with the manufacturer's installation instructions~~.

<u>**603.10 Supports.** Ducts shall be supported in accordance with Chapter 5 of the SMACNA HVAC Duct Construction Standards- Metal and Flexible or by other approved supporting systems. Flexible and other factory-made ducts shall be supported in accordance with the manufacturer's installation instructions</u>.

Reason: The SMACNA Standard permits some sizes to be supported at intervals greater than 10 feet such as 4 inch. The IBC does not govern how ducts are to be supported, that's between the IMC and SMACNA. The code official can approve any engineered system with proper back-up.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-37-603.10

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The 10 foot interval proposed for deletion gave good guidance. The proposed text offers no guidance for the approval of other support methodologies.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

603.10 Supports. Ducts shall be supported at intervals not to exceed 12 feet and shall be in accordance with ~~Chapter 5 of the~~ SMACNA HVAC Duct Construction Standards Metal and Flexible ~~or by other approved supporting systems~~. Flexible and other factory-made ducts shall be supported in accordance with the manufacturers' installations instructions.

Commenter's Reason: The committee wanted to keep a maximum support interval stated and didn't care for the statement "or by other approved supporting systems". It's appropriate that the SMACNA Standard be referenced here because all the requirements for supports are there. The user can pick from the many supporting methods found in the standard that may fit a particular need.

Final Action: AS AM AMPC____ D

M120-09/10
908.1

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

Revise as follows:

908.1 General. A cooling tower used in conjunction with an air-conditioning appliance shall be installed in accordance with the manufacturer's installation instructions. Cooling towers shall comply with UL 1995.

Reason: UL 1995 is already referenced in Chapter 15. UL 1995 includes a comprehensive set of construction and performance requirements that are used to evaluate and list cooling towers, and is already adopted by reference in other sections of the IMC.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Eugene-M-22-908.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Rebuilt or rehabilitated cooling towers would have to be listed if they were not already listed before they could be reused or reinstalled. An optional standard is needed. Major components such as cooling towers should not be required to be listed. Some towers are huge structures that might not be able to be listed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

908.1 General. A cooling tower used in conjunction with an air-conditioning appliance shall be installed in accordance with the manufacturer's installation instructions. Factory-built cooling towers shall ~~comply~~ be listed in accordance with UL 1995.

Commenter's Reason: UL 1995 is already referenced in Chapter 15. UL 1995 includes a comprehensive set of construction and performance requirements that are used to evaluate and list cooling towers, and is already adopted by reference in other sections of the IMC. It is appropriate that factory-built cooling towers be listed.

Final Action: AS AM AMPC____ D

M125-09/10
928 (New), Chapter 15

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

1. Add new text as follows:

SECTION 928
RADIANT HEATING SYSTEMS

928.1 General. Electric radiant heating systems shall be installed in accordance with the manufacturer's installation instructions and shall be listed for the application. Electric radiant heating panels and heating panel sets shall comply with UL 1693. Electric space heating cables shall comply with UL 1673.

928.2 Clearances. Clearances for radiant heating panels or elements to any wiring, outlet boxes and junction boxes used for installing electrical devices or mounting luminaires shall be in accordance with NFPA 70.

928.3 Installation on wood or steel framing. Radiant panels installed on wood or steel framing shall conform to the following requirements:

1. Heating panels shall be installed parallel to framing members and secured to the surface of framing members or shall be mounted between framing members.
2. Mechanical fasteners shall penetrate only the unheated portions provided for this purpose. Panels shall not be fastened at any point closer than ¼ inch (7 mm) to an element. Other methods of attachment of the panels shall be in accordance with the panel installation instructions.
3. Unless listed and labeled for field cutting, heating panels shall be installed as complete units.

928.4 Installation in concrete or masonry. Radiant heating systems installed in concrete or masonry shall conform to the following requirements:

1. Radiant heating systems shall be identified as being suitable for the installation, and shall be secured in place as specified in the manufacturer's installation instructions.
2. Radiant heating panels and radiant heating panel sets shall not be installed where they bridge expansion joints unless protected from expansion and contraction.

928.5 Finish surfaces. Finish materials installed over radiant heating panels and systems shall be installed in accordance with the manufacturer's installation instructions. Surfaces shall be secured so that fasteners do not pierce the radiant heating elements.

2. Add new standards to Chapter 15 as follows:

UL

1673-96 Electric Space Heating Cables – with revisions through July 2003

1693-02 Electric Radiant Heating Panels and Heating Panel Sets

Reason: The requirements included in this new section cover the installation of radiant heating systems. They are based on requirements included in Section M1406 of the International Residential Code. UL 1673 and UL 1693 are the standards used to investigate and list electric space heating cables and electric radiant heating panels. Over 20 companies have listings for these products.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standards UL 1673-96 and UL 1693-02, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: EUGENE-M-21-928-CH 15

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standards did not comply with ICC standards criteria, Section 3.6.3.2.

Committee Action: Disapproved

Committee Reason: The clearance inspection requirement of proposed Section 928.2 is not enforceable because of the reference to NFPA 70.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 928
RADIANT HEATING SYSTEMS

928.1 General. Electric radiant heating systems shall be installed in accordance with the manufacturer's installation instructions and shall be listed for the application. ~~Electric radiant heating panels and heating panel sets shall comply with UL 1693. Electric space heating cables shall comply with UL 1673.~~

928.2 Clearances. Clearances for radiant heating panels or elements to any wiring, outlet boxes and junction boxes used for installing electrical devices or mounting luminaires shall be in accordance with the International Building Code and NFPA 70.

928.3 Installation on wood or steel framing. Radiant panels installed on wood or steel framing shall conform to the following requirements:

1. Heating panels shall be installed parallel to framing members and secured to the surface of framing members or shall be mounted between framing members.
2. Mechanical fasteners shall penetrate only the unheated portions provided for this purpose. Panels shall not be fastened at any point closer than ¼ inch (7 mm) to an element. Other methods of attachment of the panels shall be in accordance with the panel installation instructions.
3. Unless listed and labeled for field cutting, heating panels shall be installed as complete units.

928.4 Installation in concrete or masonry. Radiant heating systems installed in concrete or masonry shall conform to the following requirements:

1. Radiant heating systems shall be identified as being suitable for the installation, and shall be secured in place as specified in the manufacturer's installation instructions.
2. Radiant heating panels and radiant heating panel sets shall not be installed where they bridge expansion joints unless protected from expansion and contraction.

928.5 Finish surfaces. Finish materials installed over radiant heating panels and systems shall be installed in accordance with the manufacturer's installation instructions. Surfaces shall be secured so that fasteners do not pierce the radiant heating elements.

UL
~~1673-96~~ ~~Electric Space Heating Cables – with revisions through July 2003~~
~~1693-02~~ ~~Electric Radiant Heating Panels and Heating Panel Sets~~

Commenter's Reason: The requirements included in this new section cover the installation of radiant heating systems. They are based on requirements included in Section M1406 of the International Residential Code. Over 20 companies have listings for these products. UL 1673 and UL 1693 have been deleted because, in the opinion of ICC staff, the standards did not comply with ICC standards criteria, Section 3.6.3.2. The International Building Code has been added to Section 928.2 to assure that the clearances required by NFPA 70 can be enforced.

Final Action: AS AM AMPC____ D

M127-09/10, Part I
1002.1, Chapter 15

Proposed Change as Submitted

PART I – IMC

1. Revise as follows:

1002.1 General. Potable water heaters and hot water storage tanks shall be listed and labeled and installed in accordance with the manufacturer's installation instructions, the *International Plumbing Code* and this code. All water heaters shall be capable of being removed without first removing a permanent portion of the building structure. The potable water connections and relief valves for all water heaters shall conform to the requirements of the *International Plumbing Code* . Domestic electric water heaters shall comply with UL 174 or UL 1453. Commercial electric water heaters shall comply with UL 1453. Oil-fired water heaters shall comply with UL 732. <u>Solid-fuel-fired water heaters shall</u> <u>comply with UL 2523</u>. <u>Thermal solar water heaters shall comply with Chapter 14 and UL 174 or UL 1453.</u>

2. Add new standard to Chapter 15 as follows:

UL
<u>2523-09</u> <u>Outline of Investigation for Solid Fuel-Fired Water Heaters and Boilers</u>

Reason: The UL Subject 2523 Outline of Investigation includes a comprehensive set of construction and performance requirements that are used to evaluate and list factory built manually and/or automatically fueled solid fuel-fired water heaters. UL 174 is the standard used to evaluate and list thermal solar water heaters.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard UL 2523-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: EUGENE-M-23-1002.1-CH 15-RM-21-M2005.1-CH 44

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.3.2.

PART I - IMC
Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IMC

1002.1 General. Potable water heaters and hot water storage tanks shall be listed and labeled and installed in accordance with the manufacturer's installation instructions, the *International Plumbing Code* and this code. All water heaters shall be capable of being removed without first removing a permanent portion of the building structure. The potable water connections and relief valves for all water heaters shall conform to the requirements of the *International Plumbing Code* . Domestic electric water heaters shall comply with UL 174 or UL 1453. Commercial electric water heaters shall comply with UL 1453. Oil-fired water heaters shall comply with UL 732. Solid-fuel-fired water heaters shall comply with UL 2523. Thermal solar water heaters shall comply with Chapter 14 and UL 174 or UL 1453.

UL
2523-09 ~~Outline of Investigation for~~ Solid Fuel-Fired <u>Hydronic Heating Appliances</u>.

Commenter's Reason: The First Edition of ANSI/UL 2523 includes requirements that cover solid fuel-fired hydronic heating appliances, water heaters, and boilers was issued December 22, 2009.

Public Comment 2:

Jonathan Humble (Chairman) representing ICC Reference Standards Committee, requests Approval as Modified.

Modify the proposal as follows:

PART I – IMC

1002.1 General. Potable water heaters and hot water storage tanks shall be listed and labeled and installed in accordance with the manufacturer's installation instructions, the *International Plumbing Code* and this code. All water heaters shall be capable of being removed without first removing a permanent portion of the building structure. The potable water connections and relief valves for all water heaters shall conform to the requirements of the *International Plumbing Code* . Domestic electric water heaters shall comply with UL 174 or UL 1453. Commercial electric water heaters shall comply with UL 1453. Oil-fired water heaters shall comply with UL 732. ~~Solid-fuel-fired water heaters shall comply with UL 2523~~. Thermal solar water heaters shall comply with Chapter 14 and UL 174 or UL 14

UL
~~2523-09~~ ~~Outline of Investigation for Solid Fuel-Fired Water Heaters and Boilers~~

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.

We therefore propose to have deleted the reference standard and subsequent reference to that standard as part of this proposal to modify the original proposal.

Final Action: AS AM AMPC____ D

M127-09/10, Part II
IRC M2005.1, Chapter 44

<u>Proposed Change as Submitted</u>

PART II – IRC MECHANICAL

1. Revise as follows:

M2005.1 General. Water heaters shall be installed in accordance with the manufacturer's installation instructions and the requirements of this code. Water heaters installed in an attic shall conform to the requirements of Section M1305.1.3. Gas-fired water heaters shall conform to the requirements in Chapter 24. Domestic electric water heaters shall conform to UL 174 or UL 1453. Commercial electric water heaters shall conform to UL 1453. Oiled-fired water heaters shall conform to UL 732. <u>Thermal solar water heaters shall comply with Chapter 23 and UL 174. Solid-fuel-fired water heaters shall comply with UL 2523.</u>

2. Add new standard to Chapter 44 as follows:

UL
<u>2523-09 Outline of Investigation for Solid Fuel-Fired Water Heaters and Boilers</u>

Reason: The UL Subject 2523 Outline of Investigation includes a comprehensive set of construction and performance requirements that are used to evaluate and list factory built manually and/or automatically fueled solid fuel-fired water heaters. UL 174 is the standard used to evaluate and list thermal solar water heaters.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard UL 2523-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: EUGENE-M-23-1002.1-CH 15-RM-21-M2005.1-CH 44

<u>Public Hearing Results</u>

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.3.2.

PART II - IRC
Committee Action: **Approved as Submitted**

Committee Reason: Approval was based on the proponent's printed reason.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART II – IRC

M2005.1 General. Water heaters shall be installed in accordance with the manufacturer's installation instructions and the requirements of this code. Water heaters installed in an attic shall conform to the requirements of Section M1305.1.3. Gas-fired water heaters shall conform to the requirements in Chapter 24. Domestic electric water heaters shall conform to UL 174 or UL 1453. Commercial electric water heaters shall conform to UL 1453. Oiled-fired water heaters shall conform to UL 732. Thermal solar water heaters shall comply with Chapter 23 and UL 174. Solid-fuel-fired water heaters shall comply with UL 2523.

UL
2523-09 ~~Outline of Investigation for~~ Solid Fuel-Fired Hydronic Heating Appliances.

Commenter's Reason: The First Edition of ANSI/UL 2523 includes requirements that cover solid fuel-fired hydronic heating appliances, water heaters, and boilers was issued December 22, 2009.

Public Comment 2:

Jonathan Humble (Chairman) representing ICC Reference Standards Committee, requests Approval as Modified.

Modify the proposal as follows:

PART II-IRC

M2005.1 General. Water heaters shall be installed in accordance with the manufacturer's installation instructions and the requirements of this code. Water heaters installed in an attic shall conform to the requirements of Section M1305.1.3. Gas-fired water heaters shall conform to the requirements in Chapter 24. Domestic electric water heaters shall conform to UL 174 or UL 1453. Commercial electric water heaters shall conform to UL 1453. Oiled-fired water heaters shall conform to UL 732. Thermal solar water heaters shall comply with Chapter 23 and UL 174. ~~Solid-fuel-fired water heaters shall comply with UL 2523.~~

UL
~~2523-09 Outline of Investigation for Solid Fuel-Fired Water Heaters and Boilers~~

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.

We therefore propose to have deleted the reference standard and subsequent reference to that standard as part of this proposal to modify the original proposal.

Final Action: AS AM AMPC____ D

M128-09/10, Part I
1004.1, Chapter 15

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

PART I – IMC

1. Revise as follows:

1004.1 Standards. Oil-fired boilers and their control systems shall be listed and labeled in accordance with UL 726. Electric boilers and their control systems shall be listed and labeled in accordance with UL 834. Solid-fuel-fired boilers shall be listed and labeled in accordance with UL 2523. Boilers shall be designed and constructed in accordance with the requirements of ASME CSD-1 and as applicable, the ASME *Boiler and Pressure Vessel Code* , Sections I or IV; NFPA 8501; NFPA 8502 or NFPA 8504.

2. Add new standard to Chapter 15 as follows:

UL
2523-09 Outline of Investigation for Solid Fuel-Fired Water Heaters and Boilers

Reason: UL's Subject 2523 Outline of Investigation includes a comprehensive set of construction and performance requirements that are used to evaluate and list factory built manually and/or automatically fueled solid fuel-fired boilers.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard UL 2523-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: EUGENE-M-25-1004.1-CH 15

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.3.2.

PART I - IMC

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IMC

1004.1 Standards. Oil-fired boilers and their control systems shall be listed and labeled in accordance with UL 726. Electric boilers and their control systems shall be listed and labeled in accordance with UL 834. Solid-fuel-fired boilers shall be listed and labeled in accordance with UL 2523. Boilers shall be designed and constructed in accordance with the requirements of ASME CSD-1 and as applicable, the ASME *Boiler and Pressure Vessel Code* , Sections I or IV; NFPA 8501; NFPA 8502 or NFPA 8504.

UL

2523-09 ~~Outline of Investigation for~~ Solid Fuel-Fired Hydronic Heating Appliances.

Commenter's Reason: The First Edition of ANSI/UL 2523 includes requirements that cover solid fuel-fired hydronic heating appliances, water heaters, and boilers was issued December 22, 2009.

Public Comment 2:

Jonathan Humble (Chairman) representing ICC Reference Standards Committee, requests Disapproval.

PART I – IMC

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.

We therefore propose to have disapproved Parts 1 and 2 of M128-09/10.

Final Action: AS AM AMPC____ D

M128-09/10, Part II
IRC M2001.1.1, Chapter 44

<u>Proposed Change as Submitted</u>

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

PART II – IRC MECHANICAL

1. Revise as follows:

M2001.1.1 Standards. Oil-fired boilers and their control systems shall be listed and *labeled* in accordance with UL 726. Electric boilers and their control systems shall be *listed* in accordance with UL 834. <u>Solid-fuel-fired boilers shall be listed and labeled in accordance</u> <u>with UL 2523.</u> Boilers shall be designed and constructed in accordance with the requirements of ASME CSD-1 and as applicable, the ASME *Boiler and Pressure Vessel Code*, Sections I and IV. Gas-fired boilers shall conform to the requirements listed in Chapter 24.

2. Add new standard to Chapter 44 as follows:

UL
<u>2523-09</u> <u>Outline of Investigation for Solid Fuel-Fired Water Heaters and Boilers</u>

Reason: UL's Subject 2523 Outline of Investigation includes a comprehensive set of construction and performance requirements that are used to evaluate and list factory built manually and/or automatically fueled solid fuel-fired boilers.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard UL 2523-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: EUGENE-M-25-1004.1-CH 15

<u>Public Hearing Results</u>

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.3.2.

PART II - IRC
Committee Action: **Approved as Submitted**

Committee Reason: : Approval was based on the proponent's printed reason.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IRC

M2001.1.1 Standards. Oil-fired boilers and their control systems shall be listed and *labeled* in accordance with UL

726. Electric boilers and their control systems shall be *listed* in accordance with UL 834. Solid-fuel-fired boilers shall be listed and labeled in accordance with UL 2523. Boilers shall be designed and constructed in accordance with the requirements of ASME CSD-1 and as applicable, the ASME *Boiler and Pressure Vessel Code*, Sections I and IV. Gas-fired boilers shall conform to the requirements listed in Chapter 24.

UL
2523-09 ~~Outline of Investigation for~~ Solid Fuel-Fired Hydronic Heating Appliances.

Commenter's Reason: The First Edition of ANSI/UL 2523 includes requirements that cover solid fuel-fired hydronic heating appliances, water heaters, and boilers was issued December 22, 2009.

Public Comment 2:

Jonathan Humble (Chairman) representing ICC Reference Standards Committee, requests Disapproval.

PART II- IRC

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.
We therefore propose to have disapproved Parts 1 and 2 of M128-09/10.

Final Action: AS AM AMPC____ D

M131-09/10, Part II
IRC M1411.6

NOTE: PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART I IS REPRODUCED ONLY FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART II.

Proposed Change as Submitted

Proponent: Patrick A. McLaughlin, McLaughlin & Associates, representing the Air-Conditioning, Heating and Refrigeration Institute

PART II – IRC MECHANICAL

Revise as follows:

M1411.6 Locking access port caps. Refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps or shall be otherwise protected from unauthorized access in an approved manner.

Reason: During the last code cycle, the provision requiring locking-type tamper-resistant caps to restrict access to refrigerants was approved at the Final Action Hearings. This proposal would expand the means of restricting access to other approved methods. An example would be the placement of the equipment in inaccessible locations. Also, we are aware of only one locking-type tamper-resistant cap.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCLAUGHLIN-M-2-1101.10-M1411.6

Public Hearing Results

PART II – IRC

Modify the proposal as follows:

Revise as follows:

M1411.6 Locking access port caps. Refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps or shall be otherwise secured to prevent ~~protected from~~ unauthorized access. ~~in an approved manner.~~

Reason: During the last code cycle, the provision requiring locking-type tamper-resistant caps to restrict access to refrigerants was approved at the Final Action Hearings. This proposal would expand the means of restricting access to other approved methods. An example would be the placement of the equipment in inaccessible locations. Also, we are aware of only one locking-type tamper-resistant cap.

Committee Action: Approved as Modified

Committee Reason: Approval was based on the proponent's printed reason. The modification makes the text less restrictive, allowing more options.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII, requests Disapproval.

Commenter's Reason: The committee's reason for approving this change with modification included being able to restrict access to equipment by placing the equipment in an inaccessible location. That works great for commercial applications because equipment can be placed in locked refrigeration rooms or on roofs with keyed access only by maintenance personnel. I do not know anywhere in a one- or two-family home or townhouse that equipment can be placed in a location that would prevent unauthorized access. A 6' high fence around the property will not prevent unauthorized access from someone determined to huff these dangerous fumes, and I do not see condensing units installed on roofs of one- and two-family homes or townhouses. This is appropriate language for commercial applications, not for residential applications. This will only lessen the protection of personnel that was approved in the last code cycles' final action hearings.

Final Action: AS AM AMPC____ D

NOTE: PART I REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

PART I – IMC

Revise as follows:

1101.10 Locking access port caps. Refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps <u>or shall be otherwise protected from unauthorized access in an approved manner</u>.

PART II – IRC MECHANICAL

Revise as follows:

M1411.6 Locking access port caps. Refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps <u>or shall be otherwise protected from unauthorized access in an approved manner</u>.

Reason: During the last code cycle, the provision requiring locking-type tamper-resistant caps to restrict access to refrigerants was approved at the Final Action Hearings. This proposal would expand the means of restricting access to other approved methods. An example would be the placement of the equipment in inaccessible locations. Also, we are aware of only one locking-type tamper-resistant cap.

Cost Impact: The code change proposal will not increase the cost of construction.

PART I - IMC Withdrawn by Proponent

M133-09/10, Part I
1101.11.1 (New)

Proposed Change as Submitted

Proponent: Mona Casey, United Parents to Restrict Open Access to Refrigerant

PART I – IMC

Add new text as follows:

1101.11.1 Existing systems. Existing refrigerant circuit access ports that are located outdoors shall be retrofitted with locking-type tamper-resistant caps whenever the refrigerant system is modified, serviced, or repaired.

Reason: The purpose of this code modification is to add new requirements to the Code. The existing code does not address the issue of accessibility to refrigerant from pre-existing units by unauthorized individuals. Refrigerant is extremely dangerous and potentially lethal.

Facts:

Refrigerant "can cause death without warning".
Refrigerant is considered a gateway drug because users often progress from refrigerant use to drug and alcohol abuse.
Refrigerant is not a cumulative substance where chances of dying from it increase as the dosage and number of use increases. It can kill on the 1^{st}, 10^{th}, 100^{th}, or any other time. 33 percent of deaths resulting from refrigerant huffing occurred on the 1^{st} use.
Refrigerant, like other poisons, must be kept out of reach of children.
Refrigerant theft is increasing.
According to Mike Opitz, Certification Manager, LEED for Existing Buildings, U.S. Green Building Council, chlorine in CFCs and HCFCs destroy the ozone and depletes the Earth's natural shield for incoming ultraviolet radiation and absorb outgoing infrared radiation from the earth, functioning as potent greenhouse gases.

National Statistics:

The National Institute on Drug Abuse reports that one in five American teens have used Inhalants to get high.
According to Stephen J. Pasierb, President and CEO of The Partnership for Drug-Free America, 22% of 6th and 8th graders admitted abusing inhalants and only 3% of parents think their child has ever abused inhalants.
An analysis of 144 Texas death certificates by the Texas Commission on Alcohol and Drug Abuse involving misuse of inhalants found that the most frequently mentioned inhalant (35%) was Freon (51 deaths). Of the Freon deaths, 42 percent were students or youth with a mean age of 16.4 years.
Suffocation, inhaling fluid or vomit into the lungs, and accidents each cause about 15% of deaths linked to inhalant abuse.
National Institute on Drug Abuse's 'Monitoring the Future' study reveals that inhalant abuse among 8th graders is up 7.7% since 2002.
55% of deaths linked to inhalant abuse are caused by "Sudden Sniffing Death Syndrome." SSDS can occur on the first use or any use. The
Inhalant causes the heart to beat rapidly and erratically, resulting in cardiac arrest.
22% of inhalant abusers who died of SSDS had no history of previous inhalant abuse. In other words, they were first-time users.

Collier County, FL Statistics:

The use of inhalants in middle schools has doubled in two years
The average age a child starts using drugs or alcohol is just 12½
Every third day a child is taken to the hospital because of a drug overdose
85 percent of all juvenile criminal cases are substance related
Deaths due solely to drug toxicity increased 76% between 1998 and 2005

The modification of this code will have an immense positive impact on the safety and health of our citizens, especially our youth. It will reduce the number of deaths associated with Inhalant abuse and the number of injuries associated with Freon accidents and leaks.

Cost Impact: The code change proposal will increase the cost of construction by $20-$25.

Public Hearing Results

PART I - IMC
Committee Action: **Disapproved**

Committee Reason: Legal action will likely ensue for those cases where the service personnel fail to install the devices. The locking caps are an "honest man's" lock and if someone is intent on getting refrigerant from the system, they will find a way to overcome the locking caps. Refrigerant can be obtained by making a hole in the coil tubing or connecting piping. The service personnel should not be made responsible for this. The proposed text conflicts with the intent of Section 102.2.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Mona Casey representing United Parents to Restrict Open Access to Refrigerant, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IMC

1101.11.1 Existing systems. ~~Existing~~ <u>Air conditioning units with</u> refrigerant circuit access ports ~~that are~~ located outdoors shall be ~~retrofitted~~ <u>provided</u> with locking-type tamper-resistant caps <u>or shall be otherwise secured to prevent unauthorized access</u> whenever the ~~refrigerant~~ system is ~~modified~~ <u>recharged</u>, serviced, or repaired.

Commenter's Reason: At the previous code hearing, proposal PM14-09/10, which provides a trigger for securing existing refrigerant circuit access ports located outdoors, was approved by the Property Maintenance Committee. Because the IPMC has yet to be adopted by all states, it is important to add this provision to the IMC and IRC as well to ensure a broader adoption of the code. This proposed modification will standardize the language across all three codes.

Public Comment 2:

Julius Ballanco, PE, JB Engineering and Code Consulting PC, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IMC

1101.11.1 Existing systems. ~~Existing~~ <u>Air conditioning units with</u> refrigerant circuit access ports ~~that are~~ located outdoors shall be ~~retrofitted~~ <u>provided</u> with locking-type tamper-resistant caps <u>or shall be otherwise secured to prevent unauthorized access</u> whenever the ~~refrigerant~~ system is ~~modified~~ <u>recharged</u>, serviced, or repaired.

Commenter's Reason: The reason provided by the Mechanical Committee is not an appropriate comment. Service personnel are liable for everything they do when servicing equipment. This is merely one additional requirement. The other justification was that the change conflicts with Section 102.2. In fact, this proposal is consistent with Section 102.2.

This section does not apply to existing equipment. The section clearly establishes that the requirement is applicable when the system is recharged, serviced, or repaired. The system is the refrigerant circuit. Such a change is consistent with Section 102.4.

Another point discussed by both Committees was that the section is unenforceable. There are many sections of the code that are unenforceable. That doesn't mean that the code ignores those requirements. Just because a permit is not required does not mean that the installing contractor does not have to comply with the code. Case in point is any minor change to any building system. A permit is not required, but the change must be in accordance with the code.

What both Committees should have been focusing on is whether this section is necessary for the protection of health and safety. That has been answered previously with a big yes. Therefore, the change to the Mechanical Code and Residential Code should have been accepted. This is in inexpensive change that can save lives.

Public Comment 3:

Adam Deschamp representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART I-IMC

<u>**1101.11.1 Securing refrigerant access ports.** Air conditioning units with refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access whenever the system is recharged, serviced, or repaired.</u>

Commenter's Reason: A member of my friends' family died and others have died from how easy it is to access those parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 4:

Laura Pestano representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART I-IMC

1101.11.1 Securing refrigerant access ports. Air conditioning units with refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access whenever the system is recharged, serviced, or repaired.

Commenter's Reason: A friends' daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 5:

Russell Phillips representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART I-IMC

1101.11.1 Securing refrigerant access ports. Air conditioning units with refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access whenever the system is recharged, serviced, or repaired.

Commenter's Reason: A friends' daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 6:

Dana Prothro representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART I-IMC

1101.11.1 Securing refrigerant access ports. Air conditioning units with refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access whenever the system is recharged, serviced, or repaired.

Commenter's Reason: My daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 7:

Philippe Albert Schaedler representing Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART I-IMC

1101.11.1 Securing refrigerant access ports. Air conditioning units with refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access whenever the system is recharged, serviced, or repaired.

Commenter's Reason: A friends' daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 8:

Michele Wagner representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART I-IMC

1101.11.1 Securing refrigerant access ports. Air conditioning units with refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access whenever the system is recharged, serviced, or repaired.

Commenter's Reason: A friends' daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Final Action: AS AM AMPC____ D

M133-09/10, Part II
IRC M1411.6.1 (New)

Proposed Change as Submitted

Proponent: Mona Casey, United Parents to Restrict Open Access to Refrigerant

PART II – IRC MECHANICAL

Add new text as follows:

M1411.6.1 Existing HVAC systems. Existing refrigerant circuit access ports that are located outdoors shall be retrofitted with locking-type tamper-resistant caps whenever the refrigerant system is modified, serviced, or repaired.

Reason: The purpose of this code modification is to add new requirements to the Code. The existing code does not address the issue of accessibility to refrigerant from pre-existing units by unauthorized individuals. Refrigerant is extremely dangerous and potentially lethal.

Facts:

Refrigerant "can cause death without warning".
Refrigerant is considered a gateway drug because users often progress from refrigerant use to drug and alcohol abuse.
Refrigerant is not a cumulative substance where chances of dying from it increase as the dosage and number of use increases. It can kill on the 1st, 10th, 100th, or any other time. 33 percent of deaths resulting from refrigerant huffing occurred on the 1st use.
Refrigerant, like other poisons, must be kept out of reach of children.
Refrigerant theft is increasing.
According to Mike Opitz, Certification Manager, LEED for Existing Buildings, U.S. Green Building Council, chlorine in CFCs and HCFCs destroy the ozone and depletes the Earth's natural shield for incoming ultraviolet radiation and absorb outgoing infrared radiation from the earth, functioning as potent greenhouse gases.

National Statistics:

The National Institute on Drug Abuse reports that one in five American teens have used Inhalants to get high.
According to Stephen J. Pasierb, President and CEO of The Partnership for Drug-Free America, 22% of 6th and 8th graders admitted abusing inhalants and only 3% of parents think their child has ever abused inhalants.
An analysis of 144 Texas death certificates by the Texas Commission on Alcohol and Drug Abuse involving misuse of inhalants found that the most frequently mentioned inhalant (35%) was Freon (51 deaths). Of the Freon deaths, 42 percent were students or youth with a mean age of 16.4 years.
Suffocation, inhaling fluid or vomit into the lungs, and accidents each cause about 15% of deaths linked to inhalant abuse.
National Institute on Drug Abuse's 'Monitoring the Future' study reveals that inhalant abuse among 8th graders is up 7.7% since 2002.
55% of deaths linked to inhalant abuse are caused by "Sudden Sniffing Death Syndrome." SSDS can occur on the first use or any use. The
Inhalant causes the heart to beat rapidly and erratically, resulting in cardiac arrest.
22% of inhalant abusers who died of SSDS had no history of previous inhalant abuse. In other words, they were first-time users.

Collier County, FL Statistics:

The use of inhalants in middle schools has doubled in two years
The average age a child starts using drugs or alcohol is just 12½
Every third day a child is taken to the hospital because of a drug overdose
85 percent of all juvenile criminal cases are substance related
Deaths due solely to drug toxicity increased 76% between 1998 and 2005

The modification of this code will have an immense positive impact on the safety and health of our citizens, especially our youth. It will reduce the number of deaths associated with Inhalant abuse and the number of injuries associated with Freon accidents and leaks.

Cost Impact: The code change proposal will increase the cost of construction by $20-$25.

Public Hearing Results

PART II - IRC
Committee Action: **Disapproved**

Committee Reason: The proposed text is retro-active and unenforceable. The IPMC is the more appropriate place for such text.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Mona Casey representing United Parents to Restrict Open Access to Refrigerant, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART II – IRC MECHANICAL

M1411.6.1 Existing HVAC systems. ~~Existing~~ Air conditioning units with refrigerant circuit access ports ~~that are~~ located outdoors shall be ~~retrofitted~~ provided with locking-type tamper-resistant caps or shall be otherwise secured to prevent unauthorized access whenever the ~~refrigerant~~ system is ~~modified~~ recharged, serviced, or repaired.

Commenter's Reason: At the previous code hearing, proposal PM14-09/10, which provides a trigger for securing existing refrigerant circuit access ports located outdoors, was approved by the Property Maintenance Committee. Because the IPMC has yet to be adopted by all states, it is important to add this provision to the IMC and IRC as well to ensure a broader adoption of the code. This proposed modification will standardize the language across all three codes.

Public Comment 2:

Julius Ballanco, PE, JB Engineering and Code Consulting PC, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART II – IRC MECHANICAL

M1411.6.1 Existing HVAC systems. ~~Existing~~ Air conditioning units with refrigerant circuit access ports ~~that are~~ located outdoors shall be ~~retrofitted~~ provided with locking-type tamper-resistant caps or shall be otherwise secured to prevent unauthorized access whenever the ~~refrigerant~~ system is ~~modified~~ recharged, serviced, or repaired.

Commenter's Reason: The reason provided by the Mechanical Committee is not an appropriate comment. Service personnel are liable for everything they do when servicing equipment. This is merely one additional requirement. The other justification was that the change conflicts with Section 102.2. In fact, this proposal is consistent with Section 102.2.

This section does not apply to existing equipment. The section clearly establishes that the requirement is applicable when the system is recharged, serviced, or repaired. The system is the refrigerant circuit. Such a change is consistent with Section 102.4.

Another point discussed by both Committees was that the section is unenforceable. There are many sections of the code that are unenforceable. That doesn't mean that the code ignores those requirements. Just because a permit is not required does not mean that the installing contractor does not have to comply with the code. Case in point is any minor change to any building system. A permit is not required, but the change must be in accordance with the code.

What both Committees should have been focusing on is whether this section is necessary for the protection of health and safety. That has been answered previously with a big yes. Therefore, the change to the Mechanical Code and Residential Code should have been accepted. This is in inexpensive change that can save lives.

Public Comment 3:

Adam Deschamp representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART II-IRC MECHANICAL

M1411.6.1 Securing refrigerant access ports. Air conditioning units with a refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access wheever the system is recharged, serviced, or repaired.

Commenter's Reason: A member of my friends' family died and others have died from how easy it is to access those parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 4:

Laura Pestano representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART II-IRC MECHANICAL

M1411.6.1 Securing refrigerant access ports. Air conditioning units with a refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access wheever the system is recharged, serviced, or repaired.

Commenter's Reason: A friends' daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 5:

Russell Phillips representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART II-IRC MECHANICAL

M1411.6.1 Securing refrigerant access ports. Air conditioning units with a refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access wheever the system is recharged, serviced, or repaired.

Commenter's Reason: A friends' daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 6:

Dana Prothro representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART II-IRC MECHANICAL

M1411.6.1 Securing refrigerant access ports. Air conditioning units with a refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access wheever the system is recharged, serviced, or repaired.

Commenter's Reason: My daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 7:

Philippe Albert Schaedler representing Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART II-IRC-MECHANICAL

M1411.6.1 Securing refrigerant access ports. Air conditioning units with a refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access whenever the system is recharged, serviced, or repaired.

Commenter's Reason: A friends' daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Public Comment 8:

Michele Wagner representing UPROAR/Dana Prothro, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART II-IRC MECHANICAL

M1411.6.1 Securing refrigerant access ports. Air conditioning units with a refrigerant circuit access ports located outdoors shall be provided with locking-type tamper resistant caps or shall be otherwise secured to prevent unauthorized access wheever the system is recharged, serviced, or repaired.

Commenter's Reason: A friends' daughter died because of access to the parts. The request was sent to protect people and teens from accessing it, because they huff the refrigerant to get high.

Final Action: AS AM AMPC____ D

M134-09/10

Table 1103.1

Proposed Change as Submitted

Proponent: Steve Ferguson, American Society of Heating, Refrigerating, and Air-Conditioning Engineers

Revise table as follows:

[F] TABLE 1103.1
REFRIGERANT CLASSIFICATION, Amount and OEL

Chemical Refrigerant	Formula	Chemical Name of Blend	Refrigerant Classification	Degrees of Hazard[a]	[M] Amount Of Refrigerant Per Occupied Space			
					Pound per 1,000 cubic feet	ppm	g/m^3	OEL[e]
R-E170	CH_3OCH_3	methoxymethane (dimethyl ether)	A3		1	8,500	16	1,000
R-403A	zeotrope	R-290/22/218 (5/75/20)	~~A1~~ A2	2-0-0	7.6	33,000	120	1,000
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3		0.51	4,500	8.1	950
R-433C	zeotrope	R-1270/290 (25.0/75.0)	A3		0.41	3,600	6.6	790
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1		4.9	19,000	79	990
R-600a	$CH(CH_3)_2$-CH_3	~~isobutane (2-methyl propane)~~ 2-methyl propane (isobutane)	A3	2-4-0	0.6	4,000	9.6	1,000
R-601a	$(CH_3)_2CHCH_2CH_3$	2-methylbutane (isopentane)	A3		0.2	1,000	2.9	600

(Portions of table and notes not shown remain unchanged)

Reason: R-433B, R-433C, R-438A were recently added to ASHRAE Standard 34.

The classification of R-403A has been changed from A1 to A2 based on data developed as part of an ASHRAE research project using the current method of measuring the LFL of refrigerants.

The chemical names of R-E170, R-600a and R-601a have been changed to be consistent with IUPAC rules for naming organic compounds. The common names are listed in parenthesis.

If approved for publication by ASHRAE prior to the code hearings, a floor modification will be brought forward to add R-1234yf to this table.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: FERGUSON-M-2-T. 1103.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason. The proposed revisions update the table based on the chemicals being used today.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Steve Ferguson representing American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[F]TABLE 1103.1
REFRIGERANT CLASSIFICATION, Amount and OEL

Chemical Refrigerant	Formula	Chemical Name of Blend	Refrigerant Classification	Degrees of Hazard[a]	[M] Amount Of Refrigerant Per Occupied Space			
					Pound per 1,000 cubic feet	ppm	g/m^3	OEL[e]
R-E170	CH_3OCH_3	methoxymethane (dimethyl ether)	A3		1	8,500	16	1,000
R-403A	zeotrope	R-290/22/218 (5/75/20)	A2	2-0-0	7.6	33,000	120	1,000
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3		0.51	4,500	8.1	950
R-433C	zeotrope	R-1270/290 (25.0/75.0)	A3		0.41	3,600	6.6	790
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1		4.9	19,000	79	990
R-600a	$CH(CH_3)_2$-CH_3	2-methyl propane (isobutane)	A3	2-4-0	0.6	4,000	9.6	1,000
R-601	$CH_3CH_2CH_2CH_2CH_3$	pentane	A3		0.2	1,000	2.9	600
R-601a	$(CH_3)_2CHCH_2CH_3$	2-methylbutane (isopentane)	A3		0.2	1,000	2.9	600
R-1234yf	$CF_3CF{=}CH_2$	2,3,3,3-tetrafluoro-1 propene	A2		4.7	16,000	75	500

(Portions of table not shown remain unchanged)

Commenter's Reason: This proposal adds two new refrigerants (R-601 and R-1234yf) which have recently been published as part of ASHRAE Standard 34. This makes Table 1103.1 consistent with all published refrigerants in ASHRAE Standard 34.

Final Action: AS AM AMPC____ D

M135-09/10
1105.6, 1105.6.3 (New), 1105.6.3.1, 1105.6.3.2

Proposed Change as Submitted

Proponent: Jeffrey M. Shapiro, PE, International Code Consultants, representing the International Institute of Ammonia Refrigeration

1. Revise as follows:

1105.6 Ventilation. Machinery rooms shall be mechanically ventilated to the outdoors. ~~Mechanical ventilation shall be capable of exhausting the minimum quantity of air both at normal operating and emergency conditions. Multiple fans or multispeed fans shall be allowed in order to produce the emergency ventilation rate and to obtain a reduced airflow for normal ventilation.~~

> **Exception:** Where a refrigerating system is located outdoors more than 20 feet (6096 mm) from any building opening and is enclosed by a penthouse, lean-to or other open structure, natural or mechanical ventilation shall be provided. Location of the openings shall be based on the relative density of the refrigerant to air. The free-aperture cross section for the ventilation of the *machinery room* shall be not less than:

$$F = \sqrt{G}$$ **(Equation 11-1)**

For SI:
$$F = 0.138\sqrt{G}$$

where:

F = The free opening area in square feet (m^2).
G = The mass of refrigerant in pounds (kg) in the largest system, any part of which is located in the *machinery room*.

2. Add new text as follows:

<u>**1105.6.3 Ventilation rate.** For other than ammonia systems, the mechanical ventilation systems shall be capable of exhausting the minimum quantity of air both at normal operating and emergency conditions, as required by Sections 1105.6.3.1 and 1105.6.3.2. The minimum required ventilation rate for ammonia shall be in accordance with IIAR 2.</u>

<u>Multiple fans or multispeed fans shall be allowed to produce the emergency ventilation rate and to obtain a reduced airflow for normal ventilation.</u>

3. Revise as follows:

~~**1105.6.3**~~ <u>**1105.6.3.1**</u> **Quantity—normal ventilation.** During occupied conditions, the mechanical ventilation system shall exhaust the larger of the following:

1. Not less than 0.5 cfm per square foot (0.0025 $m^3/s \cdot m^2$) of *machinery room* area or 20 cfm (0.009 m^3/s) per person; or
2. A volume required to limit the room temperature rise to 18°F (10°C) taking into account the ambient heating effect of all machinery in the room.

~~**1105.6.4**~~ <u>**1105.6.3.2**</u> **Quantity—emergency conditions.** Upon actuation of the refrigerant detector required in Section 1105.3, the mechanical ventilation system shall *exhaust air* from the *machinery room* in the following quantity:

$$Q = 100 \times \sqrt{G}$$ **(Equation 11-2)**

For SI: $Q = 0.07 \times \sqrt{G}$

Where:

Q = The airflow in cubic feet per minute (m^3/s).
G = The design mass of refrigerant in pounds (kg) in the largest system, any part of which is located in the *machinery room.*

Reason: The proposed change will defer the required ventilation rate for ammonia refrigeration machinery rooms to IIAR2, which is the ANSI accredited industry standard. IIAR 2 is in the process of being revised to change the basis of calculating required ventilation to an "air changes per minute/hour" basis. There is general agreement in the industry that the minimum ventilation rate for ammonia needs to be greater than the rate calculated using the current formula, and IIAR 2 is out for public comment so that a consensus rate that is unique based on the properties of ammonia can be established. It is anticipated that the public comment period for IIAR 2 will close prior to the ICC hearing in Baltimore, and additional information on the new calculation approach will be presented at that time to support this proposal.

As part of this change, requirements related to the required ventilation rate in Section 1105.6 have been moved to Section 1105.6.3 to create a single subsection on this topic rather than the current approach of splitting related requirements between two sections. This improves the usability of the code.

Cost Impact: Larger fans to be required by IIAR 2 will slightly increase the cost of construction.

ICCFILENAME: SHAPIRO-M-1-1105.6

Public Hearing Results

Modify the proposal as follows:

1. Revise as follows:

1105.6 Ventilation. Machinery rooms shall be mechanically ventilated to the outdoors.

> **Exception:** Where a refrigerating system is located outdoors more than 20 feet (6096 mm) from any building opening and is enclosed by a penthouse, lean-to or other open structure, natural or mechanical ventilation shall be provided. Location of the openings shall be based on the relative density of the refrigerant to air. The free-aperture cross section for the ventilation of the *machinery room* shall be not less than:

$$F = \sqrt{G} \qquad \textbf{(Equation 11-1)}$$

For SI:
$$F = 0.138\sqrt{G}$$

where:

F = The free opening area in square feet (m^2).
G = The mass of refrigerant in pounds (kg) in the largest system, any part of which is located in the *machinery room*.

2. Add new text as follows:

1105.6.3 Ventilation rate. ~~For other than ammonia systems,~~ The mechanical ventilation systems shall be capable of exhausting the minimum quantity of air both at normal operating and emergency conditions, as required by Sections 1105.6.3.1 and 1105.6.3.2. ~~The minimum required ventilation rate for ammonia shall be in accordance with IIAR 2.~~

Multiple fans or multispeed fans shall be allowed to produce the emergency ventilation rate and to obtain a reduced airflow for normal ventilation.

3. Revise as follows:

1105.6.3.1 Quantity—normal ventilation. During occupied conditions, the mechanical ventilation system shall exhaust the larger of the following:

1. Not less than 0.5 cfm per square foot ($0.0025\ m^3/s\cdot m^2$) of *machinery room* area or 20 cfm ($0.009\ m^3/s$) per person; or
2. A volume required to limit the room temperature rise to 18°F (10°C) taking into account the ambient heating effect of all machinery in the room.

1105.6.3.2 Quantity—emergency conditions. Upon actuation of the refrigerant detector required in Section 1105.3, the mechanical ventilation system shall *exhaust air* from the *machinery room* in the following quantity:

$$Q = 100 \times \sqrt{G} \qquad \textbf{(Equation 11-2)}$$

For SI: $Q = 0.07 \times \sqrt{G}$

Where:

Q = The airflow in cubic feet per minute (m^3/s).
G = The design mass of refrigerant in pounds (kg) in the largest system, any part of which is located in the *machinery room.*

Committee Action: **Approved as Modified**

Committee Reason: The proposed revision consolidates text into one section to improve usability. The modification deletes references to ammonia and IIAR2 because the revised version of the standard is yet to be completed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeffrey Shapiro, International Code Consultants, representing International Institute of Ammonia Refrigeration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1105.6.3 Ventilation rate. For other than ammonia systems, the mechanical ventilation systems shall be capable of exhausting the minimum quantity of air both at normal operating and emergency conditions, as required by Sections 1105.6.3.1 and 1105.6.3.2. The minimum required ventilation rate for ammonia shall be 30 air changes per hour, in accordance with IIAR 2.

Commenter's Reason: The proposed change will correlate the required ventilation rate for ammonia refrigeration machinery rooms with IIAR2, which is the ANSI accredited industry standard. IIAR 2 is in the process of being revised to change the basis of calculating required ventilation to an "air changes per minute/hour" basis. There is general agreement in the industry that the minimum ventilation rate for ammonia needs to be increased above the rate required for other refrigerants. Those other refrigerants will still be ventilated using a rate calculated by the current formula.

IIAR 2 is currently out for public comment so that a consensus rate that is unique based on the properties of ammonia can be established. It is anticipated that the public comment period for IIAR 2 will close prior to the ICC hearing in Dallas, and additional information on the background and technical basis for the new calculation approach will be presented at that time to support this proposal.

Final Action: AS AM AMPC____ D

M136-09/10
[F] 1105.8.1 (New), [F] 1105.8.2 (New), [F] 1105.8.3 (New), [F] 1105.8.4 (New)

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Add new text as follows:

[F] 1105.8.1 Ammonia refrigerant. Systems containing ammonia refrigerant shall discharge vapor to the atmosphere through an approved treatment system in accordance with Section 1105.8.2, a flaring system in accordance with Section 1105.8.3 or through an approved ammonia diffusion system in accordance with Section1105.8.4, or by other approved means.

Exceptions:

1. Ammonia/water absorption systems containing less than 22 pounds (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.
2. Where the fire code official determines, on review of an engineering analysis prepared in accordance with Section 104.7.2 of the *International Fire Code*, that a fire, health or environmental hazard would not result from discharging ammonia directly to the atmosphere.

[F] 1105.8.2 Treatment systems. Treatment systems shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50 percent of the IDLH at the point of exhaust. Treatment systems shall be in accordance with Chapter 37 of the *International Fire Code*

[F] 1105.8.3 Flaring systems. Flaring systems for incineration of flammable refrigerants shall be designed to incinerate the entire discharge. The products of refrigerant incineration shall not pose health or environmental hazards.

Incineration shall be automatic upon initiation of discharge, shall be designed to prevent blowback, and shall not expose structures or materials to threat of fire. Standby fuel, such as LP gas, and standby power shall have the capacity to operate for one and one-half the required time for complete incineration of refrigerant in the system.

[F] 1105.8.4 Ammonia diffusion systems. Ammonia diffusion systems shall include a tank containing 1 gallon of water for each pound of ammonia (4 L of water for each 1 kg of ammonia) that will be released in 1 hour from the largest relief device connected to the discharge pipe. The water shall be prevented from freezing. The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but not lower than 33 feet (10 058 mm) below the maximum liquid level. The tank shall contain the volume of water and ammonia without overflowing.

Reason: This is an effort to make Chapter 11 a little more complete. This language is extracted from The Fire Code. There have been complaints that the I-codes in general refer to too many standards requiring many different documents to accomplish one thing. Some of the complaints have merit. The reference to ASHRAE-15 is left in tact but the Fire Code requirements satisfy the issue. Why not just say what is required for ammonia discharge rather than referring to the standard or the Fire Code. This will aid in plan review as well as field inspection because the requirements will be right there in the chapter.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-M-7-1105.8

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent asked for disapproval to allow the proposal to be reworked and resubmitted as a public comment. The provisions for the discharge of pressure relief valves are lacking.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1105.~~8~~ 7.1 Ammonia discharge. Pressure relief valves for ~~ammonia~~ refrigeration systems shall discharge in accordance with ASHRAE-15 and Sections 1105.7.1.1 through 1105.7.1.3.3.

[F] 1105.7.1.1 Flammable refrigerants. Systems containing flammable refrigerants having a density equal to or greater than the density of air shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Section 1105.7.1.3.1. Systems containing flammable refrigerants having a density less than the density of air shall be permitted to discharge vapor to the atmosphere provided that the point of discharge is located outside of the structure at not less than15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

[F] 1105.7.1.2 Toxic and highly toxic refrigerants. Systems containing toxic of highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Section 1105.7.1.3.1 or a flaring system in accordance with Section 1105.7.1.3.2.

[F] 1105.~~8.1~~ 7.1.3 Ammonia refrigerant. Systems containing ammonia refrigerant shall discharge vapor to the atmosphere through an approved treatment system in accordance with Section 1105~~.8.2.4~~ 7.1.3.1 a flaring system in accordance with Section 1105.~~8.3~~ 7.1.3.2 or through an approved ammonia diffusion system in accordance with Section1105~~.8.4~~ 7.1.3.3, or by other approved means.

Exceptions:

1. Ammonia/water absorption systems containing less than 22 pounds (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.
2. When the fire code official determines, on review of an engineering analysis prepared in accordance with Section 104.7.2, that a fire, health or environmental hazard would not result from discharging ammonia directly to the atmosphere.

[F] 1105.~~8.2~~ 7.1.3.1 Treatment systems. Treatment systems shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50 percent of the IDLH at the point of exhaust. Treatment systems shall be in accordance with Chapter 37 of the *International Fire Code*
.

[F] 1105.~~8.3~~ 7.1.3.2 Flaring systems. Flaring systems for incineration of flammable refrigerants shall be designed to incinerate the entire discharge. The products of refrigerant incineration shall not pose health or environmental hazards. Incineration shall be automatic upon initiation of discharge, shall be designed to prevent blowback, and shall not expose structures or materials to threat of fire. Standby fuel, such as LP gas, and standby power shall have the capacity to operate for one and one-half the required time for complete incineration of refrigerant in the system.

[F] 1105.~~8.4~~ 7.1.3.3 Ammonia diffusion systems. Ammonia diffusion systems shall include a tank containing 1 gallon of water for each pound of ammonia (4 L of water for each 1 kg of ammonia) that will be released in 1 hour from the largest relief device connected to the discharge pipe. The water shall be prevented from freezing. The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but no lower than 33 feet (10 058 mm) below the maximum liquid level. The tank shall contain the volume of water and ammonia without overflowing.

Commenter's Reason: We recommended disapproval because the text was parked under the wrong section and the balance of the Fire Code section was extracted to complete the section**.** Inspectors need this information in the code to verify that relief devices are terminated appropriately.

Final Action: AS AM AMPC____ D

M139-09/10

Table 1202.4, 1203.15, 1203.15.1, 1203.15.2, 1203.15.3, 1208.1, 1208.1.1, 1210 (New), Chapter 15

Proposed Change as Submitted

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (PPFA)

1. Revise table as follows:

TABLE 1202.4
HYDRONIC PIPE

MATERIAL	STANDARD
~~Polyethylene (PE) pipe, tubing and fittings (for ground source heat pump loop systems)~~	~~ASTM D 2513; ASTM D 3035; ASTM D 2447; ASTM D 2683; ASTM F 1055; ASTM D 2837; ASTM D 3350; ASTM D 1693~~

(Portions of table not shown are unchanged)

2. Delete without substitution:

~~**1203.15 Polyethylene plastic pipe and tubing for ground source heat pump loop systems.** Joints between polyethylene plastic pipe and tubing or fittings for ground source heat pump loop systems shall be heat fusion joints conforming to Section 1203.15.1, electrofusion joints conforming to Section 1203.15.2, or stab-type insertion joints conforming to Section 1203.15.3.~~

~~**1203.15.1 Heat-fusion joints.** Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, joined in accordance with ASTM D 2657. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D 2683 or ASTM D 3261.~~

~~**1203.15.2 Electrofusion joints.** Joints shall be of the electrofusion type. Joint surfaces shall be clean and free of moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F 1055.~~

~~**1203.15.3 Stab-type insert fittings.** Joint surfaces shall be clean and free of moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F 1924.~~

3. Revise as follows:

SECTION 1208
TESTS

1208.1 General. Hydronic piping systems ~~other than ground source heat pump loop systems~~ shall be tested hydrostatically at one and one-half times the maximum system design pressure, but not less than 100 psi (689 kPa). The duration of each test shall be not less than 15 minutes. ~~Ground-source heat pump loop systems shall be tested in accordance with Section 1208.1.1.~~

4. Delete without substitution:

~~**1208.1.1 Ground source heat pump loop systems.** Before connection (header) trenches are backfilled, the assembled loop system shall be pressure tested with water at 100 psi (689 kPa) for 30 minutes with no observed leaks. Flow and pressure loss testing shall be performed and the actual flow rates and pressure drops shall be compared to the calculated design values. If actual flow rate or pressure drop values differ from calculated design values by more than 10 percent, the problem shall be identified and corrected.~~

5. Add new text as follows:

SECTION 1210
GROUND SOURCE HEAT PUMP LOOP SYSTEMS

1210.1 General. Ground-source heat pump loop systems shall comply with this section.

1210.2 Piping material. Ground-source heat pump loop system piping material for water-based systems shall comply with Sections 1210.2.1 through 1210.2.4.

1210.2.1 Used materials. Reused piping, fittings, valves, or other materials shall not be used in ground-source heat pump loop systems.

1210.2.2 Material rating. Piping shall be rated for the operating temperature and pressure of the ground-source heat pump loop systems. Fittings shall be approved for pressure applications and recommended by the manufacturer for installation with the piping material installed. Materials installed underground shall be suitable for burial.

1210.2.3 Piping and tubing materials standards. Ground source heat pump loop system piping shall conform to the standards listed in Table 1210.2.3.

TABLE 1210.2.3
GROUND SOURCE HEAT PUMP LOOP SYSTEM PIPING

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D 2846; ASTM F 441; ASTM F 442
Cross-linked polyethylene (PEX) tubing	ASTM F 876; ASTM F 877
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F 1282; CSA B137.9
Polyethylene (PE) pipe, tubing and fittings	ASTM D 3035; ASTM D 2447; ASTM D 2737; ASTM F 714; AWWA C901; CSA CAN/CSA-B-137.1
Polypropylene (PP-R) pipe, tubing and fittings	ASTM F 2389
Polyvinyl chloride (PVC) plastic pipe	ASTM D 1785; ASTM D 2241
Raised temperature polyethylene (PE-RT)	ASTM F 2623

1210.2.4 Fittings. Geothermal pipe fittings shall be approved for installation with the piping materials to be installed, suitable for use underground if buried, and shall conform to the standards listed in Table 1210.2.4.

TABLE 1210.2.4
GROUND SOURCE HEAT PUMP LOOP SYSTEM FITTINGS

PIPE MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D 2846; ASTM F 437; ASTM F 438; ASTM F 439; CSA B137.6
Cross-linked polyethylene (PEX) tubing	ASTM F 877; ASTM F 1807; ASTM F 1960; ASTM F 2080; ASTM F 2098; ASTM F 2159; ASTM F 2434; CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM D 3261; ASTM F 877; ASTM F 1807; ASTM F 2098; ASTM F 2159; ASTM F 2434; CSA B137.5, B137.1
Polyethylene (PE) pipe, tubing and fittings	ASTM D 2609; ASTM D 2683; ASTM D 3261; ASTM F 1055; CSA B137.1
Polypropylene (PP-R) pipe, tubing and fittings	ASTM F 2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D 2464; ASTM D 2466; ASTM D 2467; CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D 3261; ASTM F 877; ASTM F 1807; ASTM F 2098; ASTM F 2159; ASTM F 2434; CSA B137.5, B137.1

1210.3 Joints and connections. Joints and connections in ground source heat pump loop systems shall be of an approved type and shall comply with Sections 1210.3.1 through 1210.3.9. Joints and connections shall be leak-free for the pressure of the ground source heat pump loop systems. Joints used underground shall be approved for buried applications.

1210.3.1 Joints between different piping materials. Joints between different piping materials shall be made with approved transition fittings.

1210.3.2 Preparation of pipe ends. Piping shall be cut square, reamed, and shall be free of burrs and obstructions. CPVC, PE, and PVC pipe shall be chamfered. Pipe ends shall have full-bore openings and shall not be undercut.

1210.3.3 Joint preparation and installation. Where required by Sections 1210.3.4 through 1210.3.6, the preparation and installation of mechanical and thermoplastic-welded joints shall comply with Sections 1210.3.3.1 and 1210.3.3.2 as applicable.

1210.3.3.1 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

1210.3.3.2 Thermoplastic-welded joints. Joint surfaces shall be cleaned by an approved procedure. Joints shall be welded according to the manufacturer's instructions.

1210.3.4 CPVC plastic pipe. Joints for CPVC plastic piping and fittings shall be solvent-cemented or threaded joints conforming to Section 1203.3.

1210.3.5 Cross-linked polyethylene (PEX) plastic tubing. Joints for cross-linked polyethylene plastic piping and fittings shall conform to Sections 1210.3.5.1 and 1210.3.5.2. Mechanical joints shall conform to Section 1210.3.3.

1210.3.5.1 Compression-type fittings. Where compression- type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

1210.3.5.2 Plastic-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition from such metal pipe to PEX pipe.

1210.3.6 Polyethylene plastic pipe and tubing for ground source heat pump loop systems. Joints for polyethylene plastic piping and fittings for ground source heat pump loop systems shall be heat-fusion joints conforming to Section 1210.3.6.1, electrofusion joints conforming to Section 1210.3.6.2, or stab-type insertion joints conforming to Section 1210.3.6.3.

1210.3.6.1 Heat-fusion joints. Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, joined in accordance with ASTM D 2657. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D 2683 or ASTM D 3261.

1210.3.6.2 Electrofusion joints. Joints shall be of the electrofusion type. Joint surfaces shall be clean and free of moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F 1055.

1210.3.6.3 Stab-type insert fittings. Joint surfaces shall be clean and free of moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F 1924.

1210.3.7 Polypropylene (PP) plastic. Joints for PP plastic piping and fittings shall comply with Sections 1210.3.7 and 1210.3.7.2.

1210.3.7.1 Heat-fusion joints. Heat-fusion joints for polypropylene (PP) piping joints shall be installed with socket-type heat-fused polypropylene fittings, electrofusion polypropylene fittings or by butt-fusion. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F 2389.

1210.3.7.2 Mechanical and compression sleeve joints. Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's instructions.

1210.3.8 Raised temperature polyethylene (PE-RT) plastic tubing. Joints for raised temperature polyethylene piping and fittings shall conform to Sections 1210.3.8.1 and 1210.3.8.2. Mechanical joints shall conform to Section 1210.3.3.

1210.3.8.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

1210.3.8.2 PE-RT-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition from such metal pipe to PE-RT pipe.

1210.3.9 PVC plastic pipe. Joints for PVC plastic pipe and fittings shall be solvent-cemented or threaded joints conforming to Section 1203.3.

1210.4 Shutoff valves. Shutoff valves shall be installed in ground source heat pump loop systems in the locations indicated in Sections 1210.4.1 through 1210.4.6. Pressure relief valves shall be installed in accordance with Section 1210.4.7.

1210.4.1 Heat exchangers. Shutoff valves shall be installed on the supply and return side of a heat exchanger.

> **Exception:** Shutoff valves shall not be required where heat exchangers are integral with a boiler; or are a component of a manufacturer's boiler and heat exchanger packaged unit and are capable of being isolated from the hydronic system by the supply and return valves required by Section 1005.1.

1210.4.2 Central systems. Shutoff valves shall be installed on the building supply and return of a central utility system.

1210.4.3 Pressure vessels. Shutoff valves shall be installed on the connection to any pressure vessel.

1210.4.4 Pressure-reducing valves. Shutoff valves shall be installed on both sides of a pressure-reducing valve.

1210.4.5 Equipment and appliances. Shutoff valves shall be installed on connections to mechanical *equipment* and appliances. This requirement does not apply to components of a ground source heat pump loop system such as pumps, air separators, metering devices, and similar *equipment*.

1210.4.6 Expansion tanks. Shutoff valves shall be installed at connections to nondiaphragm-type expansion tanks.

1210.4.7 Reduced pressure. A pressure relief valve shall be installed on the low-pressure side of a hydronic piping system that has been reduced in pressure. The relief valve shall be set at the maximum pressure of the system design. The valve shall be installed in accordance with Section 1006.

1210.5 General. Piping, valves, fittings, and connections shall be installed in accordance with the conditions of approval and Sections 1210.5.1 through 1210.5.10.

1210.5.1 Protection of potable water. The potable water system shall be protected from backflow in accordance with the *International Plumbing Code*.

1210.5.2 Pipe penetrations. Openings for pipe penetrations in walls, floors and ceilings shall be larger than the penetrating pipe. Openings through concrete or masonry building elements shall be sleeved. The annular space surrounding pipe penetrations shall be protected in accordance with the *International Building Code*.

1210.5.3 Clearance to combustibles. Where the exterior temperature of piping in a geothermal piping system exceeds 250°F (121°C), such piping shall have a minimum *clearance* of 1 inch (25 mm) to combustible materials.

1210.5.4 Contact with building material. A ground source heat pump loop system shall not be in direct contact with building materials that cause the piping material to degrade or corrode, or that interfere with the operation of the system.

1210.5.5 Strains and stresses. Piping shall be installed so as to prevent detrimental strains and stresses in the pipe. Provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement. Piping shall be installed so as to avoid structural stresses or strains within building components.

1210.5.6 Flood hazard. Piping located in a flood hazard area shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the *design flood elevation*.

1210.5.7 Pipe support. Pipe shall be supported in accordance with Section 305.

1210.5.8 Velocities. Flow velocities in ground source heat pump loop systems shall be designed to not exceed the maximum flow velocity recommended by the pipe and fitting manufacturer and shall be controlled to reduce the possibility of water hammer.

1210.5.9 Labeling and marking. Ground source heat pump loop system piping shall be marked with tape, metal tags or other method where it enters a building indicating "GROUND SOURCE HEAT PUMP LOOP SYSTEM". The marking shall indicate any antifreeze used in the system by name and concentration.

1210.5.10 Chemical compatibility. Antifreeze and other materials used in a ground source heat pump loop system shall be chemically compatible with the pipe, tubing, fittings, and mechanical systems.

1210.6 Makeup water. The transfer fluid used in ground source heat pump loop systems shall be compatible with the makeup water supplied to the system.

1210.7 Ground source heat pump loop systems tests. Before connection (header) trenches are backfilled, the assembled loop system shall be pressure tested with water at 100 psi (689 kPa) for 30 minutes with no observed leaks. Flow and pressure loss testing shall be performed and the actual flow rates and pressure drops shall be compared to the calculated design values. If actual flow rate or pressure drop values differ from calculated design values by more than 10 percent, the cause shall be identified and corrective action taken.

1210.7.1 Pressurizing during installation. Ground source heat pump loop piping to be embedded in concrete shall be pressure tested prior to pouring concrete. During pouring, the pipe shall be maintained at the proposed operating pressure.

6. Add new standards to Chapter 15 as follows:

ASTM

D 2464-06	Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D 2466-06	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
D 2467-06	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D 2609-02	Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe
D 2737-03	Standard Specification for Polyethylene (PE) Plastic Tubing
F 437-06	Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
F 714-08	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter

F 1807-08	Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing
F1960-08	Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) Tubing
F 2080-08	Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Cross-Linked Polyethylene (PEX) Pipe
F 2098-08	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing to Metal Insert and Plastic Insert Fittings
F 2159-05	Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing
F 2434-08	Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Crosslinked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Tubing

AWWA

C901-08	Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) through 3 In. (76 mm), for Water Service

CSA

B137.1-02	Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services
B137.2-02	PVC Injection-moulded Gasketed Fittings for Pressure Applications
B137.3-02	Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications
B137.5-02	Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications— with Revisions through September 1992
B137.6-02	CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems— with Revisions through May 1986
B137.11-02	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications

Reason: Water based ground-source heat pump loop PE piping is currently placed in the hydronics section where it doesn't quite fit. This special and growing application should have its own section, and it should cover other materials that could potentially be used. Green building rating systems are strongly promoting ground-source heat pump loop heating and cooling systems, and the code should have more information. I am introducing this proposal to accomplish that and would hope it would act to encourage further development. While HDPE dominates the technology with an expected 95% of the systems, other materials can and are be utilized in water based ground loop systems.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard AWWA C901-08, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009. All other standards proposed for inclusion are already referenced standards of the International Plumbing Code (IPC).

ICCFILENAME: CUDAHY-M-1-1202-1210

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: Some of the proposed standards allow alloys that promote dezincification. Some of the referenced standards are not currently in Chapter 15. Copper and other materials need to be added.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Cudahy representing PPFA (Plastic Pipe and Fittings Association), requests Approval as Submitted.

Commenter's Reason: Water based ground-source heat pump loop PE piping is currently placed in the hydronics section where it doesn't quite fit. This special and growing application should have its own section, and it should cover other materials that could potentially be used.

PPFA introduced this proposal to accomplish that and we would hope it would act to encourage further development. While HDPE dominates the technology with an expected 95% of the systems, other materials can and are be utilized in water based ground loop systems.

At the initial hearing this proposal had strong support of many in the audience and on the committee. The comment that “Some of the proposed standards allow alloys that promote dezincification.” is not a suitable rational to reject this language.

PPFA would hope that this language be accepted at the FAH and updated as needed to give better guidance on this application. We would not oppose any amendments to add additional materials if suitable for these water based geothermal systems. As with other greenbuilding technologies, the codes are falling behind.

Final Action: AS AM AMPC____ D

M141-09/10, Part I
Table 1202.5

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED ONLY FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I.

Proposed Change as Submitted

Proponent: Andrew Granzow, Viega, LLC

PART I – IMC

Revise table as follows:

1202.5 TABLE
HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Brass	ASTM F 1974
Bronze	ASME B16.24
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29; <u>ASTM F 877 ; ASTM F 1807</u>
Ductile iron and gray iron	ANSI/AWWA C110/A21.10
Ductile iron	ANSI/AWWA C153/A21.53;
Gray iron	ASTM A 126
Malleable iron	ASME B16.3;
Plastic	ASTM D 2466; ASTM D 2467; ASTM D 2468; ASTM F 438; ASTM F 439; ASTM F 877; <u>ASTM F 2159;</u> ASTM F 2389
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28 ASTM A 420

Reason: To include nationally recognized standards for piping materials currently being used for hydronic applications.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: GRANZOW-M-1-T. 1202.5-RM-T. M2101.1

Public Hearing Results

PART I - IMC
Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent’s printed reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Woestman, Kellen Company, representing Copper Development Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1202.5 TABLE
HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Brass	ASTM F 1974
Bronze	ASME B16.24
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29; ~~ASTM F 877 ; ASTM F 1807~~
Ductile iron and gray iron	ANSI/AWWA C110/A21.10
Ductile iron	ANSI/AWWA C153/A21.53;
Gray iron	ASTM A 126
Malleable iron	ASME B16.3;
PEX fittings	ASTM F 877 ; ASTM F 1807 ASTM F 2159
Plastic	ASTM D 2466; ASTM D 2467; ASTM D 2468; ASTM F 438; ASTM F 439; ASTM F 877; ~~ASTM F 2159~~; ASTM F 2389
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28 ASTM A 420

Commenter's Reason: Fittings for PEX systems commonly are made of combinations of materials (e.g. plastic fittings with copper crimp rings). This proposed modification to M141 creates a row in Table 1202.5 specifically for PEX fittings, and then moves the standards recommended for approval by the committee into that row in the table. Each of these three standards are specific to PEX systems (including fittings), or for fittings used in PEX systems.
Commenter's Reason:

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

M141-09/10, PART II – IRC MECHANICAL

Revise table as follows:

TABLE M2101.1
HYDRONIC PIPING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
Brass pipe	1	ASTM B 43	Brazed, welded, threaded, mechanical and flanged fittings	
Brass tubing	1	ASTM B 135	Brazed, soldered and mechanical fittings	
Chlorinated poly (vinyl chloride) (CPVC) pipe and tubing	1, 2, 3	ASTM D 2846	Solvent cement joints, compression joints and threaded adapters	
Copper pipe	1	ASTM B 42, B 302	Brazed, soldered and mechanical fittings threaded, welded and flanged	

Copper tubing (type K, L or M)	1, 2	ASTM B 75, B 88, B 251, B 306	Brazed, soldered and flared mechanical fittings	Joints embedded in concrete
Cross-linked polyethylene (PEX)	1, 2, 3	ASTM F 876, F 877	(See PEX fittings)	Install in accordance with manufacturer's instructions.
Cross-linked polyethylene/aluminum/ cross-linked polyethylene-(PEX-AL-PEX) pressure pipe	1, 2	ASTM F 1281 or CAN/ CSA B137.10	Mechanical, crimp/insert	Install in accordance with manufacturer's instructions.
PEX Fittings		ASTM F 877 ASTM F 1807 ASTM F 1960 ASTM F 2098 ASTM F 2159	Copper-crimp/insert fittings, cold expansion fittings, stainless steel clamp, insert fittings, plastic-crimp/insert fittings	Install in accordance with manufacturer's instructions
~~Plastic fittings PEX~~		~~ASTM F 1807~~		
Polybutylene (PB) pipe and tubing	1, 2, 3	ASTM D 3309	Heat-fusion, crimp/insert and compression	Joints in concrete shall be heat-fused.
Polyethylene (PE) pipe, tubing and fittings (for ground source heat pump loop systems)	1, 2, 4	ASTM D 2513; ASTM D 3350; ASTM D 2513; ASTM D 3035; ASTM D 2447; ASTM D 2683; ASTM F 1055; ASTM D 2837; ASTM D 3350; ASTM D 1693	Heat-fusion	
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	1, 2, 3	ASTM F 1282 CSA B 137.9	Mechanical, crimp/insert	
Polyproplylene (PP)	1, 2, 3	ISO 15874 ASTM F 2389	Heat-fusion joints, mechanical fittings, threaded adapters, compression joints	
Raised temperature polyethylene (PE-RT)	1, 2, 3	ASTM F 2623	Copper crimp/insert fitting stainless steel clamp, insert fittings	
Soldering fluxes	1	ASTM B 813	Copper tube joints	
Steel pipe	1, 2	ASTM A 53, A 106	Brazed, welded, threaded, flanged and mechanical fittings	Joints in concrete shall be welded. Galvanized pipe shall not be welded or brazed.
Steel tubing	1	ASTM A 254	Mechanical fittings, welded	

For SI: ºC = [(ºF)-32]/1.8.

a. Use code:
   1. Above ground.
   2. Embedded in radiant systems.
   3. Temperatures below 180°F only.
   4. Low temperature (below 130°F) applications only.

b. Standards as listed in Chapter 44.

Reason: (Row #8-PEX Fittings-ASTM F877) The added standard reference clearly identifies a nationally recognized standard for PEX fittings and allows installers the option to utilize products under this standard for use in residential PEX hydronic applications.

"ASTM F877 - 07 Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems"

(Row #8-PEX Fittings-ASTM F2159) The added standard reference clearly identifies a nationally recognized standard for PEX fittings and allows installers the option to utilize products under this standard for use in residential PEX hydronic applications.

"ASTM F2159 - 05 Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing"

(Row #9-Plastic Fittings PEX) The standard identified above makes no reference to plastic fittings and therefore the code reference is not consistent with the intent of the standard. This proposed code change has no impact on the use of product manufactured to this standard as this standard is already referenced in the appropriate section of the table under "PEX fittings". Below is the title and scope of F1807

"ASTM F1807 - 08 Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing"

"1. Scope

1.1 This specification covers metal insert fittings and copper crimp rings for use with cross-linked polyethylene (PEX) tubing in $^3/_8$, ½, $^5/_8$, ¾, and 1 in. and 1 $^1/_4$ nominal diameters that meet the requirements for Specifications F 876 and F 877. These fittings are intended for use in 100 psi (689.5 kPa) cold- and hot-water distribution systems operating at temperatures up to, and including, 180°F (82°C). The requirements for materials, workmanship, dimensions, and markings to be used on the fittings and rings are also included.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units which are provided for information only and are not considered the standard.

1.3 Compliance with this specification requires that these fittings be tested and certified to Specification F 877.

1.4 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.
"

Cost Impact: The code change proposal will not increase the cost of construction.

PART II - IRC
Committee Action: **Approved as Submitted**

Committee Reason: Approval was based on the proponent's printed reason.

Assembly Action: **None**

M148-09/10, Part I
1203.20 (New)

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C.

PART I – IMC

Add new text as follows:

1203.20 Listed joints and connections. Joints and connections that are not otherwise addressed in Section 1203 shall be certified by a third party agency as acceptable for hydronic piping systems. The joints and connections shall be installed in accordance with their certification and manufacturer's installation instructions.

Reason: There are various types of joints and connections utilized in water distribution and water supply systems that are not listed in Section 605. However, these joints or connections are listed by a third party agency as being acceptable for water distributions systems. This new section will indicate that such joints and connections are acceptable. Some examples of these types of joints and connections are unions, rolled groove fittings, and cut groove fittings.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BALLANCO-M-2-1203.20-M1204.5

Public Hearing Results

PART I - IMC
Committee Action: **Disapproved**

Committee Reason: The proposed text is not product specific and is not tied to a specific standard, thus, confusion can result. Current Section 1201.3 allows ASME B31.9 as an option. The text "certified by a third party agency" is unique to the IPC and is not defined in the IMC. The codes should be consistent in referencing an "approved agency."

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1203.20 Listed joints and connections. Joints and connections that are not otherwise addressed in Section 1203 shall be ~~certified by a third party~~ <u>listed by an approved</u> agency as acceptable for hydronic piping systems. The joints and connections shall be installed in accordance with their <u>listing</u> and manufacturer's installation instructions.

Commenter's Reason: The proposed modification is based on the Committee's comment for consistency in language. The modification uses language that is found in Chapter 3 and throughout the Code.

Final Action: AS AM AMPC____ D

M148-09/10, Part II

IRC M2104.5 (New)

<u>Proposed Change as Submitted</u>

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C.

PART II – IRC MECHANICAL

Add new text as follows:

<u>**M2104.5 Listed joints and connections.** Joints and connections that are not otherwise addressed in Section 2104 of the *International Mechanical Code* shall be certified by a third party agency as acceptable for hydronic piping systems. The joints and connections shall be installed in accordance with their certification and manufacturer's installation instructions.</u>

Reason: There are various types of joints and connections utilized in water distribution and water supply systems that are not listed in Section 605. However, these joints or connections are listed by a third party agency as being acceptable for water distributions systems. This new section will indicate that such joints and connections are acceptable. Some examples of these types of joints and connections are unions, rolled groove fittings, and cut groove fittings.

Cost Impact: The code change proposal will not increase the cost of construction.

<u>Public Hearing Results</u>

PART II - IRC
Committee Action: **Approved as Submitted**

Committee Reason: Approval was based on the proponent's printed reason.

Assembly Action: **Disapproved**

<u>Individual Consideration Agenda</u>

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action. Note that the assembly action, Disapproved, will be the initial motion on the floor for consideration when this item is called.

Final Action: AS AM AMPC____ D

M149-09/10

Table 1302.3, Chapter 15

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

1. Revise table as follows:

TABLE 1302.3
FUEL OIL PIPING

PIPE OR TUBING TYPE ~~MATERIAL~~	STANDARD (see Chapter 15)
Brass pipe	ASTM B43
Brass tubing	ASTM B135
Copper or copper-alloy pipe	ASTM B42; ASTM B302
Copper or copper-alloy tubing (Type K, L or M)	ASTM B75; ASTM B88; ASTM B280
~~Labeled~~ Nonmetallic pipe	(See Section 1302.4)
~~Nonmetallic pipe~~	~~ASTM D2996~~
Steel pipe	ASTM A53; ASTM A106
Steel tubing	ASTM A254; ~~ASTM A539~~
Metallic Underground Fuel Pipe	UL 971A
Nonmetallic Underground Fuel Pipe	UL 971

2. Add new standards to Chapter 15 as follows:

UL
971-95 Nonmetallic Underground Piping For Flammable Liquids – with revisions through March 2006
971A-06 Outline of Investigation for Metallic Underground Fuel Pipe

Reason: This proposal accomplishes the following:

1. The first column of the table is not material, but specific pipe and tubing types.
2. The reference to "Labeled pipe" requirements in the table applies to 'Nonmetallic pipe', the title of section 1302.4.
3. ASTM D2996 is limited to only FRP pipe, so it does not reflect other forms of 'nonmetallic pipes' used in fuel applications today. In addition this standard does not contain any physical assembly, use/misuse tests or fuel compatibility tests, such as those found in UL971, which would make it suitable for use in fuel oil piping applications.
4. ASTM A539 was withdrawn without replacement in 1999.
5. *The proposed new standard (UL 971) for nonmetallic underground fuel pipe and the Outline of Investigation (UL 971A) for metallic underground fuel pipe include a comprehensive set of construction and performance requirements, including tests to address physical abuse and misuse, and long-term compatibility with fuels and fluids.*

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standards, UL 971-95 and UL 971A-06, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: EUGENE-M-31-T. 1302.3-CH 15

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standards did not comply with ICC standards criteria, Section 3.6.3.2.

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble (Chairman) representing ICC Reference Standards Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 1302.3
FUEL OIL PIPING

PIPE OR TUBING TYPE	STANDARD (see Chapter 15)
Brass pipe	ASTM B43
Brass tubing	ASTM B135
Copper or copper-alloy pipe	ASTM B42; ASTM B302
Copper or copper-alloy tubing (Type K, L or M)	ASTM B75; ASTM B88; ASTM B280
Nonmetallic pipe	(See Section 1302.4)
Steel pipe	ASTM A53; ASTM A106
Steel tubing	ASTM A254
~~Metallic Underground Fuel Pipe~~	~~UL 971A~~
~~Nonmetallic Underground Fuel Pipe~~	~~UL 971~~

UL
~~971-95~~ ~~Nonmetallic Underground Piping For Flammable Liquids – with revisions through March 2006~~
~~971A-06~~ ~~Outline of Investigation for Metallic Underground Fuel Pipe~~

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.

We therefore propose to have deleted the reference standards and subsequent reference to those standards as part of this proposal to modify the original proposal.

Final Action: AS AM AMPC____ D

M150-09/10
1302.4, Chapter 15

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

1. Revise as follows:

1302.4 Nonmetallic pipe. All nonmetallic pipe <u>and connectors</u> shall be *listed* and *labeled* as being acceptable for the intended application for flammable and combustible liquids. Nonmetallic pipe shall be installed only ~~outside~~ <u>outdoors</u>, underground.

> <u>**Exception:** Nonmetallic flexible connectors listed and labeled for aboveground use in accordance with UL 2039 shall be permitted to be installed aboveground.</u>

2. Add new standard to Chapter 15 as follows:

UL
<u>2039-02</u> <u>Outline of Investigation for Flexible Connectors for Flammable Liquids</u>

Reason: This proposal clarifies that both nonmetallic pipe and connectors need to be listed and labeled. In addition it allows flexible nonmetallic connectors listed in accordance with UL 2039 to be installed aboveground.

The Subject 2039 Outline of Investigation includes a comprehensive set of performance requirements for evaluating metallic and nonmetallic connectors for aboveground and underground transfer of noncorrosive, stable, flammable and combustible liquids. The connectors have a maximum length of eight feet.

Connectors listed in accordance with 2039 are fabricated, inspected, and tested for leakage before shipment from the factory as completely assembled vessels.

The intended use of these connectors is for the transfer of flammable and combustible liquids in, among other applications, underground carrier piping to a dispenser, carrier piping in an open dispenser sump to a dispenser, carrier piping in an open tank sump to a tank pump, and aboveground carrier piping to an aboveground tank.

Six companies currently have listings for these products.

In the second sentence, the intent is "outdoors" and the word "outside" does not necessarily mean outdoors.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard UL 22039-02, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: EUGENE-M-32-1302.4-CH 15

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.3.2.

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble (Chairman) representing ICC Reference Standards Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1302.4 Nonmetallic pipe. All nonmetallic pipe and connectors shall be *listed* and *labeled* as being acceptable for the intended application for flammable and combustible liquids. Nonmetallic pipe shall be installed only outdoors, underground.

> **Exception:** Nonmetallic flexible connectors listed and labeled for aboveground use ~~in accordance with UL 2039~~ shall be permitted to be installed aboveground.

UL

~~2039-02 Outline of Investigation for Flexible Connectors for Flammable Liquids~~

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.

We therefore propose to have deleted the reference standard and subsequent reference to that standard as part of this proposal to modify the original proposal.

Final Action: AS AM AMPC____ D

M156-09/10, Part I
401.2

Proposed Change as Submitted

Proponent: Mike Moore, Newport Ventures, representing Broan NuTone

PART I –IMC

Revise as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. <u>Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 33.5 psf (50 Pa) in accordance with Section 402.4.2.1 of the International Energy Conservation Code, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403.</u>

Reason: Everyone can agree that when dwelling units become “too” tight, they need mechanical ventilation. The question is, “how tight is too tight?” This code change proposal offers five air changes per hour at 50 Pascal as the “too tight” limit, and directs builders to provide mechanical ventilation at this point.

Why is whole-house mechanical ventilation needed?
Indoor air quality has direct impact on the health of building occupants. Poor indoor air quality is listed by the EPA as being the fourth largest environmental threat to our country.[1] A 2007 California study revealed formaldehyde exposure in most new homes is beyond limits recommended by the California Air Resources Board. Multiple studies have shown that relying on window operation to provide ventilation is not sufficient in practice.[2,3] If unchecked, pollutants from cleaning chemicals, finishes, furniture, and occupant activities can cause serious health effects on building occupants. Whole-house mechanical ventilation reduces occupant exposure to such pollutants.

Why 5 ACH 50?
Traditionally, 0.35 natural air changes per hour has been the consensus ventilation rate at which it is believed that sufficient fresh air is being provided to building occupants. This ventilation rate was typically achieved without mechanical ventilation because homes were built without an effective air barrier. As building practices have improved, homes have become tighter, and as homes become tighter, mechanical ventilation must be introduced to provide sufficient levels of ventilation.

ASHRAE Standard 136 was developed to enable calculation of natural air changes per hour as a function of air changes at various pressures. By following the calculation procedures in this standard, it can be shown that a natural infiltration rate of 0.35 air changes per hour is equivalent to somewhere between 7 ACH 50 to 10 ACH 50, depending on the local climatic conditions of the home. Because most dwellings are built this tight, ASHRAE 62.2 requires mechanical ventilation for all homes, with few exceptions. However, based on ASHRAE 136, a conservative code might prescribe whole-house mechanical ventilation for any home with an infiltration leakage rate of 10 ACH 50 or less.

As a second point of reference, California’s 2005 Title 24 Chapter 6 requires that, “Continuous mechanical ventilation (either exhaust or supply ventilation) must be installed when the target SLA is below 3.0”. California’s SLA of 3.0 is roughly equivalent to 6 ACH 50. As a third point of reference, NAHB’s National Green Building Standard requires whole-house mechanical ventilation when the infiltration rate falls below 5.0 ACH 50. This requirement provides clear recognition from a consensus standard that whole-house mechanical ventilation should be provided for all homes that meet this threshold.

Based on the previous references, there is broad consensus across states and within consensus standards that whole-house mechanical ventilation should be required when a dwelling’s infiltration falls below 5.0 ACH 50.

What states are now requiring whole-house mechanical ventilation?
Several states now require mechanical ventilation in dwellings, including MN, VT, WA, CA, and ME.

References:

1. ASHRAE Standard 62.2-2007 *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*. http://www.ashrae.org/technology/page/548
2. Price, P.N. and M.H. Sherman "Ventilation Behavior and Household Characteristics in New California Houses," April 2006. LBNL-59620 http://epb.lbl.gov/Publications/lbnl-59620.pdf
3. Offermann, F.J., et al., "Window usage, ventilation, and formaldehyde concentrations in new California homes: summer field sessions", in IAQ 2007, Healthy and Sustainable Buildings. 2007, American Society of Heating Refrigerating, and Air Conditioning Engineers, Inc.: Baltimore, MD. p. 497-526 (preprints); http://www.iee-sf.com/pdf/SummerFieldResults.pdf

Cost Impact: Where homes have infiltration rates less than 5.0 ACH 50, and those homes are not already providing whole-house mechanical ventilation, the cost of construction will increase.

ICCFILENAME:MOORE-M1-401.2

Public Hearing Results

PART I - IMC
Committee Action: **Approved as Submitted**

Committee Reason: The tightening of the thermal envelope necessitates mechanical ventilation in some cases. The proposal does not require that a blower door test be conducted, but rather, acts on the results of any such test that is conducted by choice. If Section 403 is applied by choice, no testing is required.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Mike Moore, Newport Ventures, representing Broan NuTone, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of ~~33.5 psf~~ 0.2 inch w.c. (50 Pa) in accordance with Section 402.4.2.1 of the International Energy Conservation Code, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403.

Commenter's Reason: This proposed modification is essentially editorial, in that it corrects the English units of pressure that are equivalent to 50 Pa. Parts II and III of this proposal were approved by the IBC and IRC committees with this modification.

Public Comment 2:

Craig Conner, Building Quality, representing self, requests Disapproval.

Commenter's Reason: M156 Parts I and II specify a residential air-tightness test for application to commercial buildings. M156 Parts I and II do not actually require the test even be done. M156 applies only to the dwelling units in commercial buildings, a very limited subset of the commercial buildings.

Any commercial ventilation requirement should be based on air-tightness or ventilation requirements for commercial buildings (IECC Chapter 5, IBC Section 1203, or IMC Chapter 4 or Section 505).

M156 Parts I and II are inconsistent with EC147, which was approved at the first hearing. EC147 includes commercial air-tightness requirement and criteria.

M156 Part III applies to residential (IRC). M165 Part III will be unworkable as written. Based on the approved EC13 residential buildings will be allowed to test the air-tightness of a sample of homes produced by one builder, rather than all homes (presuming the approved EC13 stands). Many jurisdictions many test only a minority of the residences produced by a specific builder. However the lack of testing will make that section of code unusable.

A better way to exempt less air tight residences from the ventilation requirements is to make the exemption apply only houses tested and shown to have higher air-change rate. (Most residences will require ventilation.) Untested residences would require ventilation. EC13 references the ventilation requirements in IRC M1507. A ventilation exception based on a test is integrated into my comment on RM17 in IRC section M1507.

Final Action: AS AM AMPC____ D

M156-09/10, Part II
1203.1

<u>Proposed Change as Submitted</u>

Proponent: Mike Moore, Newport Ventures, representing Broan NuTone

PART II – IBC

Revise as follows:

1203.1 General. Buildings shall be ventilated with natural ventilation in accordance Section 1203.4, or mechanical ventilation in accordance with the International Mechanical Code.

<u>Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 33.5 psf (50 Pa) in accordance with Section 402.4.2.1 of the International Energy Conservation Code, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403 of the International Mechanical Code.</u>

Reason: Everyone can agree that when dwelling units become "too" tight, they need mechanical ventilation. The question is, "how tight is too tight?" This code change proposal offers five air changes per hour at 50 Pascal as the "too tight" limit, and directs builders to provide mechanical ventilation at this point.

Why is whole-house mechanical ventilation needed?
Indoor air quality has direct impact on the health of building occupants. Poor indoor air quality is listed by the EPA as being the fourth largest environmental threat to our country.[1] A 2007 California study revealed formaldehyde exposure in most new homes is beyond limits recommended by the California Air Resources Board. Multiple studies have shown that relying on window operation to provide ventilation is not sufficient in practice.[2,3] If unchecked, pollutants from cleaning chemicals, finishes, furniture, and occupant activities can cause serious health effects on building occupants. Whole-house mechanical ventilation reduces occupant exposure to such pollutants.

Why 5 ACH 50?
Traditionally, 0.35 natural air changes per hour has been the consensus ventilation rate at which it is believed that sufficient fresh air is being provided to building occupants. This ventilation rate was typically achieved without mechanical ventilation because homes were built without an effective air barrier. As building practices have improved, homes have become tighter, and as homes become tighter, mechanical ventilation must be introduced to provide sufficient levels of ventilation.

ASHRAE Standard 136 was developed to enable calculation of natural air changes per hour as a function of air changes at various pressures. By following the calculation procedures in this standard, it can be shown that a natural infiltration rate of 0.35 air changes per hour is equivalent to somewhere between 7 ACH 50 to 10 ACH 50, depending on the local climatic conditions of the home. Because most dwellings are built this tight, ASHRAE 62.2 requires mechanical ventilation for all homes, with few exceptions. However, based on ASHRAE 136, a conservative code might prescribe whole-house mechanical ventilation for any home with an infiltration leakage rate of 10 ACH 50 or less.

As a second point of reference, California's 2005 Title 24 Chapter 6 requires that, "Continuous mechanical ventilation (either exhaust or supply ventilation) must be installed when the target SLA is below 3.0". California's SLA of 3.0 is roughly equivalent to 6 ACH 50. As a third point of reference, NAHB's National Green Building Standard requires whole-house mechanical ventilation when the infiltration rate falls below 5.0 ACH 50. This requirement provides clear recognition from a consensus standard that whole-house mechanical ventilation should be provided for all homes that meet this threshold.

Based on the previous references, there is broad consensus across states and within consensus standards that whole-house mechanical ventilation should be required when a dwelling's infiltration falls below 5.0 ACH 50.

What states are now requiring whole-house mechanical ventilation?
Several states now require mechanical ventilation in dwellings, including MN, VT, WA, CA, and ME.

References:

1. ASHRAE Standard 62.2-2007 *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*. http://www.ashrae.org/technology/page/548
2. Price, P.N. and M.H. Sherman "Ventilation Behavior and Household Characteristics in New California Houses," April 2006. LBNL-59620 http://epb.lbl.gov/Publications/lbnl-59620.pdf
3. Offermann, F.J., et al., "Window usage, ventilation, and formaldehyde concentrations in new California homes: summer field sessions", in IAQ 2007, Healthy and Sustainable Buildings. 2007, American Society of Heating Refrigerating, and Air Conditioning Engineers, Inc.: Baltimore, MD. p. 497-526 (preprints); http://www.iee-sf.com/pdf/SummerFieldResults.pdf

Cost Impact: Where homes have infiltration rates less than 5.0 ACH 50, and those homes are not already providing whole-house mechanical ventilation, the cost of construction will increase.

ICCFILENAME:MOORE-M1-401.2

Public Hearing Results

This code change was contained in the errata posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/09-10ProposedChanges.aspx."

PART II – IBC

Revise as follows:

1203.1 General. Buildings shall be ventilated with natural ventilation in accordance Section 1203.4, or mechanical ventilation in accordance with the International Mechanical Code.

Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of ~~33.5 psf~~ 0.2 inch w.c. (50 Pa) in accordance with Section 402.4.2.1 of the International Energy Conservation Code, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403 of the International Mechanical Code.

PART II – IBC

Committee Action: **Approved as Modified**

Committee Reason: Same reason as given for approval of M156-09/10 Part I. The modification corrects the pressure to be consistent with 50 Pa.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Craig Conner, Building Quality, representing self, requests Disapproval.

Commenter's Reason: M156 Parts I and II specify a residential air-tightness test for application to commercial buildings. M156 Parts I and II do not actually require the test even be done. M156 applies only to the dwelling units in commercial buildings, a very limited subset of the commercial buildings.

Any commercial ventilation requirement should be based on air-tightness or ventilation requirements for commercial buildings (IECC Chapter 5, IBC Section 1203, or IMC Chapter 4 or Section 505).

M156 Parts I and II are inconsistent with EC147, which was approved at the first hearing. EC147 includes commercial air-tightness requirement and criteria.

M156 Part III applies to residential (IRC). M165 Part III will be unworkable as written. Based on the approved EC13 residential buildings will be allowed to test the air-tightness of a sample of homes produced by one builder, rather than all homes (presuming the approved EC13 stands). Many jurisdictions many test only a minority of the residences produced by a specific builder. However the lack of testing will make that section of code unusable.

A better way to exempt less air tight residences from the ventilation requirements is to make the exemption apply only houses tested and shown to have higher air-change rate. (Most residences will require ventilation.) Untested residences would require ventilation. EC13 references the ventilation requirements in IRC M1507. A ventilation exception based on a test is integrated into my comment on RM17 in IRC section M1507.

Final Action: AS AM AMPC____ D

M156-09/10, Part III
R303.4

<u>Proposed Change as Submitted</u>

Proponent: Mike Moore, Newport Ventures, representing Broan NuTone

PART III – IRC

Insert new section as follows (renumber current Section 303.4 and those following as appropriate):

R303.4 Mechanical ventilation. <u>Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c. (50 Pa) in accordance with Section N1102.4.2.1, the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.</u>

(Renumber remaining text)

Reason: Everyone can agree that when dwelling units become "too" tight, they need mechanical ventilation. The question is, "how tight is too tight?" This code change proposal offers five air changes per hour at 50 Pascal as the "too tight" limit, and directs builders to provide mechanical ventilation at this point.

Why is whole-house mechanical ventilation needed?
Indoor air quality has direct impact on the health of building occupants. Poor indoor air quality is listed by the EPA as being the fourth largest environmental threat to our country.[1] A 2007 California study revealed formaldehyde exposure in most new homes is beyond limits recommended by the California Air Resources Board. Multiple studies have shown that relying on window operation to provide ventilation is not sufficient in practice.[2,3] If unchecked, pollutants from cleaning chemicals, finishes, furniture, and occupant activities can cause serious health effects on building occupants. Whole-house mechanical ventilation reduces occupant exposure to such pollutants.

Why 5 ACH 50?
Traditionally, 0.35 natural air changes per hour has been the consensus ventilation rate at which it is believed that sufficient fresh air is being provided to building occupants. This ventilation rate was typically achieved without mechanical ventilation because homes were built without an effective air barrier. As building practices have improved, homes have become tighter, and as homes become tighter, mechanical ventilation must be introduced to provide sufficient levels of ventilation.

ASHRAE Standard 136 was developed to enable calculation of natural air changes per hour as a function of air changes at various pressures. By following the calculation procedures in this standard, it can be shown that a natural infiltration rate of 0.35 air changes per hour is equivalent to somewhere between 7 ACH 50 to 10 ACH 50, depending on the local climatic conditions of the home. Because most dwellings are built this tight, ASHRAE 62.2 requires mechanical ventilation for all homes, with few exceptions. However, based on ASHRAE 136, a conservative code might prescribe whole-house mechanical ventilation for any home with an infiltration leakage rate of 10 ACH 50 or less.

As a second point of reference, California's 2005 Title 24 Chapter 6 requires that, "Continuous mechanical ventilation (either exhaust or supply ventilation) must be installed when the target SLA is below 3.0". California's SLA of 3.0 is roughly equivalent to 6 ACH 50. As a third point of reference, NAHB's National Green Building Standard requires whole-house mechanical ventilation when the infiltration rate falls below 5.0 ACH 50. This requirement provides clear recognition from a consensus standard that whole-house mechanical ventilation should be provided for all homes that meet this threshold.

Based on the previous references, there is broad consensus across states and within consensus standards that whole-house mechanical ventilation should be required when a dwelling's infiltration falls below 5.0 ACH 50.

What states are now requiring whole-house mechanical ventilation?
Several states now require mechanical ventilation in dwellings, including MN, VT, WA, CA, and ME.

References:

1. ASHRAE Standard 62.2-2007 *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*. http://www.ashrae.org/technology/page/548
2. Price, P.N. and M.H. Sherman "Ventilation Behavior and Household Characteristics in New California Houses," April 2006. LBNL-59620 http://epb.lbl.gov/Publications/lbnl-59620.pdf
3. Offermann, F.J., et al., "Window usage, ventilation, and formaldehyde concentrations in new California homes: summer field sessions", in IAQ 2007, Healthy and Sustainable Buildings. 2007, American Society of Heating Refrigerating, and Air Conditioning Engineers, Inc.: Baltimore, MD. p. 497-526 (preprints); http://www.iee-sf.com/pdf/SummerFieldResults.pdf

Cost Impact: Where homes have infiltration rates less than 5.0 ACH 50, and those homes are not already providing whole-house mechanical ventilation, the cost of construction will increase.

ICCFILENAME:MOORE-M1-401.2

Public Hearing Results

PART III – IRC

Modify the proposal as follows:

R303.4 Mechanical ventilation. Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of <u>0.2 inch w.c.</u> (50 Pa) in accordance with Section N1102.4.2.1, the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

Committee Action: Approved as Modified

Committee Reason: The proposed threshold is appropriate for determining where mechanical ventilation is required. This provides the builder with options. The modification corrects the pressure to be consistent with 50 Pa.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Craig Conner, Building Quality, representing self, requests Disapproval.

Commenter's Reason: M156 Parts I and II specify a residential air-tightness test for application to commercial buildings. M156 Parts I and II do not actually require the test even be done. M156 applies only to the dwelling units in commercial buildings, a very limited subset of the commercial buildings.

Any commercial ventilation requirement should be based on air-tightness or ventilation requirements for commercial buildings (IECC Chapter 5, IBC Section 1203, or IMC Chapter 4 or Section 505).

M156 Parts I and II are inconsistent with EC147, which was approved at the first hearing. EC147 includes commercial air-tightness requirement and criteria.

M156 Part III applies to residential (IRC). M165 Part III will be unworkable as written. Based on the approved EC13 residential buildings will be allowed to test the air-tightness of a sample of homes produced by one builder, rather than all homes (presuming the approved EC13 stands). Many jurisdictions many test only a minority of the residences produced by a specific builder. However the lack of testing will make that section of code unusable.

A better way to exempt less air tight residences from the ventilation requirements is to make the exemption apply only houses tested and shown to have higher air-change rate. (Most residences will require ventilation.) Untested residences would require ventilation. EC13 references the ventilation requirements in IRC M1507. A ventilation exception based on a test is integrated into my comment on RM17 in IRC section M1507.

Final Action: AS AM AMPC____ D

INTERNATIONAL RESIDENTIAL CODE – MECHANICAL

RM4-09/10
M1406.1, M1406.5, Chapter 44 (New)

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

1. Revise as follows:

M1406.1 General. Electric radiant heating systems shall be installed in accordance with the manufacturer's installation instructions and Chapters 34 through 43 of this code <u>and shall be listed for the application</u>. <u>Electric radiant heating panels and heating panel sets shall comply with UL 1693. Electric space heating cables shall comply with UL 1673.</u>

2. Delete without substitution:

~~**M1406.5 Gypsum panels.** Where radiant heating systems are used on gypsum assemblies, operating temperatures shall not exceed 125°F (52°C).~~

3. Add new standards to Chapter 44 as follows:

UL

<u>1673-96</u>	<u>Electric Space Heating Cables – with revisions through July 2003</u>
<u>1693-02</u>	<u>Electric Radiant Heating Panels and Heating Panel Sets</u>

Reason: UL 1673 and UL 1693 include a comprehensive set of construction and performance requirements that are used to evaluate and list electric space heating cables and electric radiant heating panels. Over 20 companies currently have heating cables and radiant heating panels listed. UL 1673 and UL 1693 do not require a temperature rating to be marked on the surface of the product or in the instructions. Instead, the product is specifically evaluated to the application and surfaces to which it is to be in contact. The instructions detail the surface (e.g. in concrete, on gypsum, above subfloor covered in tile, etc.). Note also that different surfaces have different temperature allowances in accordance with the standard, so all of these applications would all need to be itemized if temperatures limits are to continue to be maintained.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EUGENE-RM-5-M1406.1-CH 44

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standards did not comply with ICC standards criteria, Section (3.6.3.2)

Committee Action: **Disapproved**

Committee Reason: The proposed standards do not comply with ICC Council policy # 28.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1406.1 General. Electric radiant heating systems shall be installed in accordance with the manufacturer's installation instructions and Chapters 34 through 43 of this code and shall be listed for the application. ~~Electric radiant heating panels and heating panel sets shall comply with UL 1693. Electric space heating cables shall comply with UL1673.~~

UL
~~1673-96~~ ~~Electric Space Heating Cables – with revisions through July 2003~~
~~1693-02~~ ~~Electric Radiant Heating Panels and Heating Panel Sets~~

Commenter's Reason: In the opinion of ICC staff, the standards did not comply with ICC standards criteria, Section (3.6.3.2). Reference to the standards is deleted, but the proposed requirement for listing is maintained.

Final Action: AS AM AMPC____ D

RM10-09/10
M1501.1, M1506, M1506.2 (New), M1507.2

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

1. Revise as follows:

M1501.1 Outdoor discharge. The air removed by every mechanical exhaust system shall be discharged to the outdoors in accordance with Section M1506.2. ~~Air shall not be exhausted into an attic, soffit, ridge vent or crawl space~~.

> **Exception:** Whole-house ventilation-type attic fans that discharge into the attic space of dwelling units having private attics shall be permitted.

SECTION M1506
EXHAUST DUCTS AND EXHAUST OPENINGS

2. Add new text as follows:

M1506.2 Exhaust openings. Air exhaust openings shall terminate not less than 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable and non-operable openings into the building and 10 (3048 mm) feet from mechanical air intakes except where the opening is located 3 feet (914 mm) above the air intake. Openings shall comply with Sections R303.4.2 and R303.5.

3. Revise as follows:

M1507.2 Recirculation of air. Exhaust air from bathrooms and toilet rooms shall not be re-circulated within a residence or to another dwelling unit and shall be exhausted directly to the outdoors. ~~Exhaust air from bathrooms and toilet rooms shall not discharge into an attic, crawl space or other areas inside the building.~~

Reason: The logic in this proposal is consistent with the approval of M-22 last cycle which concluded that ventilation openings belong in the ventilation chapter and exhaust openings belong in the exhaust chapter. This handles all exhaust that would be encountered in residences and includes nothing new.

The stricken text in M1501.1 and M1507.2 is redundant and not needed as it will be covered under M1506.2.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-RB-2-R303.4.2-M1501-M1506

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace of Fairfax County representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1501.1 Outdoor discharge. The air removed by every mechanical exhaust system shall be discharged to the outdoors in accordance with Section M1506.2. <u>Air shall not be exhausted into an attic, soffit, ridge vent or crawl space.</u>

Exception: Whole-house ventilation-type attic fans that discharge into the attic space of dwelling units having private attics shall be permitted.

SECTION M1506

EXHAUST DUCTS AND EXHAUST OPENINGS

M1506.2 Exhaust openings. Air exhaust openings shall terminate not less than 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable and non-operable openings into the building and 10 (3048 mm) feet from mechanical air intakes except where the opening is located 3 feet (914 mm) above the air intake. Openings shall comply with Sections R303.4.2 and R303.5.

M1507.2 Recirculation of air. Exhaust air from bathrooms and toilet rooms shall not be re-circulated within a residence or to another dwelling unit and shall be exhausted directly to the outdoors. <u>Exhaust air from bathrooms and toilet rooms shall not discharge into an attic, crawl space or other areas inside the building.</u>

Commenter's Reason: The proponent of this change had stricken this language stating that this was covered in the new section M1506.2, however there in no language in M1506.2 that prohibits the installation of exhaust air into an attic, crawl space or other areas inside the building. This change simply reinstates important enforceable language.

Final Action: AS AM AMPC____ D

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: RM12-09/10 is redundant with RM11-09/10 and is therefore unnecessary. RM11-09/10 already changes the length to 35 feet.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.

Final Action: AS AM AMPC____ D

RM17-09/10

R202 (New), R303.1, R303.3, M1507.1, M1507.3 (New), M1507.3.1 (New), M1507.3.2 (New), M1507.3.3 (New), Table M1507.3.3(1) (New), Table M1507.3.3(2) (New), M1507.4, Table M1507.4

Proposed Change as Submitted

Proponent: Mike Moore, Newport Ventures, Inc., representing Broan NuTone

1. Add new definitions as follows:

LOCAL EXHAUST. An exhaust system that uses one or more fans to exhaust air from a specific room or rooms within a dwelling

WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM. An exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air for outdoor air for the purpose of diluting and removing indoor air contaminants within a dwelling. The system is designed to provide ventilation air continuously or through a programmed intermittent schedule to satisfy the ventilation rates required for the whole house. Local exhaust or supply fans can serve as such a system.

2. Revise as follows:

R303.1 Habitable rooms. All habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural *ventilation* shall be through windows, doors, louvers or other *approved* openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated.

Exceptions:

1. The glazed areas need not be openable where the opening is not required by Section R310 and ~~an *approved* mechanical *ventilation* system capable of producing 0.35 air change per hour in the room is installed or~~ a whole-house mechanical *ventilation* system is installed ~~capable of supplying outdoor *ventilation* air of 15 cubic feet per minute (cfm) (78 L/s) per occupant computed on the basis of two occupants for the first bedroom and one occupant for each additional bedroom~~ in accordance with Section M1507.
2. The glazed areas need not be installed in rooms where Exception 1 above is satisfied and artificial light is provided capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
3. Use of sunroom *additions* and patio covers, as defined in Section R202, shall be permitted for natural *ventilation* if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening.

R303.3 Bathrooms. Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet (0.3 m2), one-half of which must be openable.

Exception: The glazed areas shall not be required where artificial light and a ~~mechanical ventilation~~ local exhaust system are provided. The minimum local exhaust ~~ventilation~~ rates shall be determined in accordance with Section M1507.4. ~~50 cubic feet per minute (24 L/s) for intermittent ventilation or 20 cubic feet per minute (10 L/s) for continuous ventilation~~. ~~Ventilation~~ Exhaust air from the space shall be exhausted directly to the ~~outside~~ outdoors.

M1507.1 General. Where local exhaust or whole-house mechanical ventilation is provided ~~toilet rooms, and bathrooms are mechanically ventilated,~~ the ~~ventilation~~ equipment shall be designed in accordance with this section.

3. Add new text and tables as follows:

M1507.3 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.3.

M1507.3.1 System design. The whole-house ventilation system shall consist of one or more supply or exhaust fans or a combination of such and associated ducts and controls. Where local supply or exhaust fans are used as part of such a system, they shall be tested and rated in accordance with HVI 916, and the fans' rated flow at 0.25 in w.c. static pressure shall equal or exceed the required ventilation rate determined by Section M1507.3.3. Outdoor air ducts connected to the return side of an air handler shall be considered to provide supply ventilation.

M1507.3.2 System Controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override.

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1507.3.3(1).

> **Exception:** The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25% of each 4 hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

TABLE M1507.3.3(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

Dwelling Unit Floor Area (square feet)	**Number of Bedrooms**				
	0-1	**2-3**	**4-5**	**6-7**	**>7**
	Airflow in CFM				
<1500	30	45	60	75	90
1501-3000	45	60	75	90	105
3001-4500	60	75	90	105	120
4501-6000	75	90	105	120	135
6001-7500	90	105	120	135	150
>7500	105	120	135	150	165

TABLE M1507.3.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]

Run-Time Percentage In Each 4 Hour Segment	**25%**	**33%**	**50%**	**66%**	**75%**	**100%**
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

4 Revise as follows:

M1507.4~~3~~ Local exhaust rates ~~Ventilation rate.~~ Local exhaust ~~Ventilation~~ systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.4~~3~~.

TABLE M1507.4~~3~~
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR
ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE ~~VENTILATED~~ EXHAUSTED	**~~VENTILATION~~ EXHAUST RATES**
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms—Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.4719 L/s.

Reason: This proposal is intended to provide clear guidance to builders and code officials on the design and specification of mechanical ventilation systems for homes IF such systems are installed. Instead of mandating mechanical ventilation, it provides much needed guidance on both whole-house mechanical ventilation systems and local exhaust, including definitions of the same. The language proposed serves to streamline the code by placing all requirements for mechanical ventilation systems within the current M1507, which is aptly titled "Mechanical Ventilation".

Language that is proposed for M1507 is basically a distilled version of ASHRAE 62.2. The proposed language is intended to take ASHRAE's ten page standard and reduce it to the nuts and bolts of mechanical ventilation that are simple and straightforward. ASHRAE has issued a copyright release for the table of whole-house ventilation rates. Not only are these the same rates in ASHRAE 62.2, but they are also the same rates that are now referenced in the state building codes of California and Maine as well as being referenced within the National Green Building Standard.

Similarly, the intermittent multipliers are sourced from ASHRAE 62.2 and are included to provide builders with more options for delivering equivalent ventilation.

Cost Impact: Because this language does not require whole house mechanical ventilation or local exhaust, it will not in itself increase the cost of construction.

ICCFILENAME: MOORE-RB-1-R202-R303-M1507

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

LOCAL EXHAUST. An exhaust system that uses one or more fans to exhaust air from a specific room or rooms within a dwelling

WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM. An exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air for outdoor air ~~for the purpose of diluting and removing indoor air contaminants within a dwelling.~~ when operating ~~The system is designed to provide ventilation air~~ continuously or through a programmed intermittent schedule to satisfy the whole-house ventilation rate~~s required for the whole house. Local exhaust or supply fans can serve as such a system~~.

R303.1 Habitable rooms. All habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural *ventilation* shall be through windows, doors, louvers or other *approved* openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated.

Exceptions:

1. The glazed areas need not be openable where the opening is not required by Section R310 and a whole-house mechanical *ventilation* system is installed in accordance with Section M1507.
2. The glazed areas need not be installed in rooms where Exception 1 above is satisfied and artificial light is provided capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
3. Use of sunroom *additions* and patio covers, as defined in Section R202, shall be permitted for natural *ventilation* if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening.

R303.3 Bathrooms. Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet (0.3 m2), one-half of which must be openable.

Exception: The glazed areas shall not be required where artificial light and a local exhaust system are provided. The minimum local exhaust rates shall be determined in accordance with Section M1507.4 Exhaust air from the space shall be exhausted directly to the outdoors.

M1507.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the equipment shall be designed in accordance with this section.

M1507.3 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.3.

M1507.3.1 System design. The whole-house ventilation system shall consist of one or more supply or exhaust fans or a combination of such and associated ducts and controls. ~~Where local supply or exhaust fans are used as part of such a system, they shall be tested and rated in accordance with HVI 916, and the fans' rated flow at 0.25 in w.c. static pressure shall equal or exceed the required ventilation rate determined by Section M1507.3.3~~. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered to provide supply ventilation.

M1507.3.2 System Controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override.

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1507.3.3(1).

Exception: The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25% of each 4 hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

TABLE M1507.3.3(1)

CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

Dwelling Unit Floor Area (square feet)	Number of Bedrooms				
	0-1	2-3	4-5	6-7	>7
	Airflow in CFM				
<1500	30	45	60	75	90
1501-3000	45	60	75	90	105
3001-4500	60	75	90	105	120
4501-6000	75	90	105	120	135
6001-7500	90	105	120	135	150
>7500	105	120	135	150	165

TABLE M1507.3.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]

Run-Time Percentage In Each 4 Hour Segment	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

4 Revise as follows:

M1507.4 Local exhaust rates. Local exhaust systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.4.

TABLE M1507.4
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR
ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms—Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.4719 L/s.

Committee Reason: The current ventilation rate of 0.35 ACH is overkill and the proposed text provides more realistic rates and options. The proposal is consistent with the IECC.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Craig Conner, Building Quality, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1507.1 General. ~~Where local exhaust or~~ a whole-house mechanical ventilation system ~~is~~ shall be provided and ~~the equipment~~ shall be designed in accordance with this section.

Exception: This shall not apply to a dwelling that has been tested in accordance with Section 402.4.1.2 of the IECC and such testing demonstrates that the air leakage rate is greater than five ACH 50.

Commenter's Reason: RM17 adds ventilation requirements that will be important in new energy-efficient homes. The new IECC requires residences be more airtight to save energy (presuming the approved EC13 stands). In order to maintain healthy indoor air, airtight residences will require mechanical ventilation. The IECC sets the threshold for airtightness, based on which mechanical ventilation is required, or not required.

The new IECC also allows testing of only an approved sample of residences for air tightness, rather than testing all residences. With sampling only a minority of an individual builders residences may be tested. For the tested residences, the mechanical ventilation requirement will be based on that residence's tested airtightness. As approved RM17 is unclear how the ventilation requirements apply to residences that are not tested. For example in a sample of homes, if some tested homes require ventilation and other tested homes do not, do the untested homes require ventilation? For untested residences the code should error on the side of caution by requiring mechanical ventilation. Only residences tested and shown not to require ventilation should be exempt from the health-related ventilation.

Final Action: AS AM AMPC____ D

RM19-09/10
R303.4.1

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County, CO, representing the CO Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

R303.4.1 Intake openings. Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Where a source of contaminant is located within 10 feet (3048 mm) of an intake opening, such opening shall be located a minimum of ~~2~~ 3 feet (~~610~~ 914 mm) below the contaminant source.

For the purpose of this section, the exhaust from *dwelling* unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.

Reason: This dimension is inconsistent with many other code books such as IMC-401.4 #3; IRC-G2427.6.6 and G2427.8 #1; IFGC-503.6.7; IFGC-618.5 and IFGC-503.8 #1. This 3-foot dimension has been around for years and was also found in the legacy codes. It's important that sources of contamination don't make its way into building openings and there have still been issues where 2 feet doesn't work. This dimension was also changed last cycle in M22. Also, proposals have been submitted to the plumbing to complete the transition.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-RB-1-R303.4.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: No justification was provided demonstrating that the 2 foot dimension is improper. Consistency with the IMC is not sufficient justification.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann of Jefferson County, Colorado representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: The committee approved RM-10 which states that exhaust openings (a contaminant source) are required to be 3 feet above intake openings which is consistent with 8 other code sections. It's vital that this section be revised to fall within the balance of codes from a consistency standpoint.

Final Action: AS AM AMPC____ D

RM20-09/10
M1601.1, M1601.1.1

Proposed Change as Submitted

Proponent: Sam Dardano, City of Boulder, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

M1601.1 Duct design. Duct systems serving heating, cooling and ventilation equipment shall be ~~fabricated~~ <u>installed</u> in accordance with the provisions of this section and ACCA Manual D or other approved methods

M1601.1.1 Above-ground duct systems. Above-ground duct systems shall conform to the following:

1. Equipment connected to duct systems shall be designed to limit discharge air temperature to a maximum of 250°F (121°C).
2. Factory-made air ducts shall be constructed of Class 0 or Class 1 materials as designated in Table M1601.1.1(1)
3. Fibrous duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.
4. Minimum thickness of metal duct material shall be as listed in Table M1601.1.1(2). <u>Metallic ducts shall be fabricated in accordance with *SMACNA Duct Construction Standards Metal and Flexible*.</u> Galvanized steel shall conform to ASTM A 653.
5. Use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a flame spread index not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
   - 7.1. These cavities or spaces shall not be used as a plenum for supply air.
   - 7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
   - 7.3. Stud wall cavities shall not convey air from more than one floor level.
   - 7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight fitting fire blocking in accordance with Section R602.8.

Reason: Ducts are not fabricated according to Manual D, they are installed according to that standard. Ducts in general are fabricated according to the SMACNA Standard. This is a simple clarification.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DARDANO-RM-1-M1601.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed standard may not apply to residential construction.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann of Jefferson County, Colorado representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: The committee reason for disapproval was that the SMACNA Standard *may* not apply to residential construction. The Standard most definitely does apply. The IRC states that residential heating systems must conform to ACCA Manual D. Manual D states that duct construction shall be according to the SMACNA Standard.

Final Action: AS AM AMPC____ D

RM21-09/10
M1601.1.1

Proposed Change as Submitted

Proponent: Sam Dardano, City of Boulder, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

M1601.1.1 Above-ground duct systems. Above-ground duct systems shall conform to the following:

1. Equipment connected to duct systems shall be designed to limit discharge air temperature to a maximum of 250°F (121°C).
2. Factory-made air ducts shall be constructed of Class 0 or Class 1 materials as designated in Table M1601.1.1(1)
3. Fibrous duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.
4. Minimum thickness of metal duct material shall be as listed in Table M1601.1.1(2). Galvanized steel shall conform to ASTM A 653.
5. Use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.

~~6. *Duct systems* shall be constructed of materials having a flame spread index not greater than 200.~~

~~7~~6. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
   - ~~7.1.~~ 6.1. These cavities or spaces shall not be used as a plenum for supply air.
   - ~~7.2.~~ 6.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
   - ~~7.3.~~ 6.3. Stud wall cavities shall not convey air from more than one floor level.
   - ~~7.4.~~ 6.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight fitting fire blocking in accordance with Section R602.8.

Reason: # 6 is broken. It doesn't say or qualify what kind of duct system it's referring to. This is a great example of poor code language that's not enforceable or able to be explained with any certainty. What makes this stand out is that it does not have to meet a 25 flame-spread rating as # 2 requires?

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DARDANO-RM-4-M1601.1.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed revision would eliminate a product line that has no apparent problems.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann of Jefferson County, Colorado representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: Item 6 conflicts with Item 2. Duct systems include factory made air ducts which are required to have a maximum flame spread of 25. Item 6 turns around and says never mind, it can be 200 if its part of a "duct system" meaning a factory made air-duct with a higher flame spread could be utilized. Item 6 is intended to address above ground plastic systems but doesn't come out and say it resulting in an interpretation problem for code officials because no one knows what kind of duct system is being referred to here. This needs to be deleted until a proposal comes forward using the word "plastic" in front of "duct systems" and see if the committee will approve it. Words mean things and the lack of words have consequences. The committee's reason for disapproval was deleting # 6 would delete a product line but there is no product line stated in the text.

Final Action: AS AM AMPC____ D

RM23-09/10
1601.4.1

Proposed Change as Submitted

Proponent: Sam Dardano, City of Boulder, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Delete and substitute as follows:

~~**M1601.4.1 Joints and seams**. Joints of duct systems shall be made substantially airtight by means of tapes, mastics, liquid sealants gasketing or other approved closure systems. Closure systems used with rigid fibrous glass ducts shall comply with UL 181A and shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Closure systems used with flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. Duct connections to flanges of air distribution system equipment or sheet metal fittings shall be mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Crimp joints for round metal ducts shall have a contact lap of at least 1½ inches (38 mm) and shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced around the joint. Closure systems used to seal metal ductwork shall be installed in accordance with the manufacturers' instructions.~~

~~**Exceptions:**~~

1. ~~Spray polyurethane foam shall be permitted to be applied without additional joint seals.~~
2. ~~Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.~~
3. ~~Continuously welded and locking type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~

<u>**M1601.4.1 Joints, seams and connections.** All longitudal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC Duct Construction Standards—Metal and</u>

Flexible and NAIMA Fibrous Glass Duct Construction Standards. All joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes. Closure systems used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked “181 B-FX” for pressure sensitive tape or “181 B-M” for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Closure systems used to seal metal ductwork shall be installed in accordance with the manufacturers’ instructions. Round metallic ducts shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint. Unlisted duct tape shall not be permitted as a sealant on any duct.

Exceptions:

1. Spray polyurethane foam shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. Continuously welded and locking type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Reason: This text is being replaced with that of the IMC. The IMC language is more concise and complete. The language covering contact lap is deliberately deleted as it is inconsistent with the SMACNA Standard which calls for a one inch lap. Also language covering unlisted tape is not present in the IRC text. This is strictly editorial in nature with no new content.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DARDANO-RM-2-M1601.4.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee did not have the opportunity to review the proposed new standards. It is not clear what standard is being referenced.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann of Jefferson County, Colorado representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1601.4.1 Joints, seams and connections. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC Duct Construction Standards—Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards. All joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes. Closure systems used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked “181 B-FX” for pressure sensitive tape or “181 B-M” for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Crimp joints for round metallic ducts shall have a contact lap of at least 1 inch (25 mm) and shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced around the joint. Closure systems used to seal metal ductwork shall be installed in accordance with the manufacturers’ instructions. Round metallic ducts shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint. Unlisted duct tape shall not be permitted as a sealant on any duct.

Exceptions:

1. Spray polyurethane foam shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. Continuously welded and locking type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Commenter's Reason: The committee reason for disapproval was that they didn't have the opportunity to review the standard. This standard has been part of the code for years. Dwellings constructed under the IMC must adhere to the SMACNA Standard. Dwellings under the IRC should be held to the same standard for consistency sake and uniform enforcement of the code. There is no cost increase in utilizing the standard. The code tells us that residential systems must be installed according to ACCA Manual D and that document states that duct construction should be in accordance with the SMACNA Standard. The Tables in the IRC for duct construction are the same gages found in the standard. There is no technical reason to construct a duct system differently between the two codes. The committee mentioned that they would like to see the reference to joint lapping reinstated. It was done so with the dimension found in the standard.

Final Action: AS AM AMPC____ D

RM32-09/10
M1901.3 (New)

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

Add new text as follows:

M1901.3 Prohibited location. Cooking appliances designed, tested, listed and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.

Reason: Commercial cooking appliances are prohibited by the IMC (Sections 917.2 and 917.3) in dwelling units due to the difference in temperature requirements and operations between commercial and household appliances. This prohibition should also be in the IRC for consistency.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Sections G2447.2 and G2447.3 address the issue for gas-fired cooking appliances.

ICCFILENAME: EUGENE-RM-18-1901.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text is already covered in Chapter 24 and the proposed text in RM31-09/10.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action and a public comment. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.

Public Comment:

Miriam McGiver representing New York State Department of State Division of Code Enforcement and Administration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1901.3 Prohibited location. Cooking appliances designed, tested, listed and labeled for use only in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.

Commenter's Reason: The proposal as written would not allow use of a cooking appliance that is listed for use both in a household and a commercial occupancy. This public comment change will allow cooking appliances that are dual listed, for residential and commercial use, to be used in residential settings.

RM31, if approved, requires that cooking appliances in dwellings shall be listed for household use.

Final Action: AS AM AMPC____ D

RM33-09/10
M1902.2, Chapter 44 (New)

<u>Proposed Change as Submitted</u>

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

1. Revise as follows:

M1902.2 Installation. Sauna heaters shall be installed in accordance with the manufacturer's installation instructions. <u>Sauna heaters shall comply with UL 875.</u>

2. Add new standard to Chapter 44 as follows:

UL
<u>875-09</u> <u>Electric Dry-Bath Heaters</u>

Reason: UL 875 is already referenced in Section 914.2 of the International Mechanical Code, and includes a comprehensive set of construction and performance requirements that are specifically used to evaluate and list sauna heaters. Four companies currently have listings for sauna heaters.

Cost Impact: The code change proposal will not increase the cost of construction.

<u>Public Hearing Results</u>

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: The proposed new standard is currently referenced in the IMC and was not reviewed by staff

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's printed reason.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Miriam McGiver representing New York State Department of State Division of Code Enforcement and Administration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

M1902.2 Installation. Sauna heaters shall be installed in accordance with the manufacturer's installation instructions. <u>Electric</u> sauna heaters shall comply with UL 875.

Commenter's Reason: This modification is proposed to add clarity. The UL standard 875 is applies only to electric heaters. As the current proposal is written, it appears the standard would apply to sauna heaters that are not electric. This public comment change is intended to limit the requirement to comply with UL 875, Electric Dry-Bath Heaters, to sauna heaters that are electric.

Final Action: AS AM AMPC____ D

RM38-09/10

M2301, M2301.1, M2302 (New), M2302.1 (New), M2302.2 (New), M2302.2.1 (New), M2302.2.2 (New), M2302.2.3 (New), M2302.2.4 (New), M2302.3 (New), M2302.4 (New), Chapter 44

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

1. Revise as follows:

SECTION M2301
THERMAL SOLAR ENERGY SYSTEMS

M2301.1 General. This section provides for the design, construction, installation, alteration and repair of equipment and systems using thermal solar energy to provide space heating or cooling, hot water heating and swimming pool heating.

2. Add new text as follows:

SECTION M2302
PHOTOVOLTAIC SOLAR ENERGY SYSTEMS

M2302.1 General. This section provides for the design, construction, installation, alteration and repair of photovoltaic equipment and systems.

M2302.2 Installation. The installation of photovoltaic systems shall comply with the manufacturer's installation instructions, Sections M2302.2.1 through M2302.2.4 and NFPA 70.

M2302.2.1 Access. Photovoltaic panels, modules, inverters, converters, and combiner boxes shall be accessible for inspection, maintenance, repair and replacement.

M2302.2.2 Roof-mounted panels and modules. Where photovoltaic panels and modules are installed on roofs, the roof shall be constructed to support the loads imposed by such modules. Roof-mounted photovoltaic panels and modules that serve as a roof covering shall conform to the requirements for roof coverings in Chapter 9. Where mounted on or above the roof coverings, the photovoltaic panels and modules and supporting structure shall be constructed of noncombustible materials or fire-retardant-treated wood equivalent to that required for the roof construction.

M2302.2.3 Roof and wall penetrations. Roof and wall penetrations shall be flashed and sealed in accordance with Chapter 9 to prevent entry of water, rodents and insects.

M2302.2.4 Ground-mounted panels and modules. Ground-mounted panels and modules shall be installed in accordance with the manufacturer's installation instructions.

M2302.3 Photovoltaic panels and modules. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703

M2302.4 Inverters. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.

3. Add new standards to Chapter 44 as follows:

UL

1703-02	Flat-Plate Photovoltaic Modules and Panels – with revisions through April 2008
1741-99	Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources – with revisions through November 2005

Reason: The purpose of the code change is to distinguish between two types of solar systems – thermal and photovoltaic – and provide basic safety requirements for photovoltaic systems.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EUGENE-RM-19-2301-2302-CH 44

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard UL 1703-02 indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Analysis: Review of the proposed new standard UL 1741-99 indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section (3.6.3.2)

Committee Action: Approved as Submitted

Committee Reason: The proposal adds coverage for PV solar systems and provides the needed standards.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joann Surma representing he Dow Chemical Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION M2301
THERMAL SOLAR ENERGY SYSTEMS

M2301.1 General. This section provides for the design, construction, installation, alteration and repair of equipment and systems using thermal solar energy to provide space heating or cooling, hot water heating and swimming pool heating.

SECTION M2302
PHOTOVOLTAIC SOLAR ENERGY SYSTEMS

M2302.1 General. This section provides for the design, construction, installation, alteration and repair of photovoltaic equipment and systems.

M2302.2 ~~Installation~~ Requirements. The installation, inspection, maintenance, repair and replacement of photovoltaic systems and all system components shall comply with the manufacturer's ~~installation~~ instructions, Sections M2302.2.1 through M2302.2. ~~4~~ 3 and NFPA 70.

~~**M2302.2.1 Access.** Photovoltaic panels, modules, inverters, converters, and combiner boxes shall be accessible for inspection, maintenance, repair and replacement.~~

M2302.2.~~2~~ 1 Roof-mounted panels and modules. Where photovoltaic panels and modules are installed on roofs, the roof shall be constructed to support the loads imposed by such modules. Roof-mounted photovoltaic panels and modules that serve as a roof covering shall conform to the requirements for roof coverings in Chapter 9. Where mounted on or above the roof coverings, the photovoltaic panels and modules and supporting structure shall be constructed of noncombustible materials or fire-retardant-treated wood equivalent to that required for the roof construction.

M2302.2.~~3~~ 2 Roof and wall penetrations. Roof and wall penetrations shall be flashed and sealed in accordance with Chapter 9 to prevent entry of water, rodents and insects.

M2302.2. ~~4~~ 3 Ground-mounted panels and modules. Ground-mounted panels and modules shall be installed in accordance with the manufacturer's installation instructions.

M2302.3 Photovoltaic panels and modules. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703

M2302.4 Inverters. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.

3. Add new standards to Chapter 44 as follows:
UL 1703-02 Flat-Plate Photovoltaic Modules and Panels – with revisions through April 2008 UL 1741-99 Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed

Energy Resources – with revisions through November 2005

Commenter's Reason: This code change helps to distinguish between two types of solar systems – thermal and photovoltaic. It provides for needed direction on the use of photovoltaic systems.

This public comment further clarifies the requirements for these systems by creating a specific section; **M2302.2 Requirements** and including all important parameters in that section. The issues of installation, inspection, maintenance, repair, replacement, and accessibility have all been combined in this one section. The text referencing the other remaining subsections and NFPA 70 remains intact. This new language eliminates conflicts between NFPA 70 requirements and the original proposal wording. Also, rather than calling out specific individual pieces of the photovoltaic system (i.e. panels, modules, inverters, converters, and combiner boxes) the entire photovoltaic system and system components are referenced. This will provide more inclusive language, such that no elements are missed.

Final Action: AS AM AMPC____ D

INTERNATIONAL PLUMBING CODE

P2-09/10, Part I
202

Proposed Change as Submitted

Proponent: James Anjam, Arlington County, Virginia Plumbing and Mechanical Inspectors Association (VPMIA)

PART I - IPC

Revise as follows:

PLUMBING FIXTURE. A receptacle or device that is ~~either permanently or temporarily~~ directly or indirectly connected to the ~~water~~ ~~distribution system~~ building drainage system. Such receptacles or devices typically, but do not always require a connection to a supply of water. ~~of the premises~~ ~~and demands a supply of water therefrom; discharges wastewater, liquid-borne waste materials or sewage either directly or indirectly to the drainage system of the premises; or requires both a water supply connection and a discharge to the drainage system of the premises.~~

Reason: The current plumbing fixture definition is confusing and out of date. According to the current code, waterless urinals and floor drains are not considered to be plumbing fixtures. This proposal updates and simplifies the code.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ANJAM-P1-202

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: Testimony of opponent indicated that ASME A112.19.2 has a better definition.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII requests Approval as Modified by this Public Comment:

Replace the proposal as follows:

~~PLUMBING FIXTURE. A receptacle or device that is either permanently or temporarily connected to the water distribution system of the premises and demands a supply of water there from; discharges wastewater, liquid-borne waste materials or sewage either directly or indirectly to the drainage system of the premises; or requires both water supply connection and a discharge to the drainage system of the premises.~~

PLUMBING FIXTURE. A receptacle or device that is connected to a water supply system or discharges to a drainage system or both. Such receptacles or devices require a supply of water; or discharge liquid waste or liquid-borne solid waste; or require-a supply of water and discharge waste to a drainage system.

Commenter's Reason: The current IPC definition lacks the inclusion of code approved waterless type urinals, foor drains, stand pipes, and waste receptors. The original public comment submission failed to include hose connections or eyewash fixtures with a water supply only. The as modified language includes all fixtures whether they are water supplied or waste discharge only or both.

Final Action: AS AM AMPC____ D

P2-09/10, Part II
IRC 202

Proposed Change as Submitted

Proponent: James Anjam, Arlington County, Virginia Plumbing and Mechanical Inspectors Association (VPMIA)

PART II – IRC

Delete and substitute as follows:

~~**PLUMBING FIXTURE.** A receptor or device that requires both a water-supply connection and a discharge to the drainage system, such as water closets, lavatories, bathtubs and sinks. Plumbing *appliances* as a special class of fixture are further defined.~~

<u>**PLUMBING FIXTURE.** A receptacle or device that is directly or indirectly connected to the building drainage system. Such receptacles or devices typically, but do not always require a connection to a supply of water.</u>

Reason: The current plumbing fixture definition is confusing and out of date. According to the current code, waterless urinals and floor drains are not considered to be plumbing fixtures. This proposal updates and simplifies the code.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ANJAM-P1-202

Public Hearing Results

PART II- IRC
Committee Action: **Approved as Submitted**

Committee Reason: Agreed with proponent's reason statement that the definition is out of date and doesn't include waterless urinals.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful and a public comment was submitted.

Public Comment:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

~~PLUMBING FIXTURE. **A receptor or device that requires both a water-supply connection and a discharge to the drainage system, such as water closets, lavatories, bathtubs and sinks. Plumbing *appliances* as a special class of fixture are further defined.**~~

<u>PLUMBING FIXTURE. **A receptacle or device that is connected to a water supply system or discharges to a drainage system or both. Such receptacles or devices require a supply of water; or discharge liquid waste or liquid-borne solid waste; or require a supply of water and discharge waste to a drainage system.**</u>

Commenter's Reason: The current IRC definition lacks the inclusion of floor drains, stand pipes, and waste receptors. The original public comment submission failed to include hose connections with a water supply only. The as modified language includes all fixtures whether they are water supplied or waste discharge only or both.

Final Action: AS AM AMPC____ D

P7-09/10, Part I
303.1, 303.4, Table 303.4

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA, PART II IS REPRODUCED ONLY FOR INFORMATION PURPOSES FOLLOWING ALL OF PART I

Proposed Change as Submitted

Proponent: Becky Baker, Jefferson County Colorado, representing the Colorado Association of Plumbing Mechanical Officials

PART I - IPC

1. Revise as follows:

303.1 Identification. Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer and any markings required by the applicable referenced standards.

303.4 Third-party ~~testing and~~ certification. All plumbing products and materials shall ~~comply~~ be listed by a third-party certification agency as complying with the referenced standards, specifications and performance criteria of this code. ~~and shall be identified in accordance with Section 303.1. When required by Table 303.4, plumbing products and materials shall either be tested by an approved third – party testing agency or certified by an approved third – party certification agency.~~ Products and materials shall be identified in accordance with Section 303.1.

2. Delete table without substitution:

~~TABLE 303.4~~
~~PRODUCTS AND MATERIALS REQUIRING THIRD-PARTY TESTING AND THIRD-PARTY CERTIFICATION~~

~~PRODUCT OR MATERIAL~~	~~THIRD-PARTY CERTIFIED~~	~~THIRD-PARTY TESTED~~
~~Potable water supply system components and potable water fixture fittings~~	~~Required~~	~~-~~
~~Sanitary drainage and vent system components~~	~~Plastic pipe, fittings and pipe-related components~~	~~All others~~
~~Waste fixture fittings~~	~~Plastic pipe, fittings and pipe-related components~~	~~All others~~
~~Storm drainage system components~~	~~Plastic pipe, fittings and pipe-related components~~	~~All others~~
~~Plumbing fixtures~~	~~-~~	~~Required~~
~~Plumbing appliances~~	~~Required~~	~~-~~
~~Backflow prevention devices~~	~~Required~~	~~-~~
~~Water distribution system safety devices~~	~~Required~~	~~-~~
~~Special waste system components~~	~~-~~	~~Required~~
~~Subsoil drainage system components~~	~~-~~	~~Required~~

Reason: The revision to IPC Section 303.1 (IRC Section P2608.1)
1. To make it clear that the code intends that the identification requirements in any referenced standard(s) be met.
2. To require that the mark of the third-party certification agencies be applied to listed products. This is needed so that the inspector knows that the product has been certified by a third party agency.

The revision to IPC Section 303.4 (IRC Section P22608.4) and the deletion of IPC Table 303.4 (IRC Table P2608.1)
1. To make the job of the easier since inspectors don't have time to review test reports and
2. To create a more uniform means to enforce code requirements among the various products governed by the code.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BAKER-P1-303.1

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: Requires testing of items that really don't need to be tested.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Becky Baker, Jefferson County, Colorado representing the Colorado Association of Plumbing and Mechanical Officials, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

303.1 Identification. Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer and any markings required by the applicable referenced standards.

303.4 Third-party certification. All plumbing products and materials shall be listed by a third-party certification agency as complying with the referenced standards~~, specifications and performance criteria of this code~~. Products and materials shall be identified in accordance with Section 303.1.

Commenter's Reason: This modification will accomplish the intent of the original proposal and maintain consistency between the IPC and IRC.

Public Comment 2:

Julius Ballanco, PE, JB Engineering and Code Consulting, representing self, requests Approval as Modified by this public comment.

Modify the proposal as follows:

303.1 Identification. Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer and any markings required by the applicable referenced standards.

303.4 Third-party certification. All plumbing products and materials shall be listed by a third-party certification agency as complying with the referenced standards~~, specifications and performance criteria of this code~~. Products and materials shall be identified in accordance with Section 303.1.

Commenter's Reason: This change was a good attempt by the Colorado Association of Plumbing and Mechanical Officials. Just a slight modification is necessary. The third party certification is to the referenced standard. It is unnecessary to add a statement regarding "specifications and performance criteria of this code".

The standard practice in the industry is for products to be tested and listed to the appropriate standard. The code lists the standards that are applicable for each application.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

P7-09/10, PART II - IRC

1. Revise as follows:

P2608.1 Identification. Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer <u>and any markings required by the applicable referenced standards</u>.

P2608.4 Third-party ~~testing and~~ certification. All plumbing products and materials shall ~~comply~~ be listed by a third-party certification agency as complying with the referenced standards, specifications and performance criteria of this code. ~~and shall be identified in accordance with Section P2608.1. When required by Table P2608.4, plumbing products and materials shall either be tested by an approved third party testing agency or certified by an approved third party certification agency.~~ Products and materials shall be identified in accordance with Section P2608.1.

2. Delete table without substitution:

~~**TABLE P2608.4**~~
~~**PRODUCTS AND MATERIALS REQUIRING THIRD-PARTY TESTING AND THIRD-PARTY CERTIFICATION**~~

~~**PRODUCT OR MATERIAL**~~	~~**THIRD-PARTY CERTIFIED**~~	~~**THIRD-PARTY TESTED**~~
~~Potable water supply system components and potable water fixture fittings~~	~~Required~~	~~-~~
~~Sanitary drainage and vent system components~~	~~Plastic pipe, fittings and pipe-related components~~	~~All others~~
~~Waste fixture fittings~~	~~Plastic pipe, fittings and pipe-related components~~	~~All others~~
~~Storm drainage system components~~	~~Plastic pipe, fittings and pipe-related components~~	~~All others~~
~~Plumbing fixtures~~	~~-~~	~~Required~~
~~Plumbing appliances~~	~~Required~~	~~-~~
~~Backflow prevention devices~~	~~Required~~	~~-~~
~~Water distribution system safety devices~~	~~Required~~	~~-~~
~~Special waste system components~~	~~-~~	~~Required~~
~~Subsoil drainage system components~~	~~-~~	~~Required~~

Reason: The revision to IPC Section 303.1 (IRC Section P2608.1)
1. To make it clear that the code intends that the identification requirements in any referenced standard(s) be met.
2. To require that the mark of the third-party certification agencies be applied to listed products. This is needed so that the inspector knows that the product has been certified by a third party agency.

The revision to IPC Section 303.4 (IRC Section P22608.4) and the deletion of IPC Table 303.4 (IRC Table P2608.1)
1. To make the job of the easier since inspectors don't have time to review test reports and
2. To create a more uniform means to enforce code requirements among the various products governed by the code.

Cost Impact: The code change proposal will not increase the cost of construction.

PART II- IRC-P
Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2608.4 Third-party certification. All plumbing products and materials shall be listed by a third-party certification agency as complying with the referenced standards ~~specifications and performance criteria of this code~~. Products and materials shall be identified in accordance with Section P2608.1.

Committee Reason: Modification made to clarify that products must be certified to referenced standards. Provides for a more uniform method to enforce code requirements and reduces the number of test reports required to be reviewed by code officials.

Assembly Action: **None**

P11-09/10
308.9 (New)

Proposed Change as Submitted

Proponent: Gregory A. Farmer, PE representing ASPE Legislative Committee, ASPE

Revise as follows:

308.9 Parallel water distribution systems. Piping bundles for manifold systems shall be supported in accordance with Table 308.5. Support at changes in direction shall be in accordance with the manufacturer's installation instructions. ~~Hot and~~ ~~c~~Cold water and uninsulated hot water piping shall not be grouped in the same bundle.

Reason: The purpose of separation between the hot water and cold water piping is to prevent heat transfer. Insulation on the hot water piping accomplishes the same objective. Allowing the insulated piping to be in the same pipe bundle will reduce labor and material costs.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FARMER-P1-308.9

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: It is logical not to want hot water piping transferring heat to cold water piping in a piping bundle.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary Klein, Affiliated International Management, LLC., representing self, requests Approval as Modified by this Public Comment.

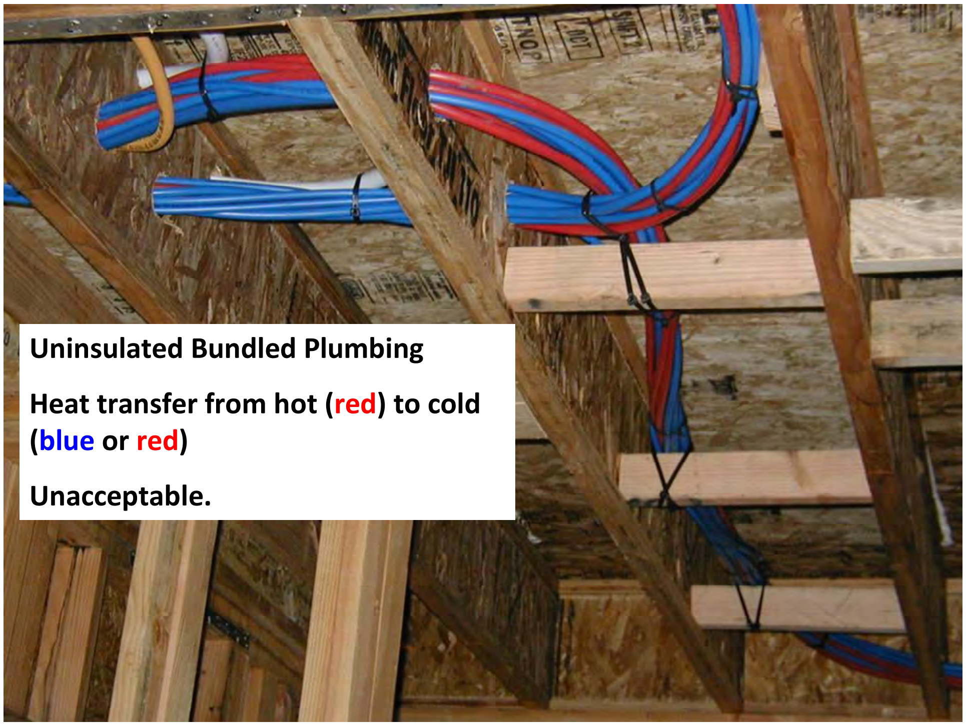
Modify the proposal as follows:

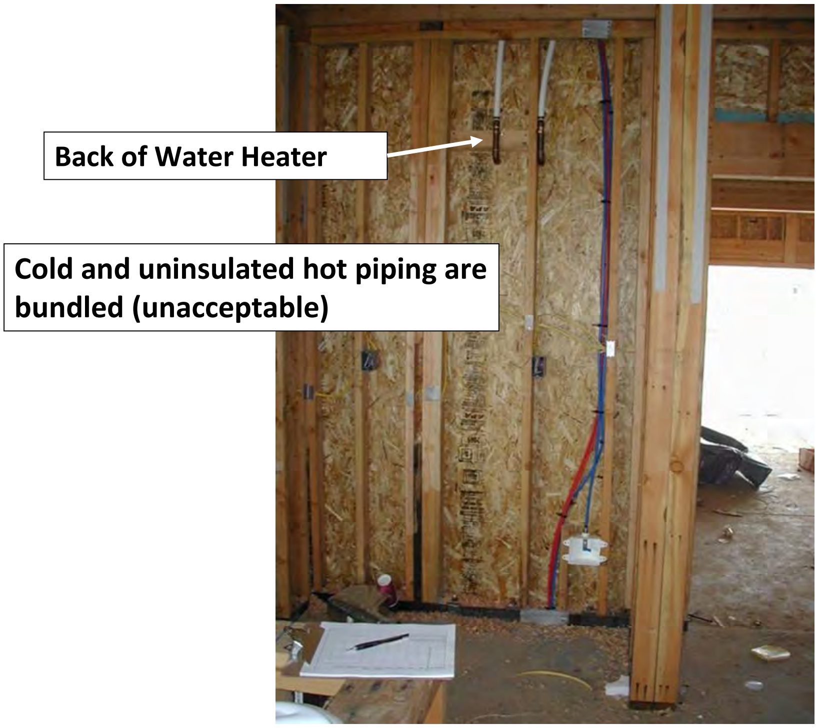
308.9 Parallel water distribution systems. Piping bundles for manifold systems shall be supported in accordance with Table 308.5. Support at changes in direction shall be in accordance with the manufacturer's installation instructions. ~~Cold water and uninsulated hot water piping shall not be grouped in the same bundle.~~ Where hot water piping is bundled with cold or hot water piping, each hot water pipe shall be insulated.

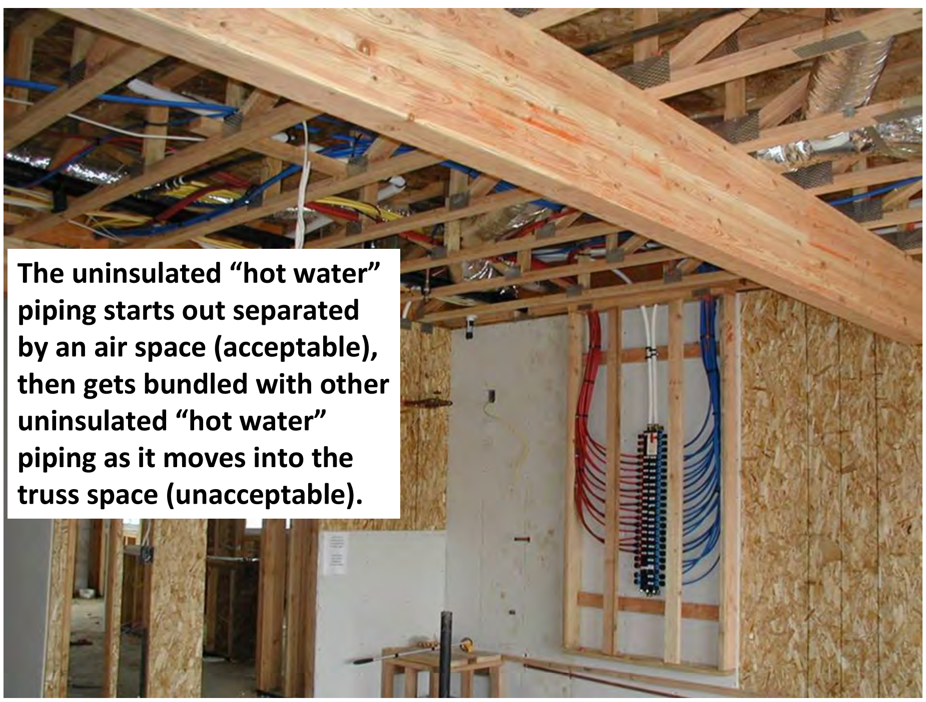
Commenter's Reason: The proposal that was approved was good, but there is another problem that the proposal does not appear to clearly address. What about a bundle that includes only "hot water" piping. In the majority of instances only one of the hot water pipes in a parallel water distribution system actually has hot water running through it at any given time. The other "hot water" pipes have cold water sitting in them and there will be heat transfer between the hot pipe being used and the other "not-hot" pipes in the bundle. The hot water piping should not be grouped into a bundle either, whether or not this bundle is insulated. Each hot water pipe needs to be insulated separately.

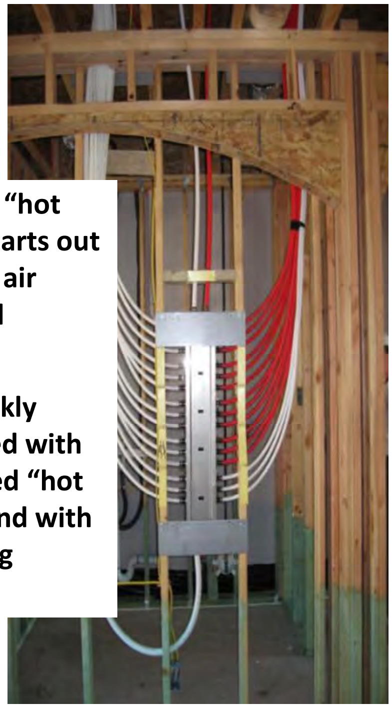
An air space around each pipe is better than being in a bundle, but insulation is significantly better. According to research conducted by the California Energy Commission, uninsulated plastic piping performs worse than copper piping. The testing was done with hot water temperatures in the range of 110-140F and air temperatures in the range of 55-75F, typical of those found in hot water systems and the buildings in which they are installed. When insulated, all hot water piping was found to have very similar performance.

The following six pictures describe the various cases that this code change should address. I believe that the proposed revisions address all of these cases. I recommend that you accept this revised proposal. Thank you.



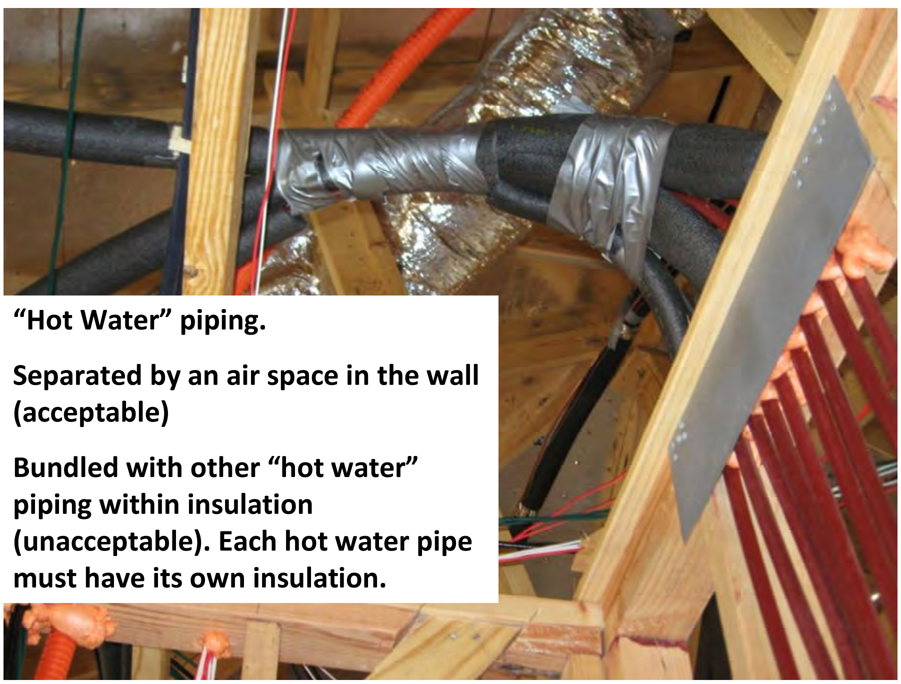

Back of Water Heater
Cold and uninsulated hot piping are bundled (unacceptable)


The uninsulated "hot water" piping starts out separated by an air space (acceptable), then gets bundled with other uninsulated "hot water" piping as it moves into the truss space (unacceptable).



The uninsulated “hot Water” piping starts out separated by an air space in the wall (acceptable).

However, it quickly becomes bundled with other uninsulated “hot water” piping and with cold water piping (unacceptable).



“Hot Water” piping.

Separated by an air space in the wall (acceptable)

Bundled with other “hot water” piping within insulation (unacceptable). Each hot water pipe must have its own insulation.

Final Action: AS AM AMPC____ D

P12-09/10
310.4 (New)

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler (GBH International) representing the American Fire Safety Council

Add new text as follows:

310.4 Exposed insulation. Where insulating materials are installed on exposed elements within toilet rooms, the materials shall comply with Section 719 of the International Building Code.

(Renumber subsequent sections)

Reason: This proposal appears to state the obvious but there has been some discussion as to whether the IBC applies when it is not explicitly referenced in the IPC and this language will help clarify. This proposal is intended to build on the language in existing Section 310.3 of the IPC. **"310.3 Interior finish.** Interior finish surfaces of toilet rooms shall comply with the *International Building Code*."

It is my belief that Section 310.3, although it contains vague code language, is important because it directs the IPC code user to the appropriate requirements for interior finish in the IBC. This includes not only the information on the requirements in Section 1210 of the IBC (related to the use of impervious floors, walls, caulking, etc. so that sanitation can be maintained) but also the information on the fire properties of interior finish in the IBC. For example it is essential that the users of the IPC be aware that toilet partitions (or other interior finish) made of some smooth and impervious surfaces that potentially have very poor fire performance, such as HDPE (high density polyethylene), must comply with the fire safety requirements of Chapter 8 of the IBC. I have also made a proposal to the IBC in this cycle to upgrade the fire safety requirements for another material used as interior finish (often via toilet partitions) for bathrooms: polypropylene. Both HDPE and polypropylene ignite easily and generate very high heat release when they burn.

In the same way as 310.3 appropriately directs the IPC code user to the requirements of Sections 1210 and Chapter 8 of the IBC, this proposal is intended to direct the IPC code user to Section 719 of the IBC, on thermal and sound insulating materials. In particular, my concern is fire safety and the compliance with Section 719.7, to ensure that exposed insulating materials exhibit adequate fire properties.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HIRSCHLER-P4-310.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based upon committee's action of disapproval of P13 and P14.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Howard Ahern, representing Plumberex Specialty Products Inc., requests Approval as Modified by this Public Comment.

Replace original proposal as follows:

310.4 Accessible fixture insulation. Where water supply and drain piping under accessible lavatories and sinks is insulated in accordance with the requirements of ICC/ANSI A117.1, the materials shall comply with Section 807 of the IBC.

Commenter's Reason: The ADA 4.19.4 & ANSI A117.1-2003 Section 606.6 requirement to insulate the pipes under lavatories and sinks to protect people in wheelchairs should be addressed in the IPC. Plumbing Engineers specify this requirement and Plumbing contractors install the insulation coverings on the drain piping and water supplies below lavatories and sinks. Plumbing inspectors work most closely with Plumbing contractors & engineers to ensure that this accessibility requirement has been complied with. This proposal would simply allow the IPC code user's to reference the correct IBC section for materials.

Plastic Thermal Insulation material is not plastic pipe, fittings or valve material both are clearly defined and regulated by the IBC and IPC. The IPC references Insulation for hot water to the IECC. This proposal simply refers insulation covering used for ANSI A117.1-2003 Section 606.6 to the appropriate code section of the IBC.

Chapter 8 of the IBC "Interior Finish" section 807 regulates Thermal and Sound insulation.

The U.S. Access Board issued a letter stating the requirement is "To prevent burns exposed hot water & drain pipes must be insulated." In addition to preventing burns and thermal shock from hot water pipes, the cold water supply must also be insulated to prevent thermal shock as well as protect from sharp surfaces.

The National Mechanical Insulation Committee (NMIC) and the National Insulation Association (NIA) and the mechanical insulation industry has generally adopted the following category definitions:

Category	*Definition*
Cryogenic Applications	*-50 F & Below*
***Thermal Applications**:*	
Refrigeration, chill water and below ambient applications	***-49 F to +75** F*
Medium to high temperature applications	*+**76 F to 1,200 F***
Refractory Applications	*+ 1,200 F & Above*

Thermal Applications is defined as -49F to +75F for below ambient applications and +76F to 1,200F for mid to high.

Insulation that is required by the ADA, ADAAG, ANSI A117.1 and the ABA for exposed drain and water pipes to prevent "thermal Shock" have a service temperature which are classified as within the Thermal Application and therefore requires Thermal Insulation and coverings on the pipe.

This proposal would simply allow the IPC code user's who currently design, specify, install and inspect for this ANSI A117.1 requirement to be able to reference the correct IBC section for materials.

Final Action: AS AM AMPC____ D

P15-09/10

404.2 (New), Chapter 13

Proposed Change as Submitted

Proponent: Sid Cavanaugh, Cavanaugh Consulting representing Truebro/IPS Corporation

1. Add new text as follows:

404.2 Waste and supply pipe protective covers. Where the waste piping and water supply piping beneath accessible lavatories and sinks are required by ICC A117.1 to be fitted with protective coverings, the products shall be in compliance to ASME A112.18.9.

2. Add standard to Chapter 13 as follows:

ASME

A112.18.9-2010 Barrier Free Insulated Protectors for Exposed Waste and Supplies

Reason: Item #1: The code needs clarification regarding accessible fixtures which are under the jurisdiction of the plumbing code and proper protection of exposed waste and supplies that are covered under the new ANSI/ASME standard under development which should be finished by early 2010. This code change will clear up confusion over enforcement of appropriate requirements for exposed waste and supplies used with accessible fixtures.

Item #2: It is important to add this new standard for proper protection of exposed waste and supplies that are covered under the new ANSI/ASME standard under development which should be finished by early 2010. This code change will clear up confusion over enforcement of appropriate requirements for exposed waste and supplies used with accessible fixtures.

Cost Impact: None, because the code currently requires both accessible fixtures and waste/supply pipe protection for users of such fixtures.

Analysis: Review of proposed new standard, ASME A112.18.9-2010, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: CAVANAUGH-P2-404.2 NEW

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard ASME A112.18.9-2010 indicated that in the opinion of ICC staff, the standard did comply with ICC standards criteria. Standard was submitted in draft form.

Committee Action: Disapproved

Committee Reason: Proponent stated that the standard would not be completed in time to be published and available by the ICC deadline.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Sidney Cavanaugh, Cavanaugh Consulting, representing TrueBro, requests Approval as Submitted.

Commenter's Reason: The proposal was rejected because the standard was not completed at that time (ASME A112.18.9) but it is hopeful that it will be approved by the time of the hearings.

Public Comment 2:

Judson Collins, JULYCO, Manford, OK, representing self, requests Disapproval.

Commenter's Reason: The standard proposed for inclusion in the code was submitted in draft form. As of January 25, 2010, the standard was not yet available. If this is still the case and the proposed change was included on the consent agenda, the code would reference a non-existent standard.

Final Action: AS AM AMPC____ D

P16-09/10, Part I
305.4

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA, PART II IS REPRODUCED ONLY FOR INFORMATION PURPOSES FOLLOWING ALL OF PART I.

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Arlington County, VA representing Virginia Plumbing and Mechanical Inspectors Association

PART I - IPC

Revise as follows:

305.4 ~~Sleeves~~ Sealing of annular spaces. The annular space~~s~~ between the outside of a pipe and the inside of a pipe sleeve~~s~~, ~~and pipes~~ or between the outside of a pipe and an opening in a building envelope wall, floor, or ceiling assembly penetrated by a pipe shall be ~~filled or tightly caulked in an approved manner~~ sealed with caulking material or closed with a gasketing system. The caulking material or gasketing system shall be suitable for the conditions at the penetration location and shall be compatible with the pipe, sleeve and building materials in contact with the sealing materials. Annular spaces ~~between~~ created by pipes penetrating ~~sleeves and pipes in~~ fire resistance-rated assemblies or membranes of such assemblies shall be ~~filled or tightly caulked~~ sealed or closed in accordance with Section 713 of the *International Building Code*.

Reason: This proposal addresses a number of shortcomings of the existing old and vague text. This change also better aligns the IPC with the intent of IECC Section 504.3 Sealing of building envelope, and the IRC plumbing section with IRC N1102.4.1 Air leakage.

The reasons for the changes in the first sentence of this section are: 1) Clarifies that only the ends annular spaces need to be sealed or closed. Filling of the entire annular space cavity is pointless. 2) Eliminates the term 'tightly caulked' as it is archaic language from the era of "packing and pouring" lead joints. It would be a rare situation where it would be desired to have a pipe so rigidly fixed in a through-penetration. 3) Clarifies what "sleeves" are to be considered by adding the word "pipe" in reference to the pipe sleeves as required by IPC Section 305.5 (IRC Section P2603.5) . Some inspectors have mistaken the existing language to require sealing between pipe and flexible plastic sleeving used for corrosion protection. 4) Adds the requirement that pipe penetrations of building envelope wall, floor or ceiling assemblies (as some penetrations might not require pipe sleeves) must also be sealed to reduce the loss of conditioned air as required by International Energy Conservation Code. Although this sealing requirement is energy related, it is important to have this text in this section because piping installers typically are the ones who cut holes in the building envelope for the passage of pipes and as such they should be the ones responsible for sealing or closing off annular spaces. They are already familiar with the requirement for sealing pipes in pipe sleeves. All trades must do their part for energy conservation. Otherwise, the sealing just doesn't get accomplished resulting in more leakage paths through the building envelope.

The reasons for the changes in the second sentence of this section are to add the requirements for sealing material compatibility to all items that the sealing material contacts and that the material is suitable for the weather and temperature conditions of the application. While this seems like something that should be obvious, there have been instances where solvent based caulking has affected plastic piping and where a caulking material was inappropriate for wet (outdoor) conditions resulting is rainwater damage to the building.

The last sentence was changed to stress and clarify the importance of making sure that where fire resistance rated assemblies are being penetrated by pipes, specific materials and methods in accordance with the IBC (or building portion of the IRC) must be used. Proper fire stopping methods are critical for fire safety.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: STRAUSBAUGH-P4-305.4

Public Hearing Results

PART I- IPC
Committee Action: Approved as Modified

Modify the proposal as follows:

305.4 Sealing of annular spaces. The annular space between the outside of a pipe and the inside of a pipe sleeve or between the outside of a pipe and an opening in a building envelope wall, floor, or ceiling assembly penetrated by a pipe shall be sealed in an approved manner with caulking material or closed with a gasketing system. The caulking material or gasketing system shall be ~~suitable~~ designed for the conditions at the penetration location and shall be compatible with the pipe, sleeve and building materials in contact with the sealing materials. Annular spaces created by pipes penetrating fire resistance-rated assemblies or membranes of such assemblies shall be sealed or closed in accordance with Section 713 of the *International Building Code*.

Committee Reason: Eliminates ambiguity about sealing of pipe penetrations through the walls, ceilings and floors of the building envelope to seal against air leakage and for pipe penetrations through fire-resistance-rated assemblies.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joann Surma, The Dow Chemical Company, Midland, MI, representing The Dow Chemical Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

305.4 Sealing of annular spaces. The annular space~~s~~ between the outside of a pipe and the inside of a pipe sleeve or between the outside of a pipe and an opening in a building envelope wall, floor, or ceiling assembly penetrated by a pipe shall be sealed in approved manner with caulking material, foam sealant or closed with a gasketing system. The caulking material, foam sealant or gasketing system shall be designed for the conditions at the penetration location and shall be compatible with the pipe, sleeve and building materials in contact with the sealing materials. Annular spaces created by pipes penetrating fire resistance-rated assemblies or membranes of such assemblies shall be sealed or closed in accordance with Section 713 of the *International Building Code*.

Commenter's Reason: This is one part of a two part code change. The parallel IRC mechanical code change included the addition of foam sealant. The IRC committee's reason was: foam sealants are also viable materials used for sealing these types of spaces and are commonly available. Adding in foam sealant will make it clear that these products can continue their successful use in these applications. This code change is a good clarification to this section of the code and this public comment adds further clarity by specifically including foam sealant as a code approved product option.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATION PURPOSES ONLY – SEE ABOVE

P16-09/10, PART II - IRC

Revise as follows:

P2603.4 ~~Sleeves~~ Sealing of annular spaces. The annular space~~s~~ between the outside of a pipe and the inside of a pipe sleeve~~s~~, ~~and pipes~~ or between the outside of a pipe and an opening in a building envelope wall, floor, or ceiling assembly penetrated by a pipe shall be ~~filled or~~

~~tightly caulked as approved by the building official.~~ sealed with caulking material or closed with a gasketing system. The caulking material or gasketing system shall be suitable for the conditions at the penetration location and shall be compatible with the pipe, sleeve and building materials in contact with the sealing materials. Annular spaces ~~between~~ created by pipes penetrating ~~sleeves and pipes in~~ fire resistance-rated assemblies or membranes of such assemblies shall be ~~filled or tightly caulked~~ sealed or closed in accordance with the building portion of this code.

Reason: This proposal addresses a number of shortcomings of the existing old and vague text. This change also better aligns the IPC with the intent of IECC Section 504.3 Sealing of building envelope, and the IRC plumbing section with IRC N1102.4.1 Air leakage.

The reasons for the changes in the first sentence of this section are: 1) Clarifies that only the ends annular spaces need to be sealed or closed. Filling of the entire annular space cavity is pointless. 2) Eliminates the term 'tightly caulked' as it is archaic language from the era of "packing and pouring" lead joints. It would be a rare situation where it would be desired to have a pipe so rigidly fixed in a through-penetration. 3) Clarifies what "sleeves" are to be considered by adding the word "pipe" in reference to the pipe sleeves as required by IPC Section 305.5 (IRC Section P2603.5) . Some inspectors have mistaken the existing language to require sealing between pipe and flexible plastic sleeving used for corrosion protection. 4) Adds the requirement that pipe penetrations of building envelope wall, floor or ceiling assemblies (as some penetrations might not require pipe sleeves) must also be sealed to reduce the loss of conditioned air as required by International Energy Conservation Code. Although this sealing requirement is energy related, it is important to have this text in this section because piping installers typically are the ones who cut holes in the building envelope for the passage of pipes and as such they should be the ones responsible for sealing or closing off annular spaces. They are already familiar with the requirement for sealing pipes in pipe sleeves. All trades must do their part for energy conservation. Otherwise, the sealing just doesn't get accomplished resulting in more leakage paths through the building envelope.

The reasons for the changes in the second sentence of this section are to add the requirements for sealing material compatibility to all items that the sealing material contacts and that the material is suitable for the weather and temperature conditions of the application. While this seems like something that should be obvious, there have been instances where solvent based caulking has affected plastic piping and where a caulking material was inappropriate for wet (outdoor) conditions resulting is rainwater damage to the building.

The last sentence was changed to stress and clarify the importance of making sure that where fire resistance rated assemblies are being penetrated by pipes, specific materials and methods in accordance with the IBC (or building portion of the IRC) must be used. Proper fire stopping methods are critical for fire safety.

Cost Impact: The code change proposal will not increase the cost of construction.

PART II- IRC-P
Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2603.4 Sealing of annular spaces. The annular space between the outside of a pipe and the inside of a pipe sleeve or between the outside of a pipe and an opening in a building envelope wall, floor, or ceiling assembly penetrated by a pipe shall be sealed with caulking material, foam sealant or closed with a gasketing system. The caulking material, foam sealant or gasketing system shall be ~~suitable~~ designed for the conditions at the penetration location and shall be compatible with the pipe, sleeve and building materials in contact with the sealing materials. Annular spaces created by pipes penetrating fire resistance-rated assemblies or membranes of such assemblies shall be sealed or closed in accordance with the building portion of this code.

Committee Reason: Modification made because foam sealant is also a viable material to be used for sealing these types of spaces and is commonly available. Proposed language eliminates ambiguity about sealing of pipe penetrations through the walls, ceilings and floors of the building envelope to seal against air leakage and for pipe penetrations through fire-resistance-rated assemblies.

Assembly Action: **None**

P17-09/10
312.2, 312.3, 702.5

Proposed Change as Submitted

Proponent: Robert Burke, University of Colorado representing (CAPMO) Colorado Association of Plumbing and Mechanical Officials

1. Delete and substitute as follows:

~~**312.2 Drainage, waste and vent water test.** A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for at least 15 minutes. The system shall then be tight at all points.~~

~~**312.3 Drainage and vent air test.** An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period.~~

<u>**312.2 Water testing of drain, waste and vent piping.** The design of test setups for leak testing of drain and waste piping systems shall consider the pressure requirements and limitations of Section 702.5. The test pressure for drain and waste piping systems, or portions thereof, shall not be less than the greatest possible in-service pressure or 10 feet (3048 mm) of water head (4.33 psi) (29.9 kPa), whichever is greater. Vent piping shall be tested at a pressure not less than 10 feet (3048 mm) of water head (4.33 psi) (29.9 kPa), except for vent piping sections that are within 10 feet of elevation below a vent system's final outdoor termination point. The upper 10 feet of a vent system terminating to the outdoors shall be permitted to be tested by a pressure ranging from 10 feet (3048 mm) of water head (4.33 psi) (29.9 kPa) at a point 10 feet in elevation below the outdoor termination point to zero pressure at the elevation of the outdoor termination point. Test pressures shall be developed by filling the closed piping system (or portion thereof) completely with water and pressurizing the system to the required test pressure using a water pump or applying the required head of water above the highest elevation of the system (or portion thereof) under test. Where piping systems are tested in sections, the joints between tested sections shall be tested at a pressure not less than the required test pressures for the sections on either side of the joint. The test pressure in the system, as evidenced by a test gauge connected to the system, shall hold steady for not less than 15 minutes, without any addition of water to the system. Where the entire piping section under test can be visually observed for water leaks and the required test pressure is developed by the required head of water above the section under test, connection of a test gauge to the system shall not be required.</u>

<u>**312.3 Air testing of drain, waste and vent piping.** The design of test setups for leak testing of drain and waste piping systems shall consider the pressure requirements and limitations of Section 702.5. The test pressure for drain, waste and vent piping systems, or portions thereof, shall not be less than the greatest possible in-service pressure or 5 psi (34.5 kPa), whichever is greater. Test pressures shall be developed by forcing air into the closed piping system (or portion thereof). Where piping systems are tested in sections, the joints between tested sections shall be tested at a pressure not less than the required test pressures for the sections on either side of the joint. The test pressure in the system, as evidenced by a test gauge connected to the system, shall hold steady for not less than 15 minutes, without any addition of air to the system.</u>

2. Add new text:

<u>**702.5 Pipe, fitting and joint selection for pressure conditions.** The selection of pipe, fittings and joints of drain, waste and sewer systems shall consider the greatest internal pressure that could occur during testing or service. The allowable pressure in drain, waste and sewer piping systems that are pressurized in service by pumps or ejectors shall be the pressure rating of the system component having the lowest pressure rating. Where system pressure is created by liquid-filled vertical sections of pipe, system components shall be pressure-rated for not less than the system pressure at the component's installed elevation.</u>

(Renumber subsequent sections)

Reason: This code change proposal was prompted by the failure of a roof drain conductor (piping) system inside of a basketball arena building here at the University of Colorado. Many 100s of thousands of dollars of water damage occurred and we were lucky that no one was hurt. An 8 inch cast iron no-hub elbow blew off the piping system due to the pressure caused by a blockage in the storm drain system outside the building. In evaluating why this particular event happened, I realized that the existing code sections concerning testing of drain and waste piping fail to properly consider building designs having drain piping systems that do not have any fixture connections for many consecutive stories in a row. Consider the following arrangement: A sports arena with sky box toilet facilities. The drain piping system serving those toilet facilities is many "stories" tall without any fixture connections between the sky box elevation and the elevation of the building drain (or the nearest level down where fixtures are connected) to relieve pressure should the system become clogged at a lower elevation. The existing code section for testing allows for such a piping system to be tested in sections as short as every 10 feet as the building construction rises from the ground. If there is a clog in the system well below sky box elevation, the drainage system could fill up to the point of overflow at the fixtures in the skybox. This creates a pressure in the lower sections of the system that is many times greater than what the piping system was tested for when 10 foot sections are tested.

Since then, I have made numerous evaluations of the drain piping systems in several multi-story buildings here at the University of Colorado and discovered that the real problem is not just in the testing but in the proper selection of piping system components for these multi-story systems that do not have fixture connections for many consecutive stories. One example of improper component selection for this type of "tall system" application could be the use of shielded couplings for no-hub cast iron pipe. ASTM standards C1540 and C1277 cover these couplings and indicate the allowable pressure ratings for different sizes. The unrestrained hydrostatic pressure for standard shielded couplings is 20 psi (46 foot of head) for 1 ½ thru 5 inch, 18 psi (42 foot of head) for 6 inch, 10 psi (23 foot of head) for 8 inch, 6 psi (14 foot of head) for 12 inch. It is obvious that the larger coupling sizes would be unsuitable for systems that are over two stories of normal height, let alone structures with tall stories. Because plastic drain, waste and vent fittings as well as "not for pressure" plastic pipe is not "pressure rated", these components could also prove to be problematic in certain applications where either testing or service conditions create pressures in excess of the component ratings.

Code officials should not have to become expert in evaluating the pressure capabilities of individual components of the drain and waste systems. This is the designer's or engineer's responsibility. However, the code requirements for design and test procedures should reflect what could be the expected actual in-service or test condition pressure, whichever is greater, in order to verify that the system has been designed properly for the intended conditions. Therefore, I have submitted new section 702.5 and re-written sections 312.2 and 312.3 to eliminate any confusion as to the pressure requirements for system components as well as the requirements for testing. The existing test sections are outdated for the type of large buildings being built today and need these changes.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Burke-P1-312.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed language does not require tests to be performed.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert Burke, University of Colorado, representing CAPMO, requests Approval as Modified by this Public Comment.

1. Replace the proposal as follows:

~~**312.2 Drainage, waste and vent water test.** A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for at least 15 minutes. The system shall then be tight at all points.~~

312.2 Water testing of drain, waste and vent piping. The design of test setups for leak testing of drain and waste piping systems shall consider the pressure requirements and limitations of Section 702.5. The test pressure for drain and waste piping systems, or portions thereof, shall not be less than the greatest possible in-service pressure or 10 feet (3048 mm) of water head (4.33 psi) (29.9 kPa), whichever is greater. Vent piping shall be tested at a pressure not less than 10 feet (3048 mm) of water head (4.33 psi) (29.9 kPa), except for vent piping sections that are within 10 feet of elevation below a vent system's final outdoor termination point. The upper 10 feet of a vent system terminating to the outdoors shall be permitted to be tested by a pressure ranging from 10 feet (3048 mm) of water head (4.33 psi) (29.9 kPa) at a point 10 feet in elevation below the outdoor termination point to zero pressure at the elevation of the outdoor termination point. Test pressures shall be developed by filling the closed piping system (or portion thereof) completely with water and pressurizing the system to the required test pressure using a water pump or applying the required head of water above the highest elevation of the system (or portion thereof) under test. Where piping systems are tested in sections, the joints between tested sections shall be tested at a pressure not less than the required test pressures for the sections on either side of the joint. The test pressure in the system, as evidenced by a test gauge connected to the system, shall hold steady for not less than 15 minutes, without any addition of water to the system. Where the entire piping section under test can be visually observed for water leaks and the required test pressure is developed by the required head of water above the section under test, connection of a test gauge to the system shall not be required.

2. Add new text:

702.5 Pipe, fitting and joint selection for pressure conditions. The selection of pipe, fittings and joints of drain, waste and sewer systems shall consider the greatest internal pressure that could occur during testing or service. The allowable pressure in drain, waste and sewer piping systems that are pressurized in service by pumps or ejectors shall be the pressure rating of the system component having the lowest pressure rating. Where system pressure is created by liquid-filled vertical sections of pipe, system components shall be pressure-rated for not less than the system pressure at the component's installed elevation.

Commenter's Reason: The code change proposal P17-09/10 was denied because air testing is not allowed on PVC piping. The intent was to test storm water piping with water from the point of discharge to the point of overflow. Therefore Section 312.3 from the code change proposal.

Final Action: AS AM AMPC____ D

P22-09/10
Table 403.1 (IBC [P] Table 2902.1)

Proposed Change as Submitted

Proponent: Eirene Oliphant, MCP, Building Official, City of Leawood, KS

Revise table as follows:

Table 403.1 (IBC [P] Table 2902.1)
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2)	
				MALE	FEMALE
2	Business	B	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses	1 per 25 for the first 50 and 1 per ~~50~~ <u>100</u> for the remainder exceeding 50	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2)		LAVATORIES	
				MALE	FEMALE	MALE	FEMALE
6	Mercantile	M	Retail stores, service stations, shops, salesroom, markets and shopping centers	1 per ~~500~~ <u>25 for the first 50 and 1 per 600 for the remainder exceeding 50</u>	1 per ~~500~~ <u>25 for the first 50 and 1 per 400 for the remainder exceeding 50</u>	1 per ~~750~~ <u>200 for the first 400 and 1 per 750 for the remainder exceeding 400</u>	

(Portions of table note shown remain unchanged)

Reason: The purpose of the change is to substitute revised material for current provisions of the code. The IPC requires 1 WC per sex for mercantile occupancies between 51-1000. The UPC[1] requires between 2 to 6 WC per sex between 51 – 800. Based on an American Restroom Association (ARA)/Wall Street Journal investigation[2], this low IPC minimum has not caused problems because a majority of the public is not aware that they are allowed to use sanitation facilities in small to midsize mercantile establishments. Media awareness campaigns like the Wall Street Journal story and Section 403.5.1 Directional Signs (P34-06/07) will change the public's awareness.

Unlike multi-stalled toilets, single WC toilets are typically user locked and the WC is not available to the next patron until the toilet door is unlocked. While studies such as the Cohen report[4,5] have shown that the average user typically needs less then 2 minutes to use a WC, there appears to be no studies of the impact of single WC, user lockable toilets. Information is available, however, via the experience of those American cities that have installed automated public toilets (APT). Every municipality has found that for legitimate reasons (wheel chair, express breast milk, change colostomy bag, absorbent pads or a child's diaper) users occasionally have a legitimate need to be in the toilet for at least 15 minutes and at least one city now allows more then 20 minutes before an alarm sounds. This same 'occasional long use' problem occurs in buildings with user lockable toilets and the problem is exacerbated because these user lockable toilets also accommodate activities not related to sanitation. A retail store with 1000 people will sometimes include more then 15 employees. OHSA requires 2 WC for 16 on site employees[3]. It is likely that those 16 employees competing with 984 other occupants does not satisfy the intent of the OSHA requirement. In the process of reviewing the requirement for M it was noted that if adjusted for gender the increase in toilet fixtures slope for males in B (Business) could be reduced.

Bibliography:

[1]2006 Uniform Plumbing Code Table 4.1 'Retail or Wholesale Stores
[2]Wall Street Journal 'Bathroom Backlash Arrives on Main Street ' July 26, 2005
[3]29CFR1910.141(c)(1)(i) Table J-1
[4]ASPE report 95-01 Cohen 'Queuing theory approach to plumbing design research'
[5]ASPE report 92-02 Cohen 'Plumbing fixture requirements for office buildings research report'

Cost Impact: The code change proposal will increase the cost of construction at lower occupancies but may reduce cost for larger occupant loads.

ICCFILENAME: Oliphant-P1-T403.1

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: A single user toilet room per gender for up to 250 persons is not adequate when one considers that single user toilet rooms can be locked by the occupant for significant periods of time leaving no available facilities for up to 249 other persons.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

Commenter's Reason: This change should be disapproved for the following reasons:

1. It significantly increases the requirement for the number of fixtures (and the overall size of restrooms) in small mercantile occupancies.
2. Current code allows a single water closet for mercantile occupancies of up to 1500 square feet (50 occupants). It appears this would still be permitted by the proposal.
3. Current code, mercantile occupancies of 1,501-3,000 square feet require only a single water closet in the men's room and in the women's room. The proposal doubles this. It makes no sense to allow a single water closet at 1,500 square feet and then require a total of 4 at 1,501 square feet.
4. The need for 'potty parity' scoping in mercantile occupancies has not been established. While there is a valid need for additional fixtures in women's rooms in high use, peak demand facilities (such as assembly facilities like theaters and sports arenas), there isn't documentation to warrant increasing the required fixtures in mercantile occupancies.
5. For smaller mercantile facilities, doubling the number of water closets in each toilet room has a significant negative impact on the overall income-producing space available. The accessibility requirements for a multiple-fixture restroom require it to be quite large; each toilet room would likely be at least double the size if required to have twice the fixtures. For a 1,600 square foot mercantile occupancy, it is not reasonable to remove another 100 square feet or more from the income-producing space available.
6. The proponent cites the large number of 'occupants' who must compete for access to the 'small' number of fixtures currently required. Note that the occupant load factors for mercantile occupancies are established for a 'worst case' (e.g., Christmas Eve shopping) scenario, and it has long been documented that the actual occupant load in these facilities tends to be far less than the code establishes for egress purposes.

Final Action: AS AM AMPC____ D

P23-09/10
Table 403.1 (IBC Table [P]2902.1)

Proposed Change as Submitted

Proponent: Robert J. Heil, Code Inspections, Inc. representing the Pennsylvania Association of Building Code Officials, Inc.

Revise table as follows:

TABLE 403.1 (IBC Table [P]2902.1)
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]
(See Sections 403.2 and 403.3)

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION					OTHER
2	Business	B	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses					1 service sink[h]
6	Mercantile	M	Retail stores, service stations, shops, salesrooms, markets and shopping centers					1 service sink [h]

h. For business and mercantile occupancies an occupant load of 15 or fewer, service sinks shall not be required.

(Portions of table and footnotes not shown remain unchanged.)

Reason: In a small facility with limited occupancy, such as a retail store with a size of less than 450 square feet or an office with less than 1,500 square feet, a service sink and the associated closet occupy a disproportionate amount of floor space, with rare requirements for use by the occupants.

Note: A similar exception was added in the 2009 Code for drinking fountains, with occupancies of 15 persons or less, under Footnote “f” of the “drinking fountain” column in Table 403.1.

Cost Impact: This code change proposal will not increase the cost of construction**.**

ICCFILENAME: Heil-P2-403.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Service sinks are very important to the occupancies regardless of the number of occupants.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Eirene Oliphant, MCP, City of Leawood, representing Metropolitan Kansas City Chapter of the ICC, requests Approval as Submitted.

Commenter's Reason: The proponent offers a valid argument about providing relief to small tenant spaces. A small space such as a 1,500 square foot retail facility should not be held to the same level of expectation on service sinks as a restaurant or hospital. As a building official, I would prefer to make as few changes by ordinance to the code whenever possible, as it provides for a more universal adoption process when brought before my governing body. I have already changed our code language to reflect the language the proponent has offered; and it has been welcomed with relief by our smaller tenants.

Public Comment 2:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Approval as Submitted.

Commenter's Reason: This code change offers a reasonable exception for very small business and mercantile occupancies. In very small businesses, there isn't a need for a service sink, and the sink and surrounding space required eats up valuable space. As noted by the proponent, this exception would be consistent with an exception already provided for drinking fountains in very small businesses.

Final Action: AS AM AMPC____ D

P24-09/10

Table 403.1 (IBC [P] Table 2902.1)

Proposed Change as Submitted

Proponent: Eirene Oliphant, MCP, Building Official, City of Leawood, KS

Revise table as follows:

Table 403.1 (IBC [P] Table 2902.1)
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2) MALE	WATER CLOSETS (URINALS SEE SECTION 419.2) FEMALE	LAVATORIES MALE	LAVATORIES FEMALE
1	Assembly	A-2[d]	Nightclubs, bars, taverns, dance halls and buildings for similar purposes	1 per ~~40~~ 25 for the first 25 and 1 per 90 for the remainder exceeding 25	1 per ~~40~~ 25 for the first 25 and 1 per 75 for the remainder exceeding 25	1 per ~~75~~ 40 for the first 40 and 1 per 200 for the remainder exceeding 40	
			Restaurants, banquet halls and food courts	1 per ~~75~~ 25 for the first 25 and 1 per 100 for the remainder exceeding 25	1 per ~~75~~ 25 for the first 25 and 1 per 80 for the remainder exceeding 25	1 per ~~200~~ 40 for the first 40 and 1 per 200 for the remainder exceeding 40	

(Portions of table not shown remain unchanged)

Reason: The purpose of the change is to substitute revised material for current provisions of the code. The American Restroom Association (ARA) is often questioned by the public and by reporters doing stories about the problems people face finding proper toilet facilities when away from home. One of the problems relates to having to wait too long for a restaurant toilet to free. To the degree that respondent recall details and also based on informal observation by ARA advocates, when more then 50 people are in a restaurant one will begin to see occasional toilet queuing when only 1 single occupant per sex toilet is available. Above 100, multiple person lines will appear. This problem is addressed in the UPC[1], which requires between 2 & 3 WC per sex between 15 – 150 occupants. The IPC requires only 1 WC per sex for A-2 restaurant occupancies between 16-150 occupants. This problem is particularly onerous in venues where people handle food. While those with an urgent need to void bowel or bladder will queue, those needing to wash their hands before eating may defer.

The low IPC A-2 minimum is made worse by the typical no-stall implementation of a single WC toilet. Unlike multi-stalled toilets, single WC toilets are typically user locked and the WC is not available to the next patron until the toilet door is unlocked. While studies such as the APSE Cohen reports[2,3] have shown that the average user typically needs less than 2 minutes to use a WC, there appears to be no studies of the impact of single WC, user lockable toilets. Information is available, however, via the logs generated by automated public toilets (APT). Every American municipality, that has installed single occupant APT's has found that for legitimate reasons (wheel chair, express breast milk, change colostomy bag, absorbent pads or a child's diaper) users occasionally have a legitimate need to be in the toilet for at least 15 minutes and one city now allows more then 20 minutes before a misuse alarm sounds. This same 'occasional long use' problem occurs in buildings with user lockable toilets and the problem is exacerbated because these lockable toilets also facilitate activities not related to sanitation. A-2 Pubs and Lounges suffers the same 1 locked toilet at lower occupancies but the attempt to address the problem by requiring 1 toilet per 40 results in excessive minimums at higher occupancies.

Bibliography:
[1]2006 Uniform Plumbing Code Table 4.1 'Retail or Wholesale Stores
[2]ASPE report 95-01 Cohen 'Queuing theory approach to plumbing design research'
[3]ASPE report 92-02 Cohen 'Plumbing fixture requirements for office buildings research report'

Cost Impact: The code change proposal will increase the cost of construction at lower occupancies but may reduce cost for larger occupant

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: Oliphant-P4-T403.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Proponent's reason stated that she and other restroom availability advocates have seen occasional queuing at toilet facilities when there are more than 50 persons in a restaurant. The proposal will adjust the required fixtures at these low occupant numbers.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

Commenter's Reason: This change should be disapproved for the following reasons:

1. The significant increase in the number of toilet fixtures, and therefore, the space required to be allocated to restrooms, in small A-2 facilities has not been justified.
2. The need for 'potty parity' scoping in small assembly occupancies has not been established. While there is a valid need for additional fixtures in women's rooms in high use, peak demand facilities (such as assembly facilities like theaters and sports arenas), there isn't documentation to warrant increasing the required fixtures in all small dining-type assembly occupancies.
3. For smaller assembly facilities, doubling the number of water closets in each toilet room has a significant negative impact on the overall income-producing space available. The accessibility requirements for a multiple-fixture restroom require it to be quite large; each toilet room would likely be at least double the size if required to have twice the fixtures. For a 1,600 square foot assembly occupancy, it is not reasonable to remove another 100 square feet or more from the income-producing space available.

Final Action: AS AM AMPC____ D

P30-09/10
403.3.5 (IBC [P] 2902.3.5) (New)

Proposed Change as Submitted

Proponent: Eirene Oliphant, MCP, Building Official, City of Leawood, KS

Add new text as follows:

403.3.5 ([P]2902.3.5) Door locking. Where a toilet room is designed for multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or assisted-use toilet rooms.

Reason: To prevent a toilet user from restricting access to a toilet facility intended to satisfy the sanitation needs of multiple persons. To also reduce misuse such as employee smoke breaks, drug dealing or other inappropriate activities that are more likely when an occupant can lock entry to the toilet.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME: Oliphant-P3-403.3.5

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

403.3.5 ([P]2902.3.5) Door locking. Where a toilet room is ~~designed~~ provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or assisted-use toilet rooms.

Committee Reason: Modification was made to replace "designed" as this might create conflict with the last sentence of the section. Toilet rooms that are lockable from the inside provide too much availability for misuse and inappropriate activities however, family/assisted-use rooms need to be exempt as privacy is a key element to having those types of toilet rooms.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International requests Disapproval.

Commenter's Reason: This code change proposal should be disapproved for the following reasons:

1. The prohibition from locking rooms from the inside has a major unintended downside; for many common installations, it will also prohibit the capability of being able to unlock the door from the inside. It is common in facilities with large restrooms to use simple push/pull hardware. When the restrooms are not in use (after hours), the doors are locked with deadbolts. Not allowing the current common thumbturn inside the restroom could result in persons being locked in the restroom, with no means of escape.
2. No evidence of the supposed cited problems (employee smoke breaks, drug dealing or other inappropriate activities) was provided, and therefore this is no justification for such a blanket requirement across all occupancies.
3. Locking on the 'exterior' side of the restroom door is frequently needed or expected for security purposes. While it is possible to provide locking from the exterior and maintain free access from inside, it limits the type of hardware that could be utilized.

Final Action: AS AM AMPC____ D

P31-09/10
403.5 (IBC [P]2902.5) (New)

Proposed Change as Submitted

Proponent: Don Davies representing the Utah Chapter of ICC

Add new text as follows:

403.5 (IBC [P]2902.5) Required drinking fountains. A required drinking fountain for a tenant space shall be located in the tenant space or external to the tenant space provided that the travel distance from the most remote point in the tenant space to the drinking fountain is within 500 feet or for covered malls, within 300 feet.

Reason: The sharing of public restroom facilities is currently allowed in the code in Section 403.3 (IBC Section 2902.3) but the code is silent on sharing of drinking fountains even though that is what is generally done. If employees and the public can share restroom facilities then they can certainly share drinking fountains when located within the prescribed travel distances.

Cost Impact: There will be a cost savings with shared drinking fountains.

ICCFILENAME: Davies-P1-403.5 NEW

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Proposed language does not include "floor above or below" or the requirement for an accessible route.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Don Davies, representing the Salt Lake City Corporation, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

403.5(IBC[P]2902.5) Drinking fountain location. Drinking fountains shall not be required to be located in individual tenant spaces provided that public drinking fountains are located within a travel distance of 500 feet of the most remote location in the tenant space and not more than one story above or below the tenant space. Where the tenant space is in a covered mall, such distance shall not exceed 300 feet. Drinking fountains shall be located on an accessible route.

Commenter's Reason: The Plumbing Code Change Committee generally liked this code change, except that the proposed language didn't include the requirement that the drinking fountain be located on an accessible route and be located on a floor above or below the individual tenant space. The requirement for an accessible route was already addressed in the code change. The provisions for the facility being located not more than one story above or below the space served has been added, as requested by the Plumbing Code Change committee. We have tried to keep this requirement in the simplest form possible by stating the requirements, rather than referencing some other part of the code.

Public Comment 2:

Eirene Oliphant, MCP, representing the Metropolitan Kansas City Chapter of the ICC, requests Approval as Modified by this Public Comment:

Modify the proposal as follows:

403.5 (IBC [P]2902.5) Required drinking fountains. ~~A required drinking fountain for a tenant space shall be located in the tenant space or external to the tenant space provided that the travel distance from the most remote point in the tenant space to the drinking fountain is within 500 feet or for covered malls, within 300 feet.~~ Customers, patrons and visitors shall be provided with *public* drinking fountains in structures and tenant spaces intended for public utilization. The number of drinking fountains shall be provided in accordance with Section 403 for all users.

403.5.1 Access. The route to the *public* drinking fountain required by Section 403.5 shall not pass through kitchens, storage rooms or closets. Access to the public drinking fountains shall be from within the building or from the exterior of the building. All routes shall comply with the accessibility requirements of the *International Building Code*. The public shall have access to the required drinking fountain at all times that the building is occupied.

403.5.2 Location of drinking fountains in occupancies other than covered malls. In occupancies other than covered mall buildings, the required *public* drinking fountain shall be located not more than one story above or below the space required to be provided with a drinking fountain, and the path of travel to such facilities shall not exceed a distance of 500 feet (152 m).

> **Exception:** The location and maximum travel distances to required employee drinking fountains in factory and industrial *occupancies* are permitted to exceed that required by this section, provided that the location and maximum travel distance are *approved*.

403.5.3 Location of drinking fountains in covered malls. In covered mall buildings, the required drinking fountains shall be located not more than one story above or below the space required to be provided with drinking fountains, and the path of travel to such drinking fountains shall not exceed a distance of 300 feet (91.44 m).

Commenter's Reason: The proponent has provided a code change which provides specific direction on the location of drinking fountains. The committee disapproved the code change because it did not address the issue of accessibly or the "floor above or below". The proposed modification provides for the language for drinking fountains to be consistent with toilet facilities in terms of their locations and access.

Final Action: AS AM AMPC____ D

P35-09/10
403.3.2 (IBC [P] 2902.3.2)

Proposed Change as Submitted

Proponent: Patrick Vandergriff***,*** Vandergriff Code Consulting Services representing himself.

Revise as follows:

403.3.2 (IBC [P]2902.3.2) Location of toilet facilities in occupancies other than covered mall buildings. In occupancies other than *covered mall buildings,* the required public and employee toilet facilities shall be located not more than one *story* above or below the space required to be provided with toilet facilities and the path of travel to such facilities shall not exceed a distance of 500 feet (152 400 mm). <u>Where multiple buildings on a single lot are under the same control, public and employee toilet facilities shall not be required to be located in each building provided that all other requirements of this section are met, the total number of plumbing fixtures within such buildings complies with the aggregate number of fixtures required for all buildings and the toilet facilities are available for use when any one building on the lot is occupied.</u>

> **Exception:** The location and maximum travel distances to required employee facilities in factory and industrial occupancies are permitted to exceed that required by this section, provided that the location and maximum travel distance are *approved*.

Reason: Although this proposal is aimed at allowing the toilet facilities in a permanent school building to serve as the required toilet facilities for semi-permanent portable classroom buildings adjacent to the school but on the same property (lot), the allowance provides for reasonable accommodations at shopping centers, strip centers and individual commercial properties having multiple buildings under the same control. For example, consider a small business offices building with several separate buildings serving as warehouses for the business, all of which are on the same lot. If the travel and elevation location requirements are met, what is the harm in all of the required toilet facilities being located in the business office building? Other examples widely exist across the country as it is commonplace for strip centers and outdoor shopping centers to have central toilet facilities for the entire center. For schools that need fast expansion of classroom space, portable buildings are often brought in and used for several years or more until funds are available to build larger permanent buildings or additions. The decision to add these semi-permanent class room modules should not be required to be burdened by the expense of installing toilet facilities in each classroom module, especially where adequate toilet facilities exist within the required travel distance and elevation.

Cost Impact: Cost savings in some areas of the country.

ICCFILENAME: VANDERGRIFF-P1-403.3.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: An outdoor travel distance of up to 500 feet in winter or rainy conditions is too difficult for employees or the public to travel.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Patrick Vandergriff, Vandergriff Code Consulting Services, representing MBI, requests Approval as Submitted.

Commenter's Reason: When this item was being considered, testimony was given regarding issues of what would be allowed. A motion to approve and a second were received from the committee. Then a statement was made by a committee that I would require "wanting to require his people to go out in the cold to go to the restroom." This was not germane to any testimony provided and was after public discussion had been completed. This statement could have easily been answered had it been brought up in public comment. The vote fell directly along the lines of the makeup of the committee which was not a balanced committee and had a vast majority of the members from states along the northern border with Canada.

In reality, the code proposal would provide that a restroom meeting the distance requirement could be provided in another building under the same control and on the same site. This is often the manner of design around the country at this time, especially in southern and southwestern climates. And the idea of going outside of a building is not foreign to the code. Currently, typical designs for gasoline stations may have the patron go outside the building and back into a restroom facility. Many sports arenas particularly outside football and baseball stadiums have bathroom facilities not directly associated with the bleachers. Numerous schools in the southwest and western United States have classrooms where you would go outside under a covered walkway to go to a bathroom located within distance but requiring the students to go outside. Numerous warehousing operations have a series of warehouses, but use common restroom facilities. This may be a design issue in Michigan or Minnesota however, it should not preclude the use of such design other areas of the country. The code is for generalized use and should establish the minimum design requirements for the generalized use. It should not apply the most egregious conditions to the whole where such is not necessary.

Final Action: AS AM AMPC____ D

P49-09/10
413.3

Proposed Change as Submitted

Proponent: Sid Cavanaugh, Cavanaugh Consulting representing In Sink Erator

Revise as follows:

413.3 Commercial food waste grinder outlets. Commercial food waste grinders shall be connected to a drain not less than 1 ½ inches (38mm) in diameter. Commercial food waste grinders shall be connected and trapped separately from any other fixtures or sink compartments. <u>The connection of a commercial food waste grinder to the sanitary drainage system shall be downstream of all grease interceptors unless the code official approves or requires food waste grinders to discharge into a grease interceptor.</u>

Reason: This code change will clarify the intent of the code regarding commercial food waste grinders. Code officials have in the past and continue to allow food waste grinders to connect directly to the sanitary drainage system of buildings. Research has shown that food waste does not cause build up or blockage of sewer lines. Food waste has the same specific gravity as fecal matter and behaves similarly in the sewer system. Finally, while this code change will allow most installations to by-pass an interceptor it will still recognize Section 1003.3.2 where it can be required/allowed by a jurisdiction to connect to an interceptor.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CAVANAUGH-P8-413.3

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Food waste grinders are not normally used for the disposal of grease so the option of whether disposals need to connect to a grease interceptor (or not) should be left open.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rand H. Ackroyd, Rand Technical Consulting, representing himself, requests Approval as Modified by this Public Comment.

Modify the proposal as follows

413.3 Commercial food waste grinder outlets. Commercial food waste grinders shall be connected to a drain not less than 1 ½ inches (38mm) in diameter. Commercial food waste grinders shall be connected and trapped separately from any other fixtures or sink compartments. The connection of a commercial food waste grinder to the sanitary drainage system shall be downstream of all grease interceptors unless the code official approves or requires food waste grinders to discharge into a ~~grease~~ <u>solids</u> interceptor.

Commenter's Reason: The Code should never refer to a grease interceptor for directly receiving food waste. Grinders must discharge into a solids interceptor before the discharging into a greased interceptor.

Public Comment 2:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

413.3 Commercial food waste grinder outlets. Commercial food waste grinders shall be connected to a drain not less than 1 ½ inches in diameter. Commercial food waste grinders shall be connected and trapped separately from any other fixtures or sink compartments. The connection of a commercial food waste grinder to the sanitary drainage system shall be downstream of all grease interceptors unless <u>the interceptors are specifically designed and certified for handling food waste grinder discharge.</u> ~~the code official approves or requires food waste grinders to discharge into a grease interceptor.~~

Commenter's Reason: The text that was approved during the Public Hearing creates many new problematic issues. First and foremost it should not be the code official's responsibility to determine when a waste grinder discharges to an interceptor or not. These type decisions are usually based on the wastewater treatment facility or the private sewage disposal system capability, not the code official's opinion. The next issue is that a designer may a justified technical reason to want to discharge through an interceptor but the original language would allow the code official to override that technical determination with no just cause.

The consensus at the public hearing was that waste grinders should not discharge through interceptors for a number of reasons. However, there may be some instances where the designer, treatment facility or just a local ordinance that may require discharge through an interceptor. Many large facilities actually have a large interceptor the size of an average septic tank that may very well be able to accommodate a waste grinder discharge.

Lastly, this was originally proposed into the wrong section. Chapter 4 is titled "fixtures" and appropriately discusses food waste grinders. There was no connection between the requirements of Chapter, titled "traps, interceptors and separators" and this new requirement. We have slightly modified the format and inserted the trigger to connect the user to the correct sections of the code while maintaining the original intent.

Public Comment 3:

Judson Collins, JULYCO, Mannford, OK, representing self, requests Disapproval.

Commenter's Reason: The proposed language for this section is not necessary. No section of the current code requires a food waste grinder to discharge into a grease interceptor. Section 1003.3.2 only addresses situations "where" food waste grinders connect to grease interceptors. It does not require the connection. The proposed language says the code official can require a food waste grinder to discharge to a grease interceptor. The code official already has that authority. It is not necessary to repeat it.

Final Action: AS AM AMPC____ D

P51-09/10
416.5

<u>*Proposed Change as Submitted*</u>

Proponent: Guy Tomberlin of Virginia representing himself.

Revise as follows:

416.5 Tempered water for public hand-washing facilities. *Tempered water* shall be delivered from <u>lavatories and group wash fixtures located in public toilet facilities provided for customers, patrons and visitors</u>. ~~*public* hand-washing facilities.~~ *Tempered water* shall be delivered through an *approved* water-temperature limiting device that conforms to ASSE 1070 or CSA B125.3.

Reason: This is an attempt to clarify that employee or private toilet rooms, not for public use, are not required to be supplied with tempered water. Section 403.3 clearly mandates where "public toilet facilities" are to be installed. This new definition specifically works in conjunction with the provisions of 403, so wherever facilities are installed for "public utilization" the hand washing fixtures are required to be provided with tempered water.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TOMBERLIN-P1-416.5

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Agreed with the proponent's reason statement which stated that employee and private toilet rooms (not for public use) do not require tempered water.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tim Pate representing the Colorado Chapter of ICC, requests Disapproval.

Commenter's Reason: I am requesting disapproval of this code change. I believe that the language in 2003 IPC Section 607.1 was very specific in requiring tempered water for any accessible sink. Code change P66 03/04 was approved as modified which took out the specific wording about accessible sinks and used the more general wording for public sinks. It does not appear in the reason statement for code change P66 03/04 that there was specific intent to not require tempered water for employee bathrooms. By approving P51 09/10 employee bath sinks will not be required to have tempered water.

The basis behind requiring tempered water is to make sure that people – both able bodied and disabled – are not able to scald their hands. It does not make sense to restrict the requirement to bath sinks used only for customers, patrons, and visitors. While there is a requirement for protection from possible contact for the pipes under all accessible lavatories (for public and employees), this does not protect someone from possible scalding in the water coming out of the tap.

Final Action: AS AM AMPC____ D

P52-09/10, Part I
417.4.2

Proposed Change as Submitted

Proponent: Christopher Birch, Executive Vice President, Bath Enclosure Manufacturers Association

PART I - IPC

Revise as follows:

417.4.2 Access. The shower compartment access and egress opening shall have a ~~minimum~~ clear and unobstructed width of <u>not less than</u> ~~22~~ <u>18</u> inches (~~559~~ <u>457</u> mm).

Reason: In writing safety standards for the shower enclosure industry the Bath Enclosure Manufacturers Association determined that the minimum access width for shower enclosures should be 18" to accommodate shower enclosure units being manufactured. This will allow the standard bases to be fit with enclosures that are not allowed by the current code. For example, the current code does not consider overlap and jamb width in a 42 inch slider or a neo angle base with a 24 inch centerline. The 22 inch minimum has led to arbitrary and inconsistent enforcement. The industry's association has determined that 18 inches allows for functional accessibility, service and maintenance, emergency egress and response and rescue. The 18 inch minimum will be consistent with the safety and installation standards being developed by ASTM.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BIRCH-P1-417.4.2

Public Hearing Results

PART I- IPC

Committee Action: **Disapproved**

Committee Reason: Rescue personnel need the 22 inches to access someone who needs help.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Christopher Birch, representing the Bath Enclosure Manufacturers Association, requests Approval as Submitted.

Commenter's Reason: The reasoning for leaving the 22 inch egress is out of touch, is illogical in the thought process and has led to arbitrary and inconsistent enforcement. Remember that the majority of shower enclosures will not be affected and most homeowners will make their purchases based upon their specifications. For the units that are affected, there is no recourse for a by the book inspector. Many dealers have customers for which they have installed bi-pass shower enclosure in their 44" fiberglass opening, thousands over the years. With the size of the jamb and the overlap, it is mathematically impossible to meet 22 inches. The local building inspector recites out of the uniform plumbing code a discrepancy for not meeting a minimum width of 22" for egress. The same goes for a neo-angle door. They rarely have a centerline that would allow a door with a 22" finished net width. There are other applications that are affected as well including but not limited to mobile homes, boats, R.V., ect. that would rule out a door but we will not address those at this time.

One could say that no one really walks into a shower "squared away" with the entry. The natural motion is move into a shower with one hand on the door handle and opposite shoulder first. This would tend to support a dimension measured from back of shoulder blade to tip of the tummy (or breast); more like 16'-18" on average. And one can also say that if a person is in need of rescue personnel in a neo angle unit or a bi-pass, the person is going to be on the floor and there will be no room for reasonable help in any situation. Common sense tells us that something needs to be changed. The industry has determined the minimum access width for shower enclosures should be 18" to accommodate all shower enclosure units being manufactured. This will allow the standard shower base to be fit with enclosures that are not allowed by the current code and still allow for functional accessibility, service and maintenance, emergency egress in response and rescue. Again, the 22" minimum egress is out of touch and has no solid basis to remain unless someone can prove to the industry that this is a TRUE safety concern. To date, we have not seen this documentation

Final Action: AS AM AMPC____ D

P52-09/10, PART II
IRC P2708.1

Proposed Change as Submitted

Proponent: Christopher Birch, Executive Vice President, Bath Enclosure Manufacturers Association

PART II - IRC

Revise as follows:

P2708.1.1 Access. The shower compartment access and egress opening shall have a ~~minimum~~ clear and unobstructed width of <u>not less than</u> ~~22~~ <u>18</u> inches (~~559~~ <u>457</u> mm).

Reason: In writing safety standards for the shower enclosure industry the Bath Enclosure Manufacturers Association determined that the minimum access width for shower enclosures should be 18" to accommodate shower enclosure units being manufactured. This will allow the standard bases to be fit with enclosures that are not allowed by the current code. For example, the current code does not consider overlap and jamb width in a 42 inch slider or a neo angle base with a 24 inch centerline. The 22 inch minimum has led to arbitrary and inconsistent enforcement. The industry's association has determined that 18 inches allows for functional accessibility, service and maintenance, emergency egress and response and rescue. The 18 inch minimum will be consistent with the safety and installation standards being developed by ASTM.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BIRCH-P1-417.4.2

Public Hearing Results

PART II- IRC-P
Committee Action: **Disapproved**

Committee Reason: Lessening of the dimension would make it difficult for the average human to get into and out of the shower.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Christopher Birch, representing the Bath Enclosure Manufacturers Association, requests Approval as Submitted.

Commenter's Reason: See P52, Part II

Final Action: AS AM AMPC____ D

P57-09/10

419.1, Chapter 13

Proposed Change as Submitted

Proponent: John M. Halliwill, Halliwill and Associates, representing Caroma

1. Revise as follows:

419.1 Approval. Urinals shall conform to ANSI Z124.9, ASME A112.19.2M, ASME A112.19.19, CSA B45.1, ~~or~~ CSA 45.5 or IAPMO IGC 161. Urinals shall conform to the water consumption requirements of Section 604.4. Water-supplied urinals shall conform to the hydraulic performance requirements of ASME A112.19.6, CSA 45.1 or CSA B45.5.

2. Add standard to Chapter 13 as follows:

International Association of Plumbing and Mechanical Inspectors
5001 E. Philadelphia St.
Ontario, CA 91761

IAPMO

IGC 161-2007 Guide Criteria for Waterless Urinals

Reason: The proposed IAPMO IGC (standard) provides for materials and testing requirements for waterless urinals that are not covered in the current standards. One of which is stainless steel. The purpose statement in the proposed IGC states in part "The purpose of this standard is to provide the minimum design and performance criteria for waterless urinals. This standard is not intended to be a specification guide nor is it intended to restrict design. Its purpose is to serve as a guide for producers, distributors, architects, engineers, contractors, inspectors, and users; to promote understanding regarding materials, manufacture and installation; and to provide for identifying waterless urinals that conform with this standard."

Urinals that have been evaluated to this standard are currently in use using the Waterless Urinal with Liquid Trap technology.

This standard contains requirements for a new trap sealing method that has been evaluated and products listed for use in jurisdictions around the world. Products using this technology are currently manufactured by a number of manufacturers in this and other countries around the world. Additionally, it was noted while testing products using this new technology that should a negative pressure develop in the DWV system. Air will be introduced through the device until equilibrium is established. This feature will help maintain the trap seals of liquid seal traps so that odors, vapors and possibly injurious materials will not enter the building.

Cost Impact: This code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard, IAPMO IGC 161-2007, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: HALLIWILL-P1-419.1

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard IGC 161-2007 indicated that in the opinion of ICC staff, the standard did not comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: IGC 161 is not a standard.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John M. Halliwell, Halliwell and Associates, Beaumont, CA, representing Caroma, requests Approval as Submitted.

Commenter's Reason: Staff, has indicated the standard submitted does not comply with the ICC Standards Policy "**3.6.3.2** The standard shall be developed and maintained through a consensus process such as ASTM or ANSI." The following information was given to staff to support the acceptance of this proposed new standard. (The standard is proposed as a new standard or as a revision is proposed. The proposal is advertised "posted for public review and comment, the committee meets in the open with public present, appeals can be made to the committees action should anyone have a problem with what was done. While this is not reviewed as an ANSI consensus document the process does allow for open and public review with comment and appeal procedures. It should be noted that there are currently none ANSI consensus documents accepted and referenced in the Code." Additionally it should be noted that not all ASTM standards have been reviewed and accepted under the ANSI standards process and that other standards were accepted by the committee at their last meeting that are not ASTM and or ANSI accepted standards.

The Committee indicated that IGC-161 was not a standard. It should be noted that the Staff did not indicate IGC-161 is not a standard and it has been noted while reviewing the committee actions that the term Standard is not defined in *Chapter 2 Definitions* of this code. While looking at other codes and dictionaries it is felt that IGC 161 does meet the definition of a standard. IGC does provide how the product is to be used, what materials are to be used in the manufacture of the products, how to test the product for compliance with the standard and how the product is to be marked to show compliance with the standard.

Final Action: AS AM AMPC____ D

P64-09/10, Part I
504.6

Proposed Change as Submitted

Proponent: Tom Hedges, representing the Arizona Building Officials

Part I - IPC

Revise as follows:

504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room as the water heater except where the discharge is to the outdoors, not subject to freezing and the piping terminates not less than 6 inches (152mm) and not more than 12 inches (305mm) above grade.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.

5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. Direct the discharge in a downward direction.

Reason: This change will allow the P & T relief drain pipe to extend direct from the water heater to an exterior location where no freeze potential exists. This is consistent with the IPC Section 504.6 (IRC Section P2803.6.1), Item no. 5 which allows the discharge to go to the outdoors. The 6" minimum termination height provides the required air gap. This proposed change also establishes a maximum termination height of 12" for outdoor termination. This method of drainage and termination is very common in locations that have previously utilized the Uniform Plumbing Code for over 50 years. No data exists to suggest this method has created unsafe conditions. The Committee reason for disapproval of Item P50-07/08 clarifies that the code allows a discharge pipe to terminate over a water heater drip pan. The code currently establishes drip pan drain terminations at 6" minimum and 24" maximum termination heights in IPC Section 504.7.2 (IRC Section P2801.5.2). If it's safe to drain a discharge pipe from a drip pan using these heights, then it certainly would be no more harmful to use the similar heights for an outdoors termination.

This proposal improves the termination requirements.

This method is also more energy efficient by not creating a direct open pipe for air flow from and to the out doors as will occur where an untrapped waste receptor for the P & T relief valve discharge drains to the outdoors.

In many commercial tenant spaces it is common practice to locate a water heater above the lay-in ceiling in an attic or interstitial space. Many times these locations are above a restroom or storage room. IPC Section 802.3 prohibits a waste receptor in such locations. A drain pipe needs to extend beyond the room or space containing the water heater.

Also, IPC 802.3 prohibits waste receptors in rest rooms and IPC Section 504.6 Item no. 2 requires an air gap in the same room as the water heater, thereby prohibiting water heaters in rest rooms. This change would allow a reasonable option where the need exists.

Cost Impact: The code change proposal will not increase the cost of construction and may decrease cost.

ICCFILENAME: HEDGES-P1-504.6

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: Air gap needs to be in room with the water heater in case piping downstream of air gap is compromised.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tom Hedges, representing the Arizona Building Officials; Bruce Dimmig, representing the Arizona Building Officials, requests Approval as Submitted.

Commenter's Reason: The proposed code change represents a plumbing method allowed in a majority of jurisdictions west of the Mississippi River for at least 50 years. This is an opportunity for the voting members of ICC to again recognize and acknowledge a safe and cost effective method for piping the discharge from a water heater pressure-temperature relief valve.

The current IPC & IRC requires the water heater pressure-temperature relief valve drain line to have an air gap and such air gap shall be located in the same room as the water heater. If one chooses to extend the drain line to another room or the exterior of the building, an air gap is still required to be located in the same room as the water heater. This will necessitate the addition of an air gap fitting in the drain line near the P & T valve before extending the line out of the room. Since the typical discharge piping is ¾ inch, if a ¾ inch air gap fitting is installed in the discharge piping, the discharge piping will no longer be capable of carrying the flow from a P & T valve discharging at full pressure. A discharge at full pressure will also discharge from the air gap fitting's vent, flowing into the room. A ¾ inch discharge pipe under normal pressure will have a flow of about 12 GPM. Based on IPC 709.3, 12 GPM will result in an equivalent flow of 24 fixture units. This will require a 3 or 4 inch waste line, which is not practical.

The current code provisions will allow the discharge to terminate at a water heater pan. As can be deduced from the expected full flow noted above, this method will also likely allow flooding. The proposed change will result in a safe alternative that will be much less likely to cause flooding.

This code change would do 3 things; allow an option to locate the air gap at the termination of the relief valve discharge pipe, define the physical limits of the air gap and to clarify that all relief valve discharge pipes shall be pointed downward to better define "discharge in a manor that does not cause personal injury".

The air gap at the termination must also comply with the Section 504.6 requirement to "discharge to a termination point that is readily observable by the building occupants.

IMC, Section 1004.1 and 1006 related to water/steam boilers contains no similar stipulations that would mandate the air gap needs to be in the same room with the water boiler in case piping downstream of air gap is compromised. The upper limit of 12" for the air gap was a compromise to past committee criticism on previous proposed changes (P51-07/08) that 24" was too high and we agreed and recommended a lower limit.

Final Action: AS AM AMPC____ D

P64-09/10, Part II
P2803.6.1

Proposed Change as Submitted

Proponent: Tom Hedges, representing the Arizona Building Officials

Part II – IRC-P

Revise as follows:

P2803.6.1 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room as the water heater <u>except where the discharge is to the outdoors, not subject to freezing and the piping terminates not less than 6 inches (152mm) and not more than 12 inches (305mm) above grade.</u>
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section P2904.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. <u>Direct the discharge in a downward direction.</u>

Reason: This change will allow the P & T relief drain pipe to extend direct from the water heater to an exterior location where no freeze potential exists. This is consistent with the IPC Section 504.6 (IRC Section P2803.6.1), Item no. 5 which allows the discharge to go to the outdoors. The 6" minimum termination height provides the required air gap. This proposed change also establishes a maximum termination height of 12" for outdoor termination. This method of drainage and termination is very common in locations that have previously utilized the Uniform Plumbing Code for over 50 years. No data exists to suggest this method has created unsafe conditions. The Committee reason for disapproval of Item P50-07/08 clarifies that the code allows a discharge pipe to terminate over a water heater drip pan. The code currently establishes drip pan drain terminations at 6" minimum and 24" maximum termination heights in IPC Section 504.7.2 (IRC Section P2801.5.2). If it's safe to drain a discharge pipe from a drip pan using these heights, then it certainly would be no more harmful to use the similar heights for an outdoors termination.

This proposal improves the termination requirements.

This method is also more energy efficient by not creating a direct open pipe for air flow from and to the out doors as will occur where an untrapped waste receptor for the P & T relief valve discharge drains to the outdoors.

In many commercial tenant spaces it is common practice to locate a water heater above the lay-in ceiling in an attic or interstitial space. Many times these locations are above a restroom or storage room. IPC Section 802.3 prohibits a waste receptor in such locations. A drain pipe needs to extend beyond the room or space containing the water heater.

Also, IPC 802.3 prohibits waste receptors in rest rooms and IPC Section 504.6 Item no. 2 requires an air gap in the same room as the water heater, thereby prohibiting water heaters in rest rooms. This change would allow a reasonable option where the need exists.

Cost Impact: The code change proposal will not increase the cost of construction and may decrease cost.

ICCFILENAME: HEDGES-P1-504.6

Public Hearing Results

PART II- IRC-P
Committee Action: **Disapproved**

Committee Reason: There needs to be an observable point near the water heater before the piping goes outside the room where the water heater is located. Proposed text conflict with the 24 inches in Section P2803.5.2.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tom Hedges, representing the Arizona Building Officials; Bruce Dimmig, representing the Arizona Building Officials, requests Approval as Submitted.

Commenter's Reason: See P64-09/10, Part I

Final Action: AS AM AMPC____ D

P65-09/10, Part I
504.7

Proposed Change as Submitted

Proponent: Shawn Strausbaugh–Arlington County, VA representing Virginia Plumbing and Mechanical Inspectors Association

PART I – IPC

Revise as follows:

504.7 Required pan. Where a storage tank-type water heater~~s~~ or a hot water storage tank~~s~~ ~~are~~ is installed in a location~~s~~ where water leakage from ~~of~~ the tank~~s~~ ~~or connections will~~ could cause damage, the tank ~~or water heater~~ shall be installed in a galvanized steel pan having a material thickness of not less than 0.236 inch (0.6010mm) (No. 24 gage), or other pans approved for such use.

Reason: The existing text is not clear about whether tankless-type water heaters require a pan. A tankless water heater does not have a storage tank and does not present any greater risk of water leakage than a water distribution piping system that has been installed and pressure tested in accordance with this code. This proposal changes the text to make the pan requirement specific to storage tank water heaters and hot water storage tanks. This section is in the code because it is a well known fact that the majority of storage-type water heater tanks and hot water storage tanks have a relatively short life span that often ends in causing catastrophic damage to the building. Tankless water heaters are constructed of materials that are much more corrosion resistant than the materials (glass-lined carbon steel) of most water heater tanks and hot water tanks. Tankless water heaters should not be required to have drip pans installed.

The language concerning connections was removed because connections made in accordance with this code have no greater risk of leakage than any other connection in the water distribution system. Finally, the language of this section has been cleaned up to read better.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: STRAUSBAUGH-P1-504.7

Public Hearing Results

PART I- IPC
Committee Action: **Approved as Submitted**

Committee Reason: Proposed text clarifies that the pans are not required under tankless water heaters or connections to tankless water heaters

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing and Mechanical Inspectors Assoc. requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

504.7 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will ~~could~~ cause damage, the tank shall be installed in a galvanized steel pan having a material thickness of not less than .0.236 inch (0.6010) (No. 24 gage), or other pans approved for such use.

Commenter's Reason: Part I was approved as submitted however the word could was unintentionally placed in the change. The use of could is not proper code language and this modification is to remove the word could and use will instead. No other modifications have been made.

Public Comment 2:

Gary Klein, Affiliated International Management LLC., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

504.7 Required pan. Where a tankless water heater, storage tank~~-type~~ water heater or a hot water storage tank is installed in a location where water leakage ~~of~~ from the water heater or tank could cause damage, the water heater or tank shall be installed in a galvanized steel pan having a material thickness of not less than 0.236 inch (0.6010mm) (No. 24 gage), or other pans approved for such use. Listed pans shall comply with CSA LC3. Tankless water heaters having an input rating not exceeding 12kW and storage water heaters having a volume not exceeding 3 gallons shall not require a pan.

Commenter's Reason: The reasoning used to support this proposal at the first hearing did not present a full picture of the problem. What was missing is the fact that we do not yet have data regarding the long term failure rates and modes of failure for tankless water heaters. This is because they have only been installed in large numbers in the US for less than 10 years. Most manufacturers offer a limited 10-15 year warranty, and we are only now approaching this number of years for the vast majority of the installed base.

While it is true that there is only a very small tank in a gas tankless water heater (in the heat exchanger and in the piping internal to the unit), the most likely mid-long term failure mode is leakage through the heat exchangers themselves. These are intentionally thin-walled devices, so that heat is transferred efficiently from the combustion gases to the water. The regular maintenance schedule stipulated by the manufacturer to flush out any sediment and calcification build-up in the heat exchanger depends on local water quality, which varies widely around the US. In areas with very hard water, it is necessary to accelerate the maintenance schedule in order to maintain proper performance. Each time the heat exchanger is flushed, some of the material comes away with the sediment, making the walls thinner is some places. Based on our experiences with pin-hole leaks in copper tubing, we can expect to see similar problems develop in the heat exchangers. While such leaks can start out small, they can quickly become quite large.

There is still another reason to adopt this revised proposal. We are beginning to see a wide variety of new water heater combinations coming on to the US market. Some of these have 0.5 gallon tanks, some tankless electric water heaters have about 1 gallon, others have 4-6 gallons and I expect to see some in the 2-3 gallon range. Also, what about the expansion tank; which all systems with a back-flow prevention device that prevents pressure from going back into the mains should have? These are at least 2.5 gallons. At what point does a water heater become a storage water heater?

To make enforcement easier, it seems prudent to require that all water heater installations in locations where a leak could cause damage should have a pan that enables the control of a major leak.

It is very premature to remove this building safety requirement at this time. I recommend that you disapprove the proposal that was adopted by the Committee. Thank you.

Final Action: AS AM AMPC____ D

P65-09/10, Part II
IRC P2801.5

Proposed Change as Submitted

Proponent: Shawn Strausbaugh–Arlington County, VA representing Virginia Plumbing and Mechanical Inspectors Association

PART II – IRC

Revise as follows:

P2801.5 Required pan. Where a storage tank-type water heater~~s~~ or a hot water storage tank~~s~~ ~~are~~ is installed in a location~~s~~ where water leakage from ~~of~~ the tank~~s~~ ~~or connections will~~ could cause damage, the tank ~~or water heater~~ shall be installed in a galvanized steel pan having a material thickness of not less than 0.236 inch (0.6010mm) (No. 24 gage), or other pans approved for such use. Listed pans shall comply with CSA LC3.

Reason: The existing text is not clear about whether tankless-type water heaters require a pan. A tankless water heater does not have a storage tank and does not present any greater risk of water leakage than a water distribution piping system that has been installed and pressure tested in accordance with this code. This proposal changes the text to make the pan requirement specific to storage tank water heaters and hot water storage tanks. This section is in the code because it is a well known fact that the majority of storage-type water heater tanks and hot water storage tanks have a relatively short life span that often ends in causing catastrophic damage to the building. Tankless water heaters are constructed of materials that are much more corrosion resistant than the materials (glass-lined carbon steel) of most water heater tanks and hot water tanks. Tankless water heaters should not be required to have drip pans installed.

The language concerning connections was removed because connections made in accordance with this code have no greater risk of leakage than any other connection in the water distribution system. Finally, the language of this section has been cleaned up to read better.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: STRAUSBAUGH-P1-504.7

Public Hearing Results

PART II- IRC-P
Committee Action: **Approved as Submitted**

Committee Reason: There are clearly differences between tank type and tankless water heaters such that tankless should not require pans. Consistency with the action of the IPC committee.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing and Mechanical Inspectors Assoc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

P2801.5 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will ~~could~~ cause damage, the tank shall be installed in a galvanized steel pan having a material thickness of not less than .0.236 inch (0.6010) (No. 24 gage), or other pans approved for such use. Listed pans shall comply with CSA LC3.

Commenter's Reason: Part I & II were both approved as submitted however the word could was unintentionally placed in the change. The use of could is not proper code language and this modification is to remove the word could and use will instead. No other modifications have been made.

Public Comment 2:

Gary Klein, Affiliated International Management, LLC., representing himself, requests Approval as Modified by this Public Comment.

P2801.5 Required pan. Where a <u>tankless water heater</u>, storage tank~~-type~~ water heater or a hot water storage tank is installed in a location where water leakage ~~of~~ from the <u>water heater or</u> tank could cause damage, the <u>water heater</u> or tank shall be installed in a galvanized steel pan having a material thickness of not less than 0.236 inch (0.6010mm) (No. 24 gage), or other pans approved for such use. Listed pans shall comply with CSA LC3. <u>Tankless water heaters having an input rating not exceeding 12kW and storage water heaters having a volume not exceeding 3 gallons shall not require a pan.</u>

Commenter's Reason: See P65-09/10, Part I

Final Action: AS AM AMPC____ D

P72-09/10- Part I
604.9

Proposed Change as Submitted

Proponent: Rand Ackroyd, Rand Technical Consulting, representing The Plumbing and Drainage Institute

Part I - IPC

1. Revise as follows:

604.9 Water hammer. The velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. A water-hammer arrestor shall be installed where quick-closing valves are utilized. Water hammer arrestors shall be installed in accordance with the manufacturer's specifications. Water-hammer arrestors shall conform to ASSE1010 <u>or PDI WH201</u>.

2. Add standard to Chapter 13 as follows:

PDI
<u>WH201-2006</u> <u>Water Hammer Arrestors</u>

Reason: PDI WH201 is the original US standard for water hammer arrestors first published over 40 ago. With copywriter permission the PDI performance requirements were allowed to be duplicated in the equivalent standard that is currently referenced in the Code, ASSE standard 1010. PDI WH201 was updated in 2006. This standard PDI WH201 is available to the public at no cost on www.pdionline.org .

Cost Impact: The code change will not increase the cost of construction.

Analysis: Review of proposed new standard, PDI WHI201-2006, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: Ackroyd-P5-604.9

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: Review of proposed new standard PDI WH201-2006 indicated that in the opinion of ICC staff, the standard did not comply with ICC standards criteria.

PART I- IPC
Committee Action: **Approved as Submitted**

Committee Reason: The PDI standard is equivalent to ASSE 1010.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble, ICC Referenced Standards Committee Chair representing the ICC Referenced Standards Committee, requests Disapproval.

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.

We therefore request disapproval.

Final Action: AS AM AMPC____ D

P72-09/10, Part II
IRC P2903.5

Proposed Change as Submitted

Proponent: Rand Ackroyd, Rand Technical Consulting, representing The Plumbing and Drainage Institute

PART II – IRC-P

1. Revise as follows:

P2903.5 Water hammer. The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. Water-hammer arrestors shall be installed in accordance with the manufacturer's installation instructions. Water hammer arrestors shall conform to ASSE 1010 <u>or PDI WH201</u>.

2. Add standard to Chapter 44 as follows:

PDI
<u>WH201-2006</u> <u>Water Hammer Arrestors</u>

Reason: PDI WH201 is the original US standard for water hammer arrestors first published over 40 ago. With copywriter permission the PDI performance requirements were allowed to be duplicated in the equivalent standard that is currently referenced in the Code, ASSE standard 1010. PDI WH201 was updated in 2006. This standard PDI WH201 is available to the public at no cost on www.pdionline.org .

Cost Impact: The code change will not increase the cost of construction.

Analysis: Review of proposed new standard, PDI WHI201-2006, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: Ackroyd-P5-604.9

Public Hearing Results

PART II- IRC-P
Committee Action: Disapproved

Committee Reason: Standard not compliant with ICC standards

Assembly Action: None

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rand H. Ackroyd representing self, requests Approval as Submitted.

Commenter's Reason: PDI Standards development is an open development process offering public comment periods on its web site. PDI WH201 is the original US standard for water hammer arrestors first published over 40 ago. With copywriter permission the PDI performance requirements were allowed to be duplicated in the equivalent standard that is currently referenced in the Code, ASSE standard 1010.
PDI WH201 was updated in 2009/2010. This standard PDI WH201 is available to the public at no cost on www.pdionline.org **.**

Final Action: AS AM AMPC____ D

P73-09/10, Part I
605.5 (New), Chapter 13

<u>Proposed Change as Submitted</u>

Proponent: Sid Cavanaugh, Cavanaugh Consulting representing Cohesant, Inc.

PART I - IPC

1. Add new text as follows:

<u>**605.5 Epoxy coating.** Epoxy coating used on existing water service or water distribution piping systems shall comply with NSF 61 and shall comply with ASTM F???? or AWWA C210.</u>

<u>(Renumber subsequent sections)</u>

2. Add standards to Chapter 13 as follows:

ASTM
<u>F????-??</u> <u>Epoxy Lining Systems for Water Piping</u>

AWWA
<u>C210-03</u> <u>Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines</u>

Reason: While the technology is allowed by the code and various jurisdictions it needs to be recognized and accepted in the body of the code with appropriate requirements and standards to assure proper approved installation in the field.

Cost Impact: None. It will probably save money for the user in many cases.

Analysis: Review of proposed new standards, ASTM F????-?? and AWWA C210-03, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME:CAVANAUGH-P4-605.5

<u>Public Hearing Results</u>

PART I- IPC
Committee Action: **Approved as Modified**

Modify the proposal as follows:

605.5 Epoxy coating. Epoxy coating used on existing water service or water distribution piping systems shall comply with NSF 61 and ~~shall comply with ASTM F???? or~~ AWWA C210.

Committee Reason: Agreed with proponent's reason statement which stated that these products are being used and a standard needs to be in the code to assure proper installation of these products.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sidney Cavanaugh, Cavanaugh Consulting, representing Cohesant, requests Approval as Submitted.

Commenter's Reason: The proposal was modified because one of the standards (ASTM FXXXX-10) was not completed but it is hopeful that it will be by the public hearings in May.

Final Action: AS AM AMPC____ D

P73-09/10, Part II
P2905.19, Chapter 44

Proposed Change as Submitted

PART II - IRC

1. Add new text as follows:

<u>**P2905.19 Epoxy coating.** Epoxy coating used on existing water service or water distribution piping systems shall comply to NSF 61 and shall comply to ASTM F???? or AWWA C210.</u>

<u>*(Renumber subsequent sections)*</u>

2. Add standards to Chapter 44 as follows:

ASTM
<u>F????-??</u> <u>Epoxy Lining Systems for Water Piping</u>

AWWA
<u>C210-03</u> <u>Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines</u>

Reason: While the technology is allowed by the code and various jurisdictions it needs to be recognized and accepted in the body of the code with appropriate requirements and standards to assure proper approved installation in the field.

Cost Impact: None. It will probably save money for the user in many cases.

Analysis: Review of proposed new standards, ASTM F????-?? and AWWA C210-03, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME:CAVANAUGH-P4-605.5

Public Hearing Results

PART II- IRC-P
Committee Action: **Approved as Modified**

Modify the proposal as follows:

P2905.19 Epoxy coating. Epoxy coating used on existing water service or water distribution piping systems shall comply with NSF 61 and ~~shall comply to ASTM F???? or~~ AWWA C210.

Committee Reason: Good alternative products for existing steel piping systems. Standard includes information on how material is applied.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sidney Cavanaugh, Cavanaugh Consulting, representing Cohesant, requests Approval as Submitted.

Commenter's Reason: See P73-09/10, Part II

Final Action: AS AM AMPC____ D

P79-09/10
607.2

Proposed Change as Submitted

Proponent: Guy Tomberlin of Virginia representing himself.

Revise as follows:

607.2 H<u>ot</u> <u>or tempered</u> water <u>supply to fixtures</u> ~~supply temperature maintenance~~. ~~Where the developed length of hot water piping from the source of hot water supply to the furthest fixture exceeds 100 feet (30 480 mm), the hot water supply system shall be provided with a method of maintaining the temperature in accordance with the International Energy Conservation Code.~~ <u>The developed length of hot or tempered water piping, from the source of hot water to the fixtures that require hot or tempered water, shall not exceed 40 feet (12192mm). Recirculating system piping and heat traced piping shall be considered to be sources of hot or tempered water.</u>

Reason: Energy conservation needs to be observed in the IPC. Hot water supply is an area where design is critical. Either locate the water heating source near the fixtures or install a circulating system or heat trace system. This is in attempt to minimize the time it takes to get hot water to a fixture. I believe that 100 feet is entirely too much distance between the fixture and the water heating source. A huge amount of water and energy is wasted while running the water and waiting for the heated water to get to the outlet.

Current text in the IPC is easily manipulated to permit unwanted systems, that comply with the language as written, but that fail to serve the intended purpose. This proposal changes the text to say what it means, and maintain the original intent which is to get hot water to the fixture without wasting unnecessary energy and water.

In essence, this is in attempt to minimize the time it takes to get hot water to a fixture. Energy conservation must be observed in the IPC/IRC. Hot water supply is an area where design is critical to enable huge energy and water savings.

Cost Impact: This proposal may increase the cost of construction.

ICCFILENAME: TOMBERLIN-P3-607.2

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

607.2 Hot or tempered water supply to fixtures The developed length of hot or tempered water piping, from the source of hot water to the fixtures that require hot or tempered water, shall not exceed ~~40~~ <u>50</u> feet (~~12192~~ <u>15240</u>mm). Recirculating system piping and heat traced piping shall be considered to be sources of hot or tempered water.

Committee Reason: Modification and action consistent with P80.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary Klein, Affiliated International Management, LLC, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

607.2 Hot or tempered water delivery ~~supply~~ to fixtures. The developed length of hot or tempered water piping, from the source of hot water to the fixtures that require hot or tempered water, shall not exceed 50 feet (15240mm). ~~Recirculating system piping and heat traced piping shall be considered to be sources of hot or tempered water.~~ Where a water heater or a hot water storage tank is the nearest source of hot or tempered water, the volume of water in hot or tempered water piping between a water heater or a hot water storage tank and the water outlet of a shower, sink or lavatory fixture fitting shall not exceed 87 ounces (2.6 L). Where circulating hot water loop system piping or electrically heat-traced piping is the nearest source of hot or tempered water, the volume of water in hot or tempered water piping between the circulating hot water loop system piping or electrically heat-traced piping and the water outlet of a shower, sink or lavatory fixture fitting shall not exceed 32 ounces (0.96 L). The volume shall be calculated in accordance with Section 607.2.1.

607.2.1 Volume calculation. For the purpose of this section, water heaters, hot water storage tanks, circulating hot water loop system piping, and electrically heat-traced piping shall be considered to be sources of hot or tempered water. The volume of water between the source of hot or tempered water and the water outlet of a shower sink or lavatory fitting shall be calculated by adding the internal volume of all piping, fittings, valves, meters, and manifolds between the source and the outlet. Where the source of hot water is a circulating hot water loop system pipe or an electrically heat-traced pipe, the calculated volume shall include the volume of the portion of the fitting on the loop or heat-traced pipe that connects to the piping leading to the fixture fitting. Piping volumes shall be calculated using Table 607.2.1.

(Renumber subsequent sections)

TABLE 607.2.1
INTERNAL VOLUME OF
VARIOUS TYPES OF WATER DISTRIBUTION PIPE AND TUBING

Nominal Pipe or Tube Size (inch)	PIPE OR TUBING MATERIAL							
	COPPER (Type)			CPVC			PEX	
	M	L	K	CTS SDR 11	SCH 40	SCH 80	CTS SDR 9	-AL-PEX
	LIQUID OUNCES PER FOOT OF LENGTH							
3/8	1.06	0.97	0.84	NA	1.17	0.86	0.64	0.63
1/2	1.69	1.55	1.45	1.25	1.89	1.46	1.18	1.31
3/4	3.43	3.22	2.90	2.67	3.38	2.74	2.35	3.39
1	5.81	5.49	5.17	4.43	5.53	4.56	3.91	5.56
1 1/4	8.70	8.36	8.09	6.61	9.66	8.24	5.81	8.49
1 1/2	12.18	11.83	11.45	9.22	13.20	11.38	8.09	13.88
2	21.08	20.58	20.04	15.79	21.88	19.11	13.86	21.48

For SI: 1 ounces = 0.030 liter

Commenter's Reason: The reasoning used to support this proposal at the first hearing correctly points out that limiting the length of pipe between the source of hot water and the hot water fixtures will reduce the waste of water, energy and time while waiting for hot water to arrive. It will also reduce the energy used during the use phase of each hot water event and it will reduce the energy that is lost when the water in the non-recirculated or heat traced piping eventually cools down.

However, the proposal did not do enough to get at the core of the problem, which is to limit the volume. As it stands, it is possible to have piping with an unknown diameter between the source of hot water and the fixtures so long as it does not exceed 50 feet. This is twice as good as a pipe that does not exceed 100 feet, but since the diameter is not specified, the actual volume is unknown. Using the table above and using Type L Copper as tubing, the volume in a 50 foot pipe will range from 48.5 – 1,029 ounces (roughly 1/3 to over 8 gallons). The greater the volume, the greater the waste.

One of the most important reasons to focus on the pipe volume, rather than the length is that many fixture flow rates are below 1 gpm, in particular those for lavatory faucets, which are currently at 0.5 gpm of full flow. The faucets that temper the water at the valve actually have flow rates on the hot side that are around 0.25 gpm. At 0.5 gpm, it will take a minimum of 45 seconds for hot water to travel through 50 feet of 3/8 pipe and more than 1.5 minutes if the flow rate was 0.25 gpm. Neither of these times-to-tap is acceptable according to ASPE. At the other extreme, in a 2 inch pipe, it will take at least16 minutes for hot water to travel 50 feet. In fact, because of the relatively small face-velocity of the water, it will take significantly longer than that, even if the pipe is insulated. This helps explain why the faucets in public restrooms in conference hotels often take an exceedingly long time to get hot water, even if there are many people using them.

I believe that this proposal is consistent with the scope of the original code change proposal and the reasoning is germane because it builds on the logic used in the reasoning for the original proposal and will enable more effective implementation of the desired intent.

I recommend that you accept this revised proposal. Thank you.

Final Action: AS AM AMPC____ D

P84-09/10, Part I
605.16.2

Proposed Change as Submitted

Proponent: Paul Coble, Lewis Pipe Company, Ardmore, TN

PART I - IPC

Revise as follows:

605.16.2 Solvent cementing. Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. Solvent cement, orange in color and conforming to ASTM F 493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D 2846 or ASTM F 493. Solvent-cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the conditions apply:

1. The solvent cement is third party certified as conforming to ASTM F-493.
2. The solvent cement used is yellow <u>or blue</u> in color.
3. The solvent cement is used only for joining ½ (12.7 mm) inch through 2 inch (51 mm) diameter pipe and fittings.
4. The CPVC pipe and fittings are manufactured in accordance with ASTM D2846.

Reason: The yellow color indicated matches a competitor products trademark color. The blue indicated would match our trademark color. This is the only code which gives a single company or product a competitive advantage in the market. This color has actually been used against our product in the market with representatives from our competitor in at least 5 states claiming yellow one step cement would not work with a blue pipe system. The products in question are FLOWGUARD GOLD marketed by Lubrizol and Lewis Blue marketed by Lewis Pipe Company. We have developed a blue one step and would like to market this accordingly. The same standards for the cement would still apply.

Cost Impact: There will be no cost impact to builders, plumbers, or home buyers as the products will be virtually the same price and represent a very small portion of the building process.

ICCFILENAME: Coble-P1-605.16.2

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: Blue color appears to be promoting a proprietary product.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing and Mechanical Inspectors Assoc. requests Approval as Modified by this Public Comment:

Modify the proposal as follows:

605.16.2 Solvent cementing. Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. Solvent cement, orange in color and conforming to ASTM F 493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D 2846 or ASTM F 493. Solvent-cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the conditions apply:

1. The solvent cement is third party certified as conforming to ASTM F-493.
~~2. The solvent cement used is yellow or blue in color.~~
~~3~~2. The solvent cement is used only for joining ½ (12.7 mm) inch through 2 inch (51 mm) diameter pipe and fittings.
~~4~~3. The CPVC pipe and fittings are manufactured in accordance with ASTM D2846.

Commenter's Reason: Part I of this proposed change was disapproved by committee and Part II was approved as submitted. In order not to have the IPC and the IRC conflicting the exception #2 from both proposals should be removed. The committee reason for Part I disapproval was that the color may be promoting a proprietary product which is why we believe colors should not be included neither blue nor yellow or any future color solvent cement that is produced. If the solvent cement conforms to ASTM F-493, the CPVC pipe and fittings are manufactured in accordance with ASTM D2846 and the solvent cement is used for joining ½ (12.7 mm) inch through 2 inch (51mm) diameter pipe and fittings then the solvent cement should conform no matter what the color.

Final Action: AS AM AMPC____ D

P84-09/10, Part II
IRC P2905.9.1.2

Proposed Change as Submitted

Proponent: Paul Coble, Lewis Pipe Company, Ardmore, TN

PART II - IRC

Revise as follows:

P2905.9 Solvent cementing. Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. Solvent cement, orange in color and conforming to ASTM F 493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D 2846 or ASTM F 493. Solvent-cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the conditions apply:

1. The solvent cement is third party certified as conforming to ASTM F-493.
2. The solvent cement used is yellow <u>or blue</u> in color.
3. The solvent cement is used only for joining ½ (12.7 mm) inch through 2 inch (51 mm) diameter pipe and fittings.
4. The CPVC pipe and fittings are manufactured in accordance with ASTM D2846.

Reason: The yellow color indicated matches a competitor products trademark color. The blue indicated would match our trademark color. This is the only code which gives a single company or product a competitive advantage in the market. This color has actually been used against our product in the market with representatives from our competitor in at least 5 states claiming yellow one step cement would not work with a blue pipe system. The products in question are FLOWGUARD GOLD marketed by Lubrizol and Lewis Blue marketed by Lewis Pipe Company. We have developed a blue one step and would like to market this accordingly. The same standards for the cement would still apply.

Cost Impact: There will be no cost impact to builders, plumbers, or home buyers as the products will be virtually the same price and represent a very small portion of the building process.

ICCFILENAME: Coble-P1-605.16.2

Public Hearing Results

PART II- IRC-P
Committee Action: **Approved as Submitted**

Committee Reason: Provides for alternative products to be used.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Shawn Strausbaugh, Arlington, VA, representing VA Plumbing and Mechanical Inspectors Assoc., requests Approval as Modified by this Public Comment:

P2905.9.1.2 Solvent cementing. Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. Solvent cement, orange in color and conforming to ASTM F 493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D 2846 or ASTM F 493. Solvent-cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the conditions apply:

1. The solvent cement is third party certified as conforming to ASTM F-493.
~~2.~~ ~~The solvent cement used is yellow or blue in color.~~
~~3~~<u>2</u>. The solvent cement is used only for joining ½ (12.7 mm) inch through 2 inch (51 mm) diameter pipe and fittings.
~~4~~<u>3</u>. The CPVC pipe and fittings are manufactured in accordance with ASTM D2846.

Commenter's Reason: See P84-09/10, Part I

Final Action: AS AM AMPC____ D

P85-09/10, Part I
605.25 (New)

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., CPD, FASPE/JB Engineering and Code Consulting, P.C. representing himself

Errata: The following correction of the monograph is noted. This errata was discovered after the public hearing errata book was published. Proposal P85 in its entirety was published in error. The correct P85 follows:

PART I - IPC

Add new text as follows:

<u>**605.25 Listed joint or connection.** Joints and connections that are not otherwise addressed in Section 605 and are certified by a third party agency as acceptable for water service or water distribution systems shall be permitted. The joints and connections shall be installed in accordance with their certification and manufacturer's installation instructions.</u>

Reason: There are various types of joints and connections utilized in water distribution and water supply systems that are not listed in Section 605. However, these joints or connections are listed by a third party agency as being acceptable for water distributions systems. This new section will indicate that such joints and connections are acceptable. Some examples of these types of joints and connections are unions, rolled groove fittings, and cut groove fittings.

Cost Impact: This code change will not increase the cost of construction.

ICCFILENAME: BALLANCO-P4-711.2

Public Hearing Results

PART I- IPC
Committee Action: Disapproved

Committee Reason: Additional information about the type of fitting is necessary. Products can always be submitted to the code official for alternate approval.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing self, requests Approval as Submitted.

Commenter's Reason: The reason for disapproving this change is the reason I submitted the change. The Committee has stated that special joints can be approved as an alternative. Of course one can always seek an alternative approval, but why go through that in every local jurisdiction when a joining method has been listed for a given application.

NPFA 13 has long permitted listed joints to be installed. The International Fuel Gas Code has a similar provision for gas piping joints. So, why not have the same requirement in the Plumbing Code.

There are currently a number of joining methods that are listed but not in the plumbing code. I listed some of these examples in my supporting statement. These joining methods have become so common place, that most inspectors don't even realize that every time they are used, the contractor or engineer should be submitting a written request for alternative approval and the inspector must rule on that request.

When is the last time an inspector had such a written request for a union fitting. Yet that would be necessary since unions connections (the thread pattern of the union) are not listed in the code. Additionally, when is that last time this occurred for grooved fittings.

Most jurisdiction are already allowing listed fitting without going through the alternative approval process. It is time to recognize that what these jurisdictions are doing is correct and proper.

Final Action: AS AM AMPC____ D

P85-09/10, Part II
IRC P2905.19 (New)

Proposed Change as Submitted

Errata: The following correction of the monograph is noted. This errata was discovered after the public hearing errata book was published. Proposal P85 in its entirety was published in error. The correct P85 follows:

PART II - IRC

Add new text as follows:

P2905.19 Listed joint or connection. Joints and connections that are not otherwise addressed in Section P2905 and are certified by a third party agency as acceptable for water service or water distribution systems shall be permitted. The joints and connections shall be installed in accordance with their certification and manufacturer's installation instructions.

Reason: There are various types of joints and connections utilized in water distribution and water supply systems that are not listed in Section 605. However, these joints or connections are listed by a third party agency as being acceptable for water distributions systems. This new section will indicate that such joints and connections are acceptable. Some examples of these types of joints and connections are unions, rolled groove fittings, and cut groove fittings.

Cost Impact: This code change will not increase the cost of construction.

ICCFILENAME: BALLANCO-P4-711.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Special joints can be approved by the code official under alternate approval.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julius Ballanco, P.E. ,JB Engineering and Code Consulting, P.C., representing self, requests Approval as Submitted.

Commenter's Reason: See P85-09/10, Part I

Final Action: AS AM AMPC____ D

P86-09/10, Part I
608.7, 608.15.4.2

Proposed Change as Submitted

Proponent: Judson Collins, JULYCO, representing Woodford Manufacturing Co.

PART I – IPC

Revise as follows:

608.7 Valves and outlets prohibited below grade. Potable water out lets and combination stop-and-waste valves shall not be installed underground or below grade. Freezeproof yard hydrants that drain the riser into the ground are considered to be stop-and-waste valves.

> **Exception:** Freezeproof yard hydrants that drain the riser into the ground shall be permitted to be installed, provided that the potable water supply to such hydrants is protected upstream of the hydrants <u>with a field testable backflow preventer assembly</u> in accordance with Section 608 and the hydrants are permanently identified as nonpotable outlets by approved signage that reads as follows: "Caution, Nonpotable Water. Do Not Drink."

608.15.4.2 Hose connections. Sillcocks, hose bibs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type vacuum breaker, <u>a</u> pressure-type vacuum breaker<u>,</u> <u>a two-check type backflow preventer</u> or a permanently attached hose connection vacuum breaker. <u>All devices used for such protection shall be field testable</u>.

Reason: A study that evaluated vacuum breakers after they were installed found that the frost proof sillcocks, conforming to ASSE 1019 that had been installed for 5 or more years, have a high probability of failure of the vacuum breaker. Therefore, property owners have no guarantee of backflow protection from ASSE 1019 devices and no way of testing to determine if the devices are working properly. Requiring a field testable backflow preventer, other than atmospheric-type vacuum breakers, for protection of hose connections will allow owners to determine if proper protection is being provided.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: COLLINS-P10-608.7

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: Field testing rarely, if ever, occurs so why require a field testable device?

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Judson Collins, JULYCO, representing Woodford Manufacturing, requests Approval as Modified by this public comment.

Modify the proposal as follows:

Section 608.7 Valves and outlets prohibited below grade. Potable water out lets and combination stop-and-waste valves shall not be installed underground or below grade. Freezeproof yard hydrants that drain the riser into the ground are considered to be stop-and-waste valves.

Exception: Freezeproof yard hydrants that drain the riser into the ground shall be permitted to be installed, provided that the potable water supply to such hydrants is protected upstream of the hydrants ~~with a field testable backflow preventer assembly~~ in accordance with Section 608 and the hydrants are permanently identified as nonpotable outlets by approved signage that reads as follows: "Caution, Nonpotable Water. Do Not Drink."
Section 608.15.4.2 Hose connections. Sillcocks, hose bibs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type or pressure-type vacuum breaker, a two-check type backflow preventer or a permanently attached hose connection vacuum breaker. All devices used for such protection shall be field testable.

Commenter's Reason: Woodford Manufacturing commissioned a study that evaluated vacuum breakers in frost proof sillcocks conforming to ASSE 1019. The study dealt with frost proof sillcocks that had been installed for 5 or more years. It was determined that the vacuum breakers in the study, had a high probability of failure. Therefore property owners have no guarantee of backflow protection from ASSE 1019 devices and no way of testing to determine if the devices are working properly. Requiring a field testable backflow preventer for protection of hose connections will allow owners to determine if proper protection is being provided.

The following table and summary (listed on the next page) are taken from the report on the study.

Table 7
Complete Test Results For Each Sillcock
(An X indicates that the valve passed the particular test.)

Id. #	Backsiphonage Test	Low Head Back Pressure Test	Atmospheric Vent, Hydrostatic, and Water Flow & Pressure Loss Test	Complete Test Results
01	X	X	X	Passed
02	X			Failed
03	X			Failed
04	X		X	Failed
05				Failed
06	X			Failed
07	X			Failed
08	X		X	Failed
09				Failed
10				Failed
11	X			Failed
12	X		X	Failed
13	X	X		Failed
14				Failed
15	X	X		Passed[1]
16	X			Failed
17	X			Failed

Note 1. Because of the split tube, the sillcock could not be tested to the final three tests.

Summary: Testing of 17 frostproof sillcocks, removed after being installed for 5 or more years, in 3 different states, indicates that the ASSE 1019 standard does not provide an adequate test protocol to provide the minimum level of protection against backflow. The piston-type frostproof sillcocks, with backflow protection conforming to ASSE 1019, cannot be considered reliable after being installed for a period of 5 years. The public cannot be assured that the frostproof sillcocks will protect the potable water supply against backflow contamination.

The American Society of Sanitary Engineering and their Product Standards Committee should be notified of these test results. A request to either revise, or withdraw, the standard should be proposed to ASSE. Likewise, the model plumbing code organizations should be informed of the test results.

Public Comment 2:

Sidney Cavanaugh, Cavanaugh Consulting, representing Woodford, requests Approved as Submitted.

Commenter's Reason: The whole philosophy behind backflow protection is that it will always protect against the appropriate degree of hazard. This is done by field testing on an annual basis by qualified testers who also make repairs as needed during testing or by consumer field testing that can indicate whether the device is working properly or not. Independent testing has shown that many devices currently being used are not field testable and will fail unless repaired or replaced. It is time for the code to recognize this failure and demand proper protection of the potable water outlets covered.

Final Action: AS AM AMPC____ D

P86-09/10 – Part II
IRC P2902.4.3, P2903.9.5

Proposed Change as Submitted

Proponent: Judson Collins, JULYCO, representing Woodford Manufacturing Co.

PART II – IRC

Revise as follows:

P2902.4.3 Hose connection. Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type ~~or~~ vacuum breaker, a pressure-type vacuum breaker , a two-check type backflow preventer or a permanently attached hose connection vacuum breaker. All devices used for such protection shall be field testable.

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

P2903.9.5 Valves and outlets prohibited below grade. Potable water outlets and combination stop-and-waste valves shall not be installed underground or below grade. Freezeproof yard hydrants that drain the riser into the ground are considered to be stop-and-waste valves.

Exception: Installation of freezeproof yard hydrants that drain the riser into the ground shall be permitted if the potable water supply to such hydrants is protected upstream of the hydrants with a field testable backflow preventer assembly in accordance with Section P2902 and the hydrants are permanently identified as nonpotable outlets by *approved* signage that reads as follows: "Caution, Nonpotable Water. Do Not Drink."

Reason: A study that evaluated vacuum breakers after they were installed found that the frost proof sillcocks, conforming to ASSE 1019 that had been installed for 5 or more years, have a high probability of failure of the vacuum breaker. Therefore, property owners have no guarantee of backflow protection from ASSE 1019 devices and no way of testing to determine if the devices are working properly. Requiring a field testable backflow preventer, other than atmospheric-type vacuum breakers, for protection of hose connections will allow owners to determine if proper protection is being provided.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: COLLINS-P10-608.7

Public Hearing Results

PART II- IRC-P

Committee Action: **Disapproved**

Committee Reason: Testimony given indicated that ASSE 1019 device failure rate is 9 out of 10. While this points to a problem that needs to be looked into by the industry, it is too early to decide to make the code require a different type of backflow device for hose bibs.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment 1:

Judson Collins, JULYCO, representing Woodford Manufacturing, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

P2902.4.3 Hose connection. Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type vacuum breaker, a pressure-type vacuum breaker , a two-check type backflow preventer or a permanently attached hose connection vacuum breaker. All devices used for such protection shall be field testable.

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

P2903.9.5 Valves and outlets prohibited below grade. Potable water outlets and combination stop-and-waste valves shall not be installed underground or below grade. Freezeproof yard hydrants that drain the riser into the ground are considered to be stop-and-waste valves.

Exception: Installation of freezeproof yard hydrants that drain the riser into the ground shall be permitted if the potable water supply to such hydrants is protected upstream of the hydrants ~~with a field testable backflow preventer assembly~~ in accordance with Section P2902 and the hydrants are permanently identified as nonpotable outlets by approved signage that reads as follows: "Caution, Nonpotable Water. Do Not Drink."

Commenter's Reason: See P86-09/10, Part I

Public Comment 2:

Sidney Cavanaugh, Cavanaugh Consulting, representing Woodford, requests Approval as Submitted.

Commenter's Reason: See P86-09/10, Part I

Final Action: AS AM AMPC____ D

P92-09/10, Part I
202

Proposed Change as Submitted

Proponent: Michael S. Moss, American Backflow Prevention Association

PART I – IPC

1. Revise as follows:

BACKFLOW PREVENTER. A backflow prevention assembly, a device or other ~~means~~ methods to prevent backflow into the potable water supply.

CONTAMINATION. An impairment of the quality of potable water that creates a~~n~~ ~~actual~~ ~~hazard to the~~ public health risk through poisoning, ~~or~~ ~~through~~ the spread of disease ~~by~~ or contact with sewage, industrial fluids, ~~or~~ waste or radioactivity. See "*Pollution*".

POLLUTION. An impairment of the quality of potable water ~~to a degree~~ that does not create a ~~hazard to the~~ public health risk but that does adversely and unreasonably affect the aesthetic qualities of ~~such~~ potable water intended for ~~domestic use~~ drinking, bathing or culinary purposes. See "*Contamination*".

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENT~~ER~~ION ASSEMBLY. A backflow prevention ~~device~~ assembly consisting of two independently acting check valves, internally ~~force-~~loaded to a normally closed position and separated by an intermediate chamber with a ~~(or~~ zone~~)~~ of reduced pressure. ~~in which there is~~ The reduced pressure zone is provided with an automatic ~~relief~~ means of venting to the atmosphere, internally loaded to a normally open position between two tightly closing shutoff valves and with a means for testing for tightness of the checks and opening of the relief means.

2. Add new definitions as follows:

HAZARD, DEGREE OF

High or Health. A condition or arrangement that could cause contamination of a potable water supply or system supply. See "*Contamination*".

Low or Non-health. A condition or arrangement that could cause pollution of a potable water supply or system supply. See "*Pollution*".

Reason: BACKFLOW PREVENTER: The change in this term's definition is necessary to better understand the use of Table 608.1(IRC Table P2902.3) APPLICATION OF BACKFLOW PREVENTERS. I have submitted a companion proposal for rearranging the information in Table 608.1 to show that BACKFLOW PREVENTERS are categorized in three groups: Backflow Prevention Assemblies, Backflow Devices, and Other Methods. The purpose of the three groupings is to illustrate that Backflow Prevention Assemblies are field testable (having shutoff valves and test cock fittings), Backflow Devices are not field testable; and Other Methods are not field testable but by observation, can be determined that proper backflow protection exists.

CONTAMINATION and POLLUTION: Table 608.1 (IRC Table P2902.3) has a footnote concerning the relationship between the terms "high" and "low" hazard and the defined terms of CONTAMINATION and POLLUTION, respectively. The backflow prevention community also uses the terms "health hazard" and "non-health hazard" in describing applications and connections. The proposed amendments to these definitions are necessary so that code officials, backflow prevention specialists, plumbers and plumbing system designers clearly understand the relationships between these terms and are able to properly select appropriate backflow preventers in accordance with the table.

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY: This definition needs changed to be in alignment with the 3 groups of Backflow Preventers that are identified in the proposed amended definition of BACKFLOW PREVENTER and the proposed rearrangement of Table 608.1. For the IRC, the term "REDUCED PRESSURE-ZONE BACKFLOW PREVENTER" is not found in the IRC text, therefore, the term is being corrected to match terminology corrections that are being proposed by companion proposals for numerous code sections.

All proposed changes in the above definitions have no technical impact. These changes, along with other proposed companion changes are necessary to provide meaningful and consistent terminology throughout the code for better understanding of the application of backflow preventers.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Moss-P1-202

Public Hearing Results

PART I- IPC

Committee Action: **Disapproved**

Committee Reason: Conflicts with existing code language and will cause confusion.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael S. Moss, representing American Backflow Prevention Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

CONTAMINATION. An impairment of the quality of potable water that creates public health risk through poisoning, the spread of disease or contact with sewage, industrial fluids, waste or radioactivity. ~~See "Pollution".~~ An arrangement that could cause contamination of potable water to occur is referred to as a high hazard or health hazard condition.

POLLUTION. An impairment of the quality of the potable water that does not create public health risk but that does adversely and unreasonably affect the aesthetic qualities of potable water intended for drinking, bathing or culinary purposes. ~~See "Contamination".~~ An arrangement that could cause pollution of potable water to occur is referred to as a low hazard or non-health hazard condition.

Commenter's Reason: There was considerable confusion during the code hearing concerning the ASSE Standards. An individual provided testimony against the proposal to the Committee and was in error. The ASSE Plumbing Standards Magazine provides that organizations standardized titles and approval dates. The representative's error appeared to take credibility from the proposals presented. The titles for assemblies and devices used for the code proposals have been published for several years and have been current for a considerable period of time. I do not believe the representative had read the ABPA "reasoning" which was clearly published in the ICC information provided to all who were in the hearings. On the other hand, had the representative read the published information and had other reasons to make his statements this should definitely be brought to the attention of both the ICC Committee and THE PUBLIC for open clarification of the matter. However, after the fourth proposal, the committee approved the remaining code proposals. All of the proposals received are consistent, as submitted, as a package. Part II of the P95 proposal was approved by the respective committee. This is inconsistent as both parts are the same language in their respective code. The terminology is consistent with industry, the code and those who utilize the code. I recommend that this proposal and those additional proposals be accepted as submitted or as modified.

Final Action: AS AM AMPC____ D

P92-09/10-Part II
IRC 202

Proposed Change as Submitted

Proponent: Michael S. Moss, American Backflow Prevention Association

PART II – IRC

1. Revise as follows:

BACKFLOW PREVENTER. A backflow prevention assembly, a device or other ~~means~~ methods to prevent backflow into the potable water supply.

CONTAMINATION. An impairment of the quality of potable water that creates a~~n~~ ~~actual~~ ~~hazard to the~~ public health risk through poisoning, ~~or~~ ~~through~~ the spread of disease ~~by~~ or contact with sewage, industrial fluids, ~~or~~ waste or radioactivity. See "*Pollution*".

POLLUTION. An impairment of the quality of potable water ~~to a degree~~ that does not create a ~~hazard to the~~ public health risk but that does adversely and unreasonably affect the aesthetic qualities of ~~such~~ potable water intended for ~~domestic use~~ drinking, bathing or culinary purposes. See "*Contamination*".

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENT~~ER~~ION ASSEMBLY. A backflow prevention ~~device~~ assembly consisting of two independently acting check valves, internally ~~force-~~loaded to a normally closed position and separated by an intermediate chamber with a ~~(or~~ zone~~)~~ of reduced pressure. ~~in which there is~~ The reduced pressure zone is provided with an automatic ~~relief~~ means of venting to the atmosphere, internally loaded to a normally open position between two tightly closing shutoff valves and with a means for testing for tightness of the checks and opening of the relief means.

2. Add new definitions as follows:

HAZARD, DEGREE OF

High or Health. A condition or arrangement that could cause contamination of a potable water supply or system supply. See "*Contamination*".

Low or Non-health. A condition or arrangement that could cause pollution of a potable water supply or system supply. See "*Pollution*".

Reason: BACKFLOW PREVENTER: The change in this term's definition is necessary to better understand the use of Table 608.1(IRC Table P2902.3) APPLICATION OF BACKFLOW PREVENTERS. I have submitted a companion proposal for rearranging the information in Table 608.1 to show that BACKFLOW PREVENTERS are categorized in three groups: Backflow Prevention Assemblies, Backflow Devices, and Other Methods. The purpose of the three groupings is to illustrate that Backflow Prevention Assemblies are field testable (having shutoff valves and test cock fittings), Backflow Devices are not field testable; and Other Methods are not field testable but by observation, can be determined that proper backflow protection exists.

CONTAMINATION and POLLUTION: Table 608.1 (IRC Table P2902.3) has a footnote concerning the relationship between the terms "high" and "low" hazard and the defined terms of CONTAMINATION and POLLUTION, respectively. The backflow prevention community also uses the terms "health hazard" and "non-health hazard" in describing applications and connections. The proposed amendments to these definitions are necessary so that code officials, backflow prevention specialists, plumbers and plumbing system designers clearly understand the relationships between these terms and are able to properly select appropriate backflow preventers in accordance with the table.

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY: This definition needs changed to be in alignment with the 3 groups of Backflow Preventers that are identified in the proposed amended definition of BACKFLOW PREVENTER and the proposed rearrangement of Table 608.1. For the IRC, the term "REDUCED PRESSURE-ZONE BACKFLOW PREVENTER" is not found in the IRC text, therefore, the term is being corrected to match terminology corrections that are being proposed by companion proposals for numerous code sections.

All proposed changes in the above definitions have no technical impact. These changes, along with other proposed companion changes are necessary to provide meaningful and consistent terminology throughout the code for better understanding of the application of backflow preventers.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Moss-P1-202

Public Hearing Results

PART II- IRC-P
Committee Action: **Disapproved**

Committee Reason: Wording is inconsistent and confusing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael S. Moss, representing American Backflow Prevention Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

CONTAMINATION. An impairment of the quality of potable water that creates public health risk through poisoning, the spread of disease or contact with sewage, industrial fluids, waste or radioactivity. ~~See "Pollution".~~ An arrangement that could cause contamination of potable water to occur is referred to as a high hazard or health hazard condition.

POLLUTION. An impairment of the quality of the potable water that does not create public health risk but that does adversely and unreasonably affect the aesthetic qualities of potable water intended for drinking, bathing or culinary purposes. ~~See "Contamination".~~ An arrangement that could cause pollution of potable water to occur is referred to as a low hazard or non-health hazard condition.

Commenter's Reason: See P92-09/10, Part I

Final Action: AS AM AMPC____ D

P93-09/10, Part I
Table 608.1, 608.13.6

Proposed Change as Submitted

Proponent: Michael S. Moss of the American Backflow Prevention Association

PART I - IPC

1. Revise table as follows:

TABLE 608.1
APPLICATION OF BACKFLOW PREVENTERS

BACKFLOW PREVENTION ASSEMBLIES			
DEVICE	**DEGREE OF HAZARD**[a]		**APPLICABLE STANDARDS**
Double check backflow prevention assembly ~~and~~ Double check fire protection backflow prevention assembly	Low hazard		ASSE 1015, AWWA C510, CSA B64.5, CSA B64.5.1
Double check detector fire protection backflow prevention assembl~~ies~~y	Low hazard		ASSE 1048
Pressure vacuum breaker assembly	High or low hazard		ASSE 1020, CSA B64.1.2
Reduced pressure principle backflow prevent~~er~~ion assembly ~~and~~ Reduced pressure principle fire protection backflow prevent~~er~~ion assembly	High or low hazard		ASSE 1013, AWWA C511, CAN/CSA B64.4, CSA B64.4.1
Reduced pressure detector fire protection backflow prevention assembly	High or low hazard		ASSE 1047
Spill~~proof~~ –resistant vacuum breaker assembly	High or low hazard		ASSE 1056

BACKFLOW PREVENTER DEVICES			
DEVICE	**DEGREE OF HAZARD[a]**		**APPLICABLE STANDARDS**
Antisiphon~~-type~~ fill valve~~s~~ for gravity water closet flush tanks	High hazard		ASSE 1002, CSA B125.3
~~Pipe-applied~~ Atmospheric vacuum breaker	High or low hazard		ASSE 1001, CAN/CSA B64.1.1
Backflow preventer for ~~carbonated~~ beverage dispensing equipment ~~machines~~	Low hazard		ASSE 1022
Backflow preventer with intermediate atmospheric vents	Low hazard		ASSE 1012, CAN/CSA B64.3
Dual check valve type backflow preventer	Low hazard		ASSE 1024, CSA B64.6
Hose connection backflow preventer	~~High or~~ Low hazard		ASSE 1052, CSA B64.2.1.1
Hose connection vacuum breaker	~~High or~~ Low hazard		ASSE 1011, CAN/CSA B64.2, CSA B64.2.1
Laboratory faucet backflow preventer	~~High or~~ Low hazard		ASSE 1035, CSA B64.7
Vacuum breaker wall hydrant~~s~~, ~~frost~~ freeze-resistant, automatic draining type	~~High or~~ Low hazard		ASSE 1019, CAN/CSA B64.2.2
OTHER METHODS			
DEVICE	**DEGREE OF HAZARD[a]**		**APPLICABLE STANDARDS**
Air gap	High or low hazard		ASME A112.1.2
Air gap fitting~~s~~ for use with plumbing fixtures, appliances and appurtenances	High or low hazard		ASME A112.1.3
Barometric loop	High or low hazard		(See Section 608.13.4)

(Portions of table not shown remain unchanged)

2. Revise as follows:

608.13.6 Atmospheric~~-type~~ vacuum breakers. ~~Pipe-applied~~ Atmospheric~~-type~~ vacuum breakers shall conform to ASSE 1001 or CAN/CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CAN/CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CAN/CSA B64.2.2 or CSA B64.7. These devices shall operate under normal atmospheric pressure when the critical level is installed at the required height.

Reason: There is much confusion concerning protection provided by any 'backflow preventer'. This table would better identify proper and correct applications by identifying the different protection methods: assemblies, plumbing devices and other methods. The existing table gives the mistaken understanding that "any of the above provides adequate protection for any job". This is not true. Adequate protection is based on hazard classification, application and proper installation. Backflow prevention assemblies are specifically recognized and accepted as separate and distinct units based on Section 312.10.2 because of their requirement for periodic testing to ensure proper and reliable operation in order to protect public health. Titles are in accordance with ASSE Standards listing from Plumbing Standards magazine January-March 2009.

No new assemblies, devices or means have been added to Table 608.1 and none have been deleted. The assemblies, devices and methods are simply grouped in 3 categories for simplicity and better understanding as to how they are to be applied. The HIGH hazard was taken off the hose connection backflow preventer, the hose connection vacuum breaker and the laboratory faucet vacuum breaker as these devices are never suitable for high hazard applications. Section 608.13.6 (IRC Section P2902.3.2) was revised to align the terminology to the standards and Table 608.1 (IRC Table P2902.3) as well as eliminate the confusing term "pipe-applied".

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MOSS-P18-605.3.1

Public Hearing Results

PART I- IPC
Committee Action: Disapproved

Committee Reason: Proponent stated that he wants to clean up table at a later date. There was some concern about "high hazard" being removed from some entries.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael S. Moss representing the American Backflow Prevention Association requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

TABLE 608.1
APPLICATION OF BACKFLOW PREVENTERS

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Air gap	High or low hazard	Backsiphonage or backpressure	ASME A112.1.2
Air gap fitting~~s~~ for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backsiphonage or backpressure	ASME A112.1.3
Antisiphon fill valve~~s~~ for ~~gravity~~ water closet tank~~s~~	High hazard	Backsiphonage only	ASSE 1002, CSA B125.3
Backflow preventer for ~~carbonated~~ beverage ~~machines~~ dispensing equipment	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 3/8 "	ASSE 1022
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 3/4"	ASSE 1012, CAN/CSA B64.3
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.13.4)
Double check backflow prevention assembly and double check fire protection backflow prevention assembly	Low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1015, AWWA C510, CSA B64.5, CSA B64.5.1
Double check detector fire protection backflow prevention assembl~~ies~~y	Low hazard	Backpressure or backsiphonage (Fire sprinkler systems) Sizes 2" - 16"	ASSE 1048
~~Dual-check-valve-type~~ Dual check backflow preventer	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 1"	ASSE 1024, CSA B64.6
Hose connection backflow preventer	High or low hazard	Low head backpressure, rated working pressure, backpressure or backsiphonage Sizes 1/2", 1"	ASSE 1052, CSA B64.2.1.1
Hose connection vacuum breaker	High or low hazard	Low head backpressure or backsiphonage Sizes 1/2", 3/4", 1"	ASSE 1011, CAN/CSA B64.2, CSA B64.2.1
Laboratory faucet backflow preventer~~s~~	High or low hazard	Low head backpressure and backsiphonage	ASSE 1035, CSA B64.7
~~Pipe-applied~~ Atmospheric-type vacuum breaker	High or low hazard	Backsiphonage only Sizes 1/4" - 4"	ASSE 1001, CAN/CSA B64.1.1
Pressure vacuum breaker assembly	High or low hazard	Backsiphonage only Sizes 1/2" - 2"	ASSE 1020, CSA B64.1.2
Reduced pressure detector fire protection backflow prevention assembl~~ies~~y	High or low hazard	Backsiphonage or backpressure (Fire sprinkler systems)	ASSE 1047

Reduced pressure principle backflow prevent~~er~~ion assembly and reduced pressure principle fire protection backflow prevent~~er~~ion assembly	High or low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1013, AWWA C511, CAN/CSA B64.4, CSA B64.4.1
Spill~~proof~~ resistant vacuum breaker assembly	High or low hazard	Backsiphonage only Sizes 1/4" -2"	ASSE 1056
Vacuum breaker wall hydrant~~s~~, fr~~ost~~eeze-resistant, automatic draining type	High or low hazard	Low head backpressure or backsiphonage Sizes 3/4", 1"	ASSE 1019, CAN/CSA B64.2.2

For SI: 1 inch = 25.4 mm

a. Low Hazard - See Pollution (Section 202)
High Hazard - See Contamination (Section 202)

b. See Backpressure (Section 202)
See Backpressure, low head (Section 202)
See Backsiphonage (Section 202)

608.13.6 Atmospheric-type vacuum breakers. ~~Pipe-applied~~ Atmospheric-type vacuum breakers shall conform to ASSE 1001 or CAN/CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. These devices shall operate under normal atmospheric pressure when the critical level is installed at the required height.

Commenter's Reason: There was considerable confusion during the code hearing concerning the ASSE Standards. An individual provided testimony against the proposal to the Committee and was in error. The ASSE Plumbing Standards Magazine provides that organizations standardized titles and approval dates. The representative's error appeared to take credibility from the proposals presented. The titles for assemblies and devices used for the code proposals have been published for several years and have been current for a considerable period of time. I do not believe the representative had read the ABPA "reasoning" which was clearly published in the ICC information provided to all who were in the hearings. On the other hand, had the representative read the published information and had other reasons to make his statements this should definitely be brought to the attention of both the ICC Committee and THE PUBLIC for open clarification of the matter. However, after the fourth proposal, the committee approved the remaining code proposals. All of the proposals received are consistent, as submitted, as a package. Part II of this proposal was approved by the respective committee. This is inconsistent as both parts are the same language in their respective code. The terminology is consistent with industry, the code and those who utilize the code. I recommend that this proposal and those additional proposals be accepted as modified.

Final Action: AS AM AMPC____ D

P93-09/10-PART II

IRC Table P2902.3, P2902.3.2

Proposed Change as Submitted

Proponent: Michael S. Moss of the American Backflow Prevention Association

PART II – IRC

1. Revise table as follows:

TABLE P2902.3
APPLICATION OF BACKFLOW PREVENTERS

BACKFLOW PREVENTION ASSEMBLIES			
DEVICE	**DEGREE OF HAZARD[a]**		**APPLICABLE STANDARDS**
Double check backflow prevention assembly ~~and~~ Double check fire protection backflow prevention assembly	Low hazard		ASSE 1015, AWWA C510, CSA B64.5, CSA B64.5.1
Double check detector fire protection backflow prevention assembl~~ies~~y	Low hazard		ASSE 1048
Pressure vacuum breaker assembly	High or low hazard		ASSE 1020, CSA B64.1.2
Reduced pressure principle backflow prevent~~er~~ion assembly ~~and~~ Reduced pressure principle fire protection backflow prevent~~er~~ion	High or low hazard		ASSE 1013, AWWA C511, CAN/CSA B64.4, CSA B64.4.1

assembly			
Reduced pressure detector fire protection backflow prevention assembly	High or low hazard		ASSE 1047
Spill~~proof~~ –resistant vacuum breaker assembly	High or low hazard		ASSE 1056
BACKFLOW PREVENTER DEVICES			
DEVICE	**DEGREE OF HAZARD[a]**		**APPLICABLE STANDARDS**
Antisiphon~~-type~~ fill valve~~s~~ for gravity water closet flush tanks	High hazard		ASSE 1002, CSA B125.3
~~Pipe-applied~~ Atmospheric vacuum breaker	High or low hazard		ASSE 1001, CAN/CSA B64.1.1
Backflow preventer with intermediate atmospheric vents	Low hazard		ASSE 1012, CAN/CSA B64.3
Dual check valve type backflow preventer	Low hazard		ASSE 1024, CSA B64.6
Hose connection backflow preventer	~~High or~~ Low hazard		ASSE 1052, CSA B64.2.1.1
Hose connection vacuum breaker	~~High or~~ Low hazard		ASSE 1011, CAN/CSA B64.2, CSA B64.2.1
Laboratory faucet backflow preventer	~~High or~~ Low hazard		ASSE 1035, CSA B64.7
OTHER METHODS			
DEVICE	**DEGREE OF HAZARD[a]**		**APPLICABLE STANDARDS**
Air gap	High or low hazard		ASME A112.1.2
Air gap fitting~~s~~ for use with plumbing fixtures, appliances and appurtenances	High or low hazard		ASME A112.1.3

(Portions of table not shown remain unchanged)

2. Revise as follows:

P2902.3.2 Atmospheric~~-type~~ vacuum breakers. ~~Pipe-applied~~ Atmospheric~~-type~~ vacuum breakers shall conform to ASSE 1001 or CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. These devices shall operate under normal atmospheric pressure when the critical level is installed at the required height.

Reason: There is much confusion concerning protection provided by any 'backflow preventer'. This table would better identify proper and correct applications by identifying the different protection methods: assemblies, plumbing devices and other methods. The existing table gives the mistaken understanding that "any of the above provides adequate protection for any job". This is not true. Adequate protection is based on hazard classification, application and proper installation. Backflow prevention assemblies are specifically recognized and accepted as separate and distinct units based on Section 312.10.2 because of their requirement for periodic testing to ensure proper and reliable operation in order to protect public health. Titles are in accordance with ASSE Standards listing from Plumbing Standards magazine January-March 2009.

No new assemblies, devices or means have been added to Table 608.1 and none have been deleted. The assemblies, devices and methods are simply grouped in 3 categories for simplicity and better understanding as to how they are to be applied. The HIGH hazard was taken off the hose connection backflow preventer, the hose connection vacuum breaker and the laboratory faucet vacuum breaker as these devices are never suitable for high hazard applications. Section 608.13.6 (IRC Section P2902.3.2) was revised to align the terminology to the standards and Table 608.1 (IRC Table P2902.3) as well as eliminate the confusing term "pipe-applied".

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MOSS-P18-605.3.1

Public Hearing Results

PART II- IRC-P
Committee Action: **Disapproved**

Committee Reason: Proponent stated that he wants to clean up table at a later date.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael S. Moss representing the American Backflow Prevention Association requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

TABLE P2902.3
APPLICATION FOR BACKFLOW PREVENTERS

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Air gap	High or low hazard	Backsiphonage or backpressure	ASME A112.1.2
Air gap fitting~~s~~ for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backsiphonage or backpressure	ASME A112.1.3
Antisiphon fill valve~~s~~ for ~~gravity~~ water closet tank~~s~~	High hazard	Backsiphonage only	ASSE 1002, CSA B125.3
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 3/4"	ASSE 1012, CAN/CSA B64.3
Double check backflow prevention assembly and double check fire protection backflow prevention assembly	Low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1015, AWWA C510, CSA B64.5, CSA B64.5.1
Double check detector fire protection backflow prevention assembl~~ies~~y	Low hazard	Backpressure or backsiphonage (Fire sprinkler systems) Sizes 2" - 16"	ASSE 1048
~~Dual-check-valve-type~~ Dual check backflow preventer	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 1"	ASSE 1024, CSA B64.6
Hose connection backflow preventer	High or low hazard	Low head backpressure, rated working pressure, backpressure or backsiphonage Sizes 1/2", 1"	ASSE 1052, CSA B64.2.1.1
Hose connection vacuum breaker	High or low hazard	Low head backpressure or backsiphonage Sizes 1/2", 3/4", 1"	ASSE 1011, CAN/CSA B64.2, CSA B64.2.1
Laboratory faucet backflow preventer~~s~~	High or low hazard	Low head backpressure and backsiphonage	ASSE 1035, CSA B64.7
~~Pipe-applied~~ Atmospheric-type vacuum breaker	High or low hazard	Backsiphonage only Sizes 1/4" - 4"	ASSE 1001, CAN/CSA B64.1.1
Pressure vacuum breaker assembly	High or low hazard	Backsiphonage only Sizes 1/2" - 2"	ASSE 1020, CSA B64.1.2
Reduced pressure detector fire protection backflow prevention assembl~~ies~~y	High or low hazard	Backsiphonage or backpressure (Fire sprinkler systems)	ASSE 1047
Reduced pressure principle backflow prevent~~er~~ion assembly and reduced pressure principle fire protection backflow prevent~~er~~ion assembly	High or low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1013, AWWA C511, CAN/CSA B64.4, CSA B64.4.1
Spill~~proof~~ resistant vacuum breaker assembly	High or low hazard	Backsiphonage only Sizes 1/4" -2"	ASSE 1056
Vacuum breaker wall hydrant~~s~~, fr~~ost~~eeze-resistant, automatic draining type	High or low hazard	Low head backpressure or backsiphonage Sizes 3/4", 1"	ASSE 1019, CAN/CSA B64.2.2

For SI: 1 inch = 25.4 mm
a. Low Hazard - See Pollution (Section 202)
High Hazard - See Contamination (Section 202)
b. See Backpressure (Section 202)
See Backpressure, low head (Section 202)
See Backsiphonage (Section 202)

P2902.3.2 Atmospheric-type vacuum breakers. ~~Pipe-applied~~ Atmospheric-type vacuum breakers shall conform to ASSE 1001 or CAN/CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. These devices shall operate under normal atmospheric pressure when the critical level is installed at the required height.

Commenter's Reason: See P93-09/10, Part I

Final Action: AS AM AMPC____ D

P94-09/10-PART I
608.13.7, 608.15.4.1, 608.15.4.2

Proposed Change as Submitted

Proponent: Michael S. Moss of the American Backflow Prevention Association

PART I - IPC

Revise as follows:

608.13.7 Double check~~-valve~~ backflow prevention assemblies. Double check~~-valve~~ backflow prevention assemblies shall conform to ASSE 1015, CSA B64.5, CSA B64.5.1 or AWWA C510. Double~~-detector~~ check~~-valve~~ detector backflow prevention assemblies shall conform to ASSE 1048. These devices shall be capable of operating under continuous pressure conditions.

608.15.4.1 Deck-mounted and integral vacuum breakers. *Approved* deck-mounted or equipment-mounted vacuum breakers and faucets with integral atmospheric vacuum breakers or integral spill~~proof~~ –resistant vacuum breaker~~s~~ assemblies shall be installed in accordance with the manufacturer's instructions and the requirements for labeling.~~ with~~ The critical level of the breakers and assemblies shall be located at not less than 1 inch (25 mm) above the *flood level rim*.

608.15.4.2 Hose connections. Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric~~-type~~ vacuum breaker, ~~or~~ a pressure~~-type~~ vacuum breaker assembly or a permanently attached hose connection vacuum breaker.

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MOSS-P19-608.13.7

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: Language is not consistent with current ASSE Standards.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael S. Moss, representing the American Backflow Prevention Association, requests Approval as Submitted.

Commenter's Reason: There was considerable confusion during the code hearing concerning the ASSE Standards. An individual provided testimony against the proposal to the Committee and was in error. The ASSE Plumbing Standards Magazine provides that organizations standardized titles and approval dates. The representative's error appeared to take credibility from the proposals presented. The titles for assemblies and devices used for the code proposals have been published for several years and have been current for a considerable period of time. I do not believe the representative had read the ABPA "reasoning" which was clearly published in the ICC information provided to all who were in the hearings. On the other hand, had the representative read the published information and had other reasons to make his statements this should definitely be brought to the attention of both the ICC Committee and THE PUBLIC for open clarification of the matter. However, after the fourth proposal, the committee approved the remaining code proposals. All of the proposals received are consistent, as submitted, as a package. Part II of this proposal was approved by the respective committee. This is inconsistent as both parts are the same language in their respective code. The terminology is consistent with industry, the code and those who utilize the code. I recommend that this proposal and those additional proposals be accepted as submitted

Final Action: AS AM AMPC____ D

P94-09/10, Part II
IRC P2902.3.6, P2902.4, P2902.4.2, P2904.4.3, P2902.5.5

Proposed Change as Submitted

Proponent: Michael S. Moss of the American Backflow Prevention Association

PART II – IRC

Revise as follows:

P2902.3.6 Double check~~-valve~~ backflow prevention assemblies. Double check~~-valve~~ backflow prevention assemblies shall conform to ASSE 1015, CSA B64.5, CSA B64.5.1 or AWWA C510. Double~~-detector~~ check~~-valve~~ detector backflow prevention assemblies shall conform to ASSE 1048. These devices shall be capable of operating under continuous pressure conditions.

P2902.4 Protection of potable water outlets. Potable water openings and outlets shall be protected by an air gap, a reduced pressure principle backflow prevent~~er~~ion assembly ~~with atmospheric vent~~, an atmospheric~~-type~~ vacuum breaker, a pressure~~-type~~ vacuum breaker assembly or a hose connection backflow preventer.

P2902.4.2 Deck-mounted and integral vacuum breakers. *Approved* deck-mounted or equipment-mounted vacuum breakers and faucets with integral atmospheric vacuum breakers or integral spill~~proof~~ –resistant vacuum breaker~~s~~ assemblies shall be installed in accordance with the manufacturer's instructions and the requirements for labeling.~~-with~~ The critical level of the breakers and assemblies shall be located at not less than 1 inch (25 mm) above the *flood level rim*.

P2902.4.3 Hose connections. Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection threads shall be protected by an atmospheric~~-type~~ vacuum breaker, ~~or~~ a pressure~~-type~~ vacuum breaker assembly or a permanently attached hose connection vacuum breaker.

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

P2902.5.5 Solar systems. The potable water supply to a solar system shall be equipped with a backflow preventer with intermediate atmospheric vents complying with ASSE 1012 or a reduced pressure principle backflow prevent~~er~~ion assembly complying with ASSE 1013. Where chemicals are used, the potable water supply shall be protected by a reduced pressure principle backflow prevent~~er~~ion assembly.

> **Exception:** Where all solar system piping is a part of the potable water distribution system, in accordance with the requirements of the *International Plumbing Code*, and all components of the piping system are listed for potable water use, ~~cross-connection protection measures~~ backflow protection shall not be required.

Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MOSS-P19-608.13.7

Public Hearing Results

PART II- IRC-P
Committee Action: **Disapproved**

Committee Reason: It is unclear as to whether the terminology aligns with the nationally recognized standards.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael S. Moss representing the American Backflow Prevention Association requests Approval as Submitted.

Commenter's Reason: See P94-09/10, Part I

Final Action: AS AM AMPC____ D

P95-09/10, Part I
608.13.2

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I

Proposed Change as Submitted

Proponent: Michael S. Moss of the American Backflow Prevention Association

PART I - IPC

Revise as follows:

608.13.2 Reduced pressure principle backflow prevent~~ers~~ion assemblies. Reduced pressure principle backflow prevent~~ers~~ion assemblies and reduced pressure principle fire protection backflow prevent~~ers~~ion assemblies shall conform to ASSE 1013, AWWA C511, CSA B64.4 or CSA B64.4.1. Reduced pressure detector fire protection ~~assembly~~ backflow prevent~~ers~~ion assemblies shall conform to ASSE 1047. These devices shall be permitted to be installed where subject to continuous pressure conditions. The relief opening shall discharge by air gap and shall be prevented from being submerged.

Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Moss-P7-608.13.2

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: A survey of ASSE and other backflow industry people revealed that they had no idea what was meant by the device terminology used in the proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael S. Moss representing the American Backflow Prevention Association requests Approval as Submitted.

Commenter's Reason: There was considerable confusion during the code hearing concerning the ASSE Standards. An individual provided testimony against the proposal to the Committee and was in error. The ASSE Plumbing Standards Magazine provides that organizations standardized titles and approval dates. The representative's error appeared to take credibility from the proposals presented. The titles for assemblies and devices used for the code proposals have been published for several years and have been current for a considerable period of time. I do not believe the representative had read the ABPA "reasoning" which was clearly published in the ICC information provided to all who were in the hearings. On the other hand, had the representative read the published information and had other reasons to make his statements this should definitely be brought to the attention of both the ICC Committee and THE PUBLIC for open clarification of the matter. However, after the fourth proposal, the committee approved the remaining code proposals. All of the proposals received are consistent, as submitted, as a package. Part II of this proposal was approved by the respective committee. This is inconsistent as both parts are the same language in their respective code. The terminology is consistent with industry, the code and those who utilize the code. I recommend that this proposal and those additional proposals be accepted as submitted.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

P95-09/10, PART II- IRC

Revise as follows:

P2902.3.5 Reduced pressure principle backflow prevent~~ers~~ion assemblies. Reduced pressure principle backflow prevent~~ers~~ion assemblies and reduced pressure principle fire protection backflow prevent~~ers~~ion assemblies shall conform to ASSE 1013, AWWA C511, CSA B64.4 or CSA B64.4.1. Reduced pressure detector fire protection ~~assembly~~ backflow prevent~~ers~~ion assemblies shall conform to ASSE 1047. These devices shall be permitted to be installed where subject to continuous pressure conditions. The relief opening shall discharge by air gap and shall be prevented from being submerged.
Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

PART II- IRC-P
Committee Action: **Approved as Submitted**

Committee Reason: Agreed with the proponent's reason statement which was to provide for consistent terminology throughout the code.

Assembly Action: **None**

P102-09/10, Part I
608.6

Proposed Change as Submitted

Proponent: Michael S. Moss of the American Backflow Prevention Association

PART I - IPC

Revise as follows:

608.6 Cross-connection control. Cross connections shall be prohibited, except where approved ~~protective~~ backflow preventers ~~devices~~ are installed to protect the potable water supply.

Reason: Because the term "Protective devices" is not included in the definitions, this change clarifies the intent of Section 608.6. The change for the definition of "Backflow preventer" makes the definition more descriptive and precise.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Moss-P2-608.6

Public Hearing Results

PART I- IPC
Committee Action: **Approved as Submitted**

Committee Reason: Eliminates cloudy wording and clearly specifies that a backflow device is needed where cross connections are made.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing the Home Ventilating Institute, requests Approval as Modified by this public comment.

Modify the proposal as follows:

608.6 Cross-connection control. Cross connections shall be prohibited, except where approved ~~backflow preventers~~ methods are installed to protect the potable water supply.

Commenter's Reason: While I agree with the proponent that the language needs correcting, it would appear that the use of the term, "backflow preventers" would be inappropriate. The most common method of preventing backflow is an air gap. This would not be considered a backflow preventer, but would be considered and approved method of backflow protection. Another method identified that is not a backflow preventer is a barometric loop.

Final Action: AS AM AMPC____ D

P102-09/10, Part II
IRC P2902.1

Proposed Change as Submitted

Proponent: Michael S. Moss of the American Backflow Prevention Association

PART II - IRC

Revise as follows:

P2902.1 General. A potable water supply system shall be designed and installed as to prevent contamination from nonpotable liquids, solids or gases being introduced into the potable water supply. Connections shall not be made to a potable water supply in a manner that could contaminate the water supply or provide a cross-connection between the supply and a source of contamination ~~unless an *approved* backflow-prevention device~~ <u>except where approved backflow preventers are installed to protect the potable water supply.</u> ~~is provided.~~ Cross-connections between an individual water supply and a potable public water supply shall be prohibited.

Reason: Because the term "Protective devices" is not included in the definitions, this change clarifies the intent of Section 608.6. The change for the definition of "Backflow preventer" makes the definition more descriptive and precise.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Moss-P2-608.6

Public Hearing Results

PART II- IRC-P
Committee Action: **Approved as Submitted**

Committee Reason: Proposed language makes the terminology of the code consistent with the standards.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing the Home Ventilating Institute, requests Approval as Modified by this public comment.

Modify the proposal as follows:

P2902.1 General. A potable water supply system shall be designed and installed as to prevent contamination from nonpotable liquids, solids or gases being introduced into the potable water supply. Connections shall not be made to a potable water supply in a manner that could contaminate the water supply or provide a cross-connection between the supply and a source of contamination except where approved ~~backflow preventers~~ <u>methods</u> are installed to protect the potable water supply. Cross-connections between an individual water supply and a potable public water supply shall be prohibited

Commenter's Reason: See P102-09/10, Part I

Final Action: AS AM AMPC____ D

P105-09/10
608.15.2

Proposed Change as Submitted

Proponent: Michael S. Moss of the American Backflow Prevention Association

Revise as follows:

608.15.2 Protection by ~~a~~ reduced pressure principle backflow prevent~~er~~ion assembly. Openings and outlets shall be protected by a reduced pressure principle backflow prevent~~er~~ion assembly on potable water supplies or by a reduced pressure principle fire protection backflow prevention assembly on dedicated fire line water supplies.

Reason: To provide consistent terminology throughout the code for reference and comparison.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Agreed with the proponent's reason statement which stated that the change was needed for consistency in terminology throughout the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing the Home Ventilating Institute, requesting Approval as Modified by this public comment.

Modify the proposal as follows:

608.15.2 Protection by reduced pressure principle backflow prevention assembly. Openings and outlets shall be protected by a reduced pressure principle backflow prevention assembly or a reduced pressure principle fire protection backflow prevention assembly on potable water supplies ~~or by a reduced pressure principle fire protection backflow prevention assembly on dedicated fire line water supplies~~.

Commenter's Reason: The proponent is correct in identifying a reduce pressure principle fire protection backflow prevention assembly, however, this valve is not limited to dedicated fire line water supplies. The valve can be used on any water supply. Furthermore a reduced pressure principle backflow preventer can be used on a fire sprinkler or standpipe water supply. The difference between the two valves is in the pressure loss at high rates of flow. The backflow performance is the same for both valves.

Final Action: AS AM AMPC____ D

P107-09/10
608.18

Proposed Change as Submitted

Proponent: Robert Burke University of Colorado representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Add new text as follows:

608.18 Dead ends. Dead ends exceeding 4 feet in developed length shall be prohibited unless protected by an approved backflow preventer .

Reason: Stagnant water is unhealthy and a prime cause of Legionella disease. ASHRAE Standard 12-200 addresses this issue; minimizing the risk of Legionellosis associated with building water system.

Cost Impact: The cost impact to construction will be minimal.

ICCFILENAME: Burke-P3-608.18

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: A backflow preventer will not work under these conditions. There are other ways to isolate dead ends such as valve.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert Burke, University of Colorado, representing CAPMO requests Approval As Modified by this public comment.

Modify the proposal as follows:

Dead ends exceeding 4 feet in developed length shall be prohibited ~~unless protected by an approved backflow preventer~~.

Commenter's Reason: Stagnant water is unhealthy and a prime cause of legionella disease. ASHRAE Standard 12-2000 addresses this issue; minimizing the risk of Legionellosis associated with building water systems**.**

Final Action: AS AM AMPC____ D

P110-09/10, Part I
705.8.2, 705.14

Proposed Change as Submitted

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (PPFA)

PART I – IPC

Revise as follows:

705.8.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM D 2564.
2. The materials joined are drain, waste and vent pipe and fittings installed in non-pressure service applications.
3. The pipe and fitting size does not exceed 4 inches (100 mm) in diameter.

705.14.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

<u>Exception:</u> <u>A primer is not required where all of the following conditions apply:</u>

1. <u>The solvent cement used is third-party certified as conforming to ASTM D 2564.</u>
2. <u>The materials joined are drain, waste and vent pipe and fittings installed in non-pressure service applications.</u>
3. <u>The pipe and fitting size does not exceed 4 inches (100 mm) in diameter.</u>

Reason: To introduce an exception in IPC Chapter 7 (IRC Chapter 30), Sanitary Drainage, allowing for the practice of one-step solvent cementing of non-pressure DWV systems 4" and under.

This exception allows for an optional one-step procedure for joining non-pressure DWV PVC piping systems 4" in diameter and below with solvent cement conforming to ASTM D 2564. This method is practiced, and the code should include specific language to indicate when it is acceptable.

Pressure testing completed by NSF International has shown that solvent cement conforming to ASTM D 2564, when used without primer on PVC DWV pipe and fittings, both solid wall and cell core, generates bonding forces well in excess of what is required for these systems. The strength of the joint often exceeds the pipe and fitting pressure capacity.

Bibliography: NSF International report J-00036842.can be found on the PPFA website, www.ppfahome.org//ICC09/PPFA_NSF_J-00036842.pdf

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CUDAHY-P1-705.8.2

<u>Public Hearing Results</u>

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: A primed joint works best and many manufacturers require priming before solvent cementing.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Cudahy, **PPFA (Plastic Pipe and Fittings Association), requests Approval as Submitted**

Commenter's Reason: This exception allows for an <u>optional</u> one-step procedure for joining non-pressure DWV PVC piping systems 4" in diameter and below with solvent cement conforming to ASTM D 2564. This method is practiced, and the code should include specific language to indicate when it is acceptable.

Pressure testing completed by NSF International has shown that solvent cement conforming to ASTM D 2564, when used without primer on PVC DWV pipe and fittings, both solid wall and cell core, generates bonding forces well in excess of what is required for these systems.

The strength of the joint often exceeds the pipe and fitting pressure capacity with the pipe of fitting failing before the joint in the "hundreds of psi" range of pressures.

Since these are non-pressure systems, the one step PVC practice is completely suitable – as is one step ABS and one step CPVC solvent welding.

PPFA urges the FAH to support this change as submitted.

Bibliography: NSF International report J-00036842.can be found on the PPFA website, <u>www.ppfahome.org/ICC09/PPFA_NSF_J-00036842.pdf</u>

Final Action: AS AM AMPC____ D

P110-09/10, Part II
IRC P3003.9.2, P3003.14.2

Proposed Change as Submitted

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (PPFA)

PART II – IRC

Revise as follows:

P3003.9.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D 2564, CSA B137.3 or CSA B181.2 shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM D 2564.
2. The materials joined are drain, waste and vent pipe and fittings installed in non-pressure service applications.
3. The pipe and fitting size does not exceed 4 inches (100 mm) in diameter.

P3003.14.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D 2564, CSA B137.3 or CSA B181.2 shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM D 2564.
2. The materials joined are drain, waste and vent pipe and fittings installed in non-pressure service applications.
3. The pipe and fitting size does not exceed 4 inches (100 mm) in diameter.

Reason: To introduce an exception in IPC Chapter 7 (IRC Chapter 30), Sanitary Drainage, allowing for the practice of one-step solvent cementing of non-pressure DWV systems 4" and under.

This exception allows for an optional one-step procedure for joining non-pressure DWV PVC piping systems 4" in diameter and below with solvent cement conforming to ASTM D 2564. This method is practiced, and the code should include specific language to indicate when it is acceptable.

Pressure testing completed by NSF International has shown that solvent cement conforming to ASTM D 2564, when used without primer on PVC DWV pipe and fittings, both solid wall and cell core, generates bonding forces well in excess of what is required for these systems. The strength of the joint often exceeds the pipe and fitting pressure capacity.

Bibliography: NSF International report J-00036842.can be found on the PPFA website, www.ppfahome.org//ICC09/PPFA_NSF_J-00036842.pdf

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CUDAHY-P1-705.8.2

Public Hearing Results

PART II- IRC-P
Committee Action: **Disapproved**

Committee Reason: A primed joint is easier to inspect. Strength of a primed joint is better.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Cudahy, **PPFA (Plastic Pipe and Fittings Association) requests Approval as Submitted.**

Commenter's Reason: See P110-09/10, Part I

Bibliography: See P110-09/10, Part I

Final Action: AS AM AMPC____ D

P116-09/10, Part I
712.3.5

Proposed Change as Submitted

Proponent: John T.E. Walters, Prince William County, VA., representing the Virginia Plumbing and Mechanical Inspectors Association

PART I - IPC

Revise as follows:

712.3.5 Ejector connection to the drainage system. Pumps connected to the drainage system shall connect to ~~the~~ a *building sewer*, ~~or shall connect to a wye fitting in the~~ *building drain*, soil stack, waste stack or horizontal branch drain. ~~a minimum of 10 feet (3048 mm) from the base of any soil *stack*, waste *stack* or *fixture drain*.~~ Where the discharge line connects into horizontal drainage piping, the connect~~or~~ion shall be made through a wye fitting into the top of the drainage piping and such wye fitting shall be located not less than 10 feet (3048 mm) from the base of any soil stack, waste stack or fixture drain.

Reason: In addition to building sewers and building drains, soil stacks, waste stacks and horizontal branch drains are acceptable points of termination for ejector discharge lines. Fittings acceptable for changes of direction are already addressed in Table 706.3.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WALTERS-P1-712.3.5

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: Good proposal except last line of added text needs to be changed to say 10 pipe diameters instead of 10 feet.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Shawn Strausbaugh, representing VA Plumbing and Mechanical Inspectors Assoc. and ICC Region 7, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

712.3.5. Ejector connection to the drainage system. Pumps connected to the drainage system shall connect to a building sewer, building drain, soil stack, waste stack or horizontal branch drain. Where the discharge line connects into horizontal drainage piping, the connection shall be made through a wye fitting into the top of the drainage piping and such wye fitting shall be located not less than 10 ~~feet (3048 mm)~~ pipe diameters from the base of any soil stack, waste stack or fixture drain.

Commenter's Reason: Part I of the above code change was denied by the committee due to the language of 10 feet. This was existing wording in this code section however the language per this proposal is to remove feet and replace with pipe diameters. In order to keep this change consistent with the IPC and IRC both part I and part II have been modified. Part II had been approved as submitted by the IRC committee.

Final Action: AS AM AMPC____ D

P116-09/10, Part II
IRC P3007.3.5

<u>Proposed Change as Submitted</u>

Proponent: John T.E. Walters, Prince William County, VA., representing the Virginia Plumbing and Mechanical Inspectors Association

PART II- IRC

Revise as follows:

P3007.3.5 Ejector connection to the drainage system. Pumps connected to the drainage system shall connect to ~~the~~ <u>a</u> *building sewer*<u>,</u> ~~or shall connect to a wye fitting in the~~ *building drain*<u>, soil stack, waste stack or horizontal branch drain</u>. ~~a minimum of 10 feet (3048 mm) from the base of any soil *stack*, waste *stack* or *fixture drain*.~~ Where the discharge line connects into horizontal drainage piping, the connect~~or~~<u>ion</u> shall be made through a wye fitting into the top of the drainage piping <u>and such wye fitting shall be located not less than</u> <u>10 feet (3048 mm) from the base of any soil stack, waste stack or fixture drain.</u>

Reason: In addition to building sewers and building drains, soil stacks, waste stacks and horizontal branch drains are acceptable points of termination for ejector discharge lines. Fittings acceptable for changes of direction are already addressed in Table 706.3.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WALTERS-P1-712.3.5

<u>Public Hearing Results</u>

PART II- IRC-P
Committee Action: **Approved as Submitted**

Committee Reason: Agreed with the proponent's reason statement which stated that soil stacks, waste stacks and horizontal branch drains are also acceptable points of termination of an ejector discharge line.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Shawn Strausbaugh, representing VA Plumbing and Mechanical Inspectors Assoc. and ICC Region 7, requests Approval as Modified by this Public Comment

Modify the proposal as follows:

P3007.3.5 Ejector connection to the drainage system. Pumps connected to the drainage system shall connect to a building sewer, building drain, soil stack, waste stack or horizontal branch drain. Where the discharge line connects into horizontal drainage piping, the connect~~or~~ion shall be made through a wye fitting into the top of the drainage piping and such wye fitting shall be located not less than 10 ~~feet (3048 mm)~~ pipe diameters from the base of any soil stack, waste stack or fixture drain.

Commenter's Reason: See P116-09/10, Part I

Final Action: AS AM AMPC____ D

P119-09/10
802.1.8

Proposed Change as Submitted

Proponent: Robert G. Konyndyk, Chief, Plumbing Division, Bureau of Construction Codes, State of Michigan

Revise as follows:

802.1.8 Food utensils, dishes, pots and pans sinks. Sinks used for the washing, rinsing or sanitizing of utensils, dishes, pots, pans or service ware used in the preparation, serving or eating of food shall discharge indirectly through an air gap or an air break ~~or directly connect~~ to the drainage system.

Reason: The insertion of the new section into the 09 edition of the code attempted to list the three options for connections of the named fixtures. While any one of the three options may be accepted in different jurisdictions, the lead in clarification of "indirectly" obviates the direct connection choice. If a code change was to be submitted removing the directive "indirectly" the choice of three methods would be merely a laundry list which is contrary to modern code text processes.

Cost Impact: The clarification will not increase the cost of construction from that of the present language.

ICCFILENAME: KONYNDYK-P2-802.1.8

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Creates a safer environment in a kitchen.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rand H. Ackroyd representing self, requests Approval as Modified by this public comment.

Modify the proposal as follows:

802.1.8 Food utensils, dishes, pots and pans sinks. Sinks used for the washing, rinsing or sanitizing of utensils, dishes, pots, pans or service ware used in the preparation, serving or eating of food shall discharge indirectly through an air gap or an air break <u>or directly connect</u> to the drainage system. <u>Where such sinks are directly connected, the next fixture connected downstream of the sink fixture drain connection to the drainage system shall be a floor drain.</u>

Commenter's Reason: The concern was the backup of the drainage system to a sink. The requirement of a floor drain addresses this issue.

Final Action: AS AM AMPC____ D

P120-09/10
802.2

Proposed Change as Submitted

Proponent: Cort Strain University of Colorado representing (CAPMO) Colorado Association of Plumbing and Mechanical Officials

Revise as follows:

802.2 Installation. All indirect waste piping shall discharge through an air gap or air break into a waste receptor ~~or standpipe~~. Waste receptors and standpipes shall be trapped and vented and shall connect to the building drainage system. All indirect waste piping that exceeds ~~2 feet~~ <u>30 inches (762mm)</u> in developed length measured horizontally, or ~~4 feet~~ <u>54 inches (1372mm)</u> in total developed length, shall be trapped.

> <u>**Exception:** Where a waste receptor receives only clear water waste and does not directly connect to a sanitary drainage system, the receptor shall not require a trap.</u>

Reason: Because the IPC allows 30 inches center-to-center for a combination fixture (see Section 1002.1 exception 2), horizontal continuous waste tubing of up to 30 inches in length is allowed by the code. Therefore, a horizontal indirect waste pipe should be allowed to be 30 inches long elsewhere, so as to be consistent. The 54 inch total developed length allowance is simply the 30 inches horizontal length allowance plus the 24 inches vertical distance allowed from a fixture to it's trap (see Section 1002.1) The proposed lengths seem to make a lot more sense and will be consistent with other allowances in the code. The added exception should be self evident; no traps are necessary with clear water waste in an indirect piping system.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: Strain-P1-802.2

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

802.2 Installation. All indirect waste piping shall discharge through an air gap or air break into a waste receptor Waste receptors and standpipes shall be trapped and vented and shall connect to the building drainage system. All indirect waste piping that exceeds 30 inches (762mm) in developed length measured horizontally, or 54 inches (1372mm) in total developed length, shall be trapped.

> ~~**Exception:** Where a waste receptor receives only clear water waste and does not directly connect to a sanitary drainage system, the receptor shall not require a trap.~~

Committee Reason: Modification was made because some equipment might require a trap. Agreed with the proponent's reason statement which indicated that the distances are aligned with the same distances allowed for waste piping from a combination sink before connection to a trap.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.

Final Action: AS AM AMPC____ D

P123-09/10

901.3, 917.8, Chapter 13

Proposed Change as Submitted

Proponent: Jack Beuschel, Studor, Inc. representing himself.

1. Revise as follows:

901.3 Chemical waste vent systems. The vent system for a chemical waste system shall be independent of the sanitary vent system and shall terminate separately through the roof to the ~~open air~~ outdoors or to an air admittance valve that complies with ASSE 1049. Air admittance valves for chemical waste systems shall be constructed of materials approved in accordance with Section 702.5 and shall be tested for chemical resistance in accordance with ASTM F1412.

917.8 Prohibited installations. Air admittance valves shall not be installed in non-neutralized special waste systems as described in Chapter 8 except where such valves are in compliance with ASSE 1049, are constructed of materials approved in accordance with Section 702.5 and are tested for chemical resistance in accordance with ASTM F1412. Air admittance valves shall not be located in spaces utilized as supply or return air plenums.

2. Add standards to Chapter 13 as follows:

ASSE

1049-2009 Performance Requirements for Individual and Branch Type Air Admittances Valves for Chemical Waste Systems.

ASTM

F1412-01 Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems.

Reason: The purpose of this code change is to add new provisions to the code to allow air admittance valves that are chemically-resistant (AAVCs) to serve as vents for a chemical waste system as an option to chemical waste vent piping terminating outdoors.

Laboratory sinks into which acids and chemicals are dumped are usually located in islands in the middle of rooms. To vent the traps for these sinks using vent piping that can only terminate outdoors requires extensive labor and material. Because acid- and chemically-resistant pipe and fittings are very costly (as compared to materials used in sanitary drainage systems), allowing the use of AAVCs will significantly reduce material costs for installing chemical waste systems. A reduction in the amount of required material vent piping material will result in reduced labor costs for installing chemical waste systems.

ASSE has recently developed ANSI/ASSE Standard 1049 - *Performance Requirements for Individual and Branch Type Air Admittance Valves for Chemical Waste Systems*. Section 702.5 of the IPC requires that drainage systems for chemical wastes and vent pipes shall be of an approved material that is resistant to corrosion and degradation for the concentrations of chemicals involved. Therefore, AAVs that comply with ANSI/ASSE 1049 and are manufactured from materials that meet recognized industry standards for chemical and acid resistant material in compliance with Section 702.5 and tested to ASTM F1412 for chemical resistance must be permitted to serve as the vent for nonneutralized special waste systems.

Referenced Standards:

ASSE 1049
ASTM F1412-01
ASTM D4104-05

Cost Impact: This code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standards, ASSE 1049-2009 and ASTM F1412-01, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: BEUSCHEL-P1-901.3

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standards ASSE 1049-2009 and ASTM F 1412-01 indicated that in the opinion of ICC staff, the standards did comply with ICC standards criteria. Standard was submitted in draft form.

Committee Action: **Approved as Submitted**

Committee Reason: Past committees have turned this same proposal because no standard existed for chemical air admittance valves. Now that the standard is in place, it is time that the proposal is approved.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), ICC Region VII, requests Disapproval.

Commenter's Reason: The opposition to this application is not based on the approval of a Standard or even if the material is compatible with the materials contained within the piping system, it is based solely on the fact that the Air Admittance Valves (AAV) have a life expectancy. This is not the same application as a typical plumbing system. This application would be serving venting systems for some of the most dangerous materials know to man. So even if the AAV maintains good operating condition for several years, the fact remains that, inevitably, one day it is going to fail. When that happens it could be a deadly event. In most instances the vapors produced by hazardous fluids are far more dangerous that the fluid itself.

These need to remain as a viable option for the industry just as the current code permits now, through a code modification. That way proper assessment of each application can be reviewed and evaluated on its own merit, not a blanket approval for any and all.

Final Action: AS AM AMPC____ D

P126-09/10
912.1

Proposed Change as Submitted

Proponent: Robert Burke, University of Colorado representing Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

912.1 Type of fixtures. A combination drain and vent system shall not serve fixtures other than floor drains, sinks, lavatories, and drinking fountains. Combination drain and vent systems shall not receive ~~discharge from a food waste grinder or clinical sink~~ grease laden waste or solid waste.

Reason: By design, combination drain and vent systems are intended for clear and gray water waste. See 2006 IPC code commentary.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Burke-P2-912.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Combination drain and vent systems are used extensively in commercial kitchens. Proposal would eliminate that type venting system to be used in commercial kitchens.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert Burke, University of Colorado, representing CAPMO, requests Approval as Submitted.

Commenter's Reason: By design, combination drain and vent systems are intended for clear and gray water waste. See IPC code commentary.

Final Action: AS AM AMPC____ D

P127-09/10, Part II
IRC P3111.3

Proposed Change as Submitted

Proponent: John R. Addario, PE, New York State Department of State - Division of Code Enforcement and Administration

PART II- IRC

Revise as follows:

P3111.3 Size. The minimum size of a combination drain and vent pipe shall be in accordance with Table 3111.3. <u>The horizontal length of a combination drain and vent system shall be unlimited.</u>

Reason: This proposed change clarifies the intent of the code by adding that a combination drain and vent system, sized per code, shall be unlimited in horizontal length. Combination drain and vent systems are critical when used in piping systems serving floor drains, especially in large commercial kitchens. It is a source of confusion as to whether the length of the combination drain and vent is limited in length; this proposed change clarifies the intent of the code.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Addario-P1-912.3

Public Hearing Results

PART II- IRC-P
Committee Action: **Approved as Submitted**

Committee Reason: No limit allows for greater design possibilities. There doesn't appear to be any downside to allowing unlimited length.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John R. Addario requests Approval as Modified by this public comment.

Modify the proposal as follows:

Part II – IRC-P

P3111.3 Size. The minimum size of a combination waste and vent pipe shall be in accordance with Table P3111.3. ~~The horizontal length of a combination drain and vent system shall be unlimited.~~

P3111.2 Installation. The only vertical pipe of a combination drain and vent system shall be the connection between the fixture drain and the horizontal combination waste and vent pipe. The maximum vertical distance shall be 8 feet (2438 mm). <u>The horizontal length of a combination drain and vent system shall be unlimited.</u>

Commenter's Reason: This proposed modification simply moves the committee approved language to a more appropriate section.
This change also provides consistency between the Residential Code and the Plumbing Code.
This same change, along with the approved language and corresponding code section, was approved, this code cycle, by the IPC committee for inclusion into the plumbing code.

Final Action: AS AM AMPC____ D

NOTE: PART I REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

P127-09/10, PART I - IPC

Revise as follows:

912.3 Size. The minimum size of a combination drain and vent pipe shall be in accordance with Table 912.3. <u>The horizontal length of a combination drain and vent system shall be unlimited.</u>

Reason: This proposed change clarifies the intent of the code by adding that a combination drain and vent system, sized per code, shall be unlimited in horizontal length. Combination drain and vent systems are critical when used in piping systems serving floor drains, especially in large commercial kitchens. It is a source of confusion as to whether the length of the combination drain and vent is limited in length; this proposed change clarifies the intent of the code.

Cost Impact: The code change proposal will not increase the cost of construction.

PART I- IPC
Committee Action: **Approved as Modified**

Modify the proposal as follows:

~~912.3~~ <u>912.2.2</u> Size. The minimum size of a combination drain and vent pipe shall be in accordance with Table ~~912.3~~ <u>912.2.2</u>. The horizontal length of a combination drain and vent system shall be unlimited.

(Renumber Table 912.3 to Table 912.2.2)

(Renumber subsequent sections)

Committee Reason: Modification was made to make the section tie to the existing dry vent connection section (912.2) as that is more logical for the subject matter of Section 912.3. Proposal eliminates the question about whether there is a limit to the maximum length of the combination drain and vent system.

Assembly Action: **None**

P134-09/10
1002.1

<u>Proposed Change as Submitted</u>

Proponent: Donald R. Monahan, PE, Walker Parking Consultants, representing the National Parking Association and the Automated & Mechanical Parking Association

Revise as follows:

1002.1 Fixture traps. Each plumbing fixture shall be separately trapped by a liquid-seal trap, except as otherwise permitted by this code. The vertical distance from the fixture outlet to the trap weir shall not exceed 24 inches (610 mm), and the horizontal distance shall not exceed 30 inches (610 mm) measured from the centerline of the fixture outlet to the centerline of the inlet of the trap. The height of a clothes washer standpipe above a trap shall conform to Section 802.4. A fixture shall not be double trapped.

Exceptions:

1. This section shall not apply to fixtures with integral traps.
2. A combination plumbing fixture is permitted to be installed on one trap, provided that one compartment is not more than 6 inches (152 mm) deeper than the other compartment and the waste outlets are not more than 30 inches (762 mm) apart.
3. A grease interceptor intended to serve as a fixture trap in accordance with the manufacturer's installation instructions shall be permitted to serve as the trap for a single fixture or a combination sink of not more than three compartments where the vertical distance from the fixture outlet to the inlet of the interceptor does not exceed 30 inches (762 mm) and the *developed length* of the waste pipe from the most upstream fixture outlet to the inlet of the interceptor does not exceed 60 inches (1524 mm).
4. Where floor drains in multi-level parking structures are required to discharge to a combined building sewer system, the floor drains shall not be required to be individually trapped provided that they are connected to a main trap in accordance with Section 1103.1.

Reason: Floor drain traps in unheated multi-level parking structures are problematic because the traps can be damaged during freezing conditions. The liquid in traps for floor drains in covered parking levels usually evaporates as there is little, if any, water runoff on the covered levels. Heat tracing and insulation are not reliable in these locations. A main trap for the parking structure floor drain system is typically required as many jurisdictions require a sand/oil separator prior to discharge to the sanitary sewer.

Cost Impact: The code change will not increase the cost of construction. There will be a construction cost savings to install only a main trap at the lowest level as opposed to traps at all floor drains on the upper levels.

ICCFILENAME: MONAHAN-P1-1002.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Agreed with the proponent's reason statement which stated that parking garage floor drains do not require traps if there is a main trap provided prior to connection to a combined sewer.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing and Mechanical Inspectors Assoc., requests Disapproval.

Commenter's Reason: Even though this language is existing in Chapter 11 we believe it needs to stay in Chapter 11 only. By adding this language into Chapter 10 it appears to make this system part of a sanitary drainage system when in essence it is a storm drainage system discharging to a combined building sewer or drain. The existing language of "main trap" is undefined in the IPC and the proponent in his reasoning is inferring that a sand/oil interceptor will serve as a "main trap". However depending upon the construction of the sand/oil interceptor it may or may not act as a trap and may allow sewer gases into the untrapped storm drainage system and ultimately into the building/structure. It is also imperative that if this section is to be placed in chapter 10 that it also references that no other sanitary drainage system connections be permitted into a storm drainage system which is discharging into a combined building sewer or drain unless it is downstream of the "main trap".

Final Action: AS AM AMPC____ D

P136-09/10, Part I
1002.4

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E./JB Engineering and Code Consulting,P.C. representing Sure Seal

PART I - IPC

1. Revise as follows:

1002.4 Trap seals. Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm), or deeper for special designs relating to accessible fixtures. Where a trap seal is subject to loss by evaporation, a trap seal primer shall be connected to the trap ~~valve~~ or a trap seal protection device shall be installed. The discharge pipe from a trap seal primer ~~valves~~ shall connect to the trap at a point above the level of the trap seal. Trap seal protection devices shall be installed in accordance with the manufacturer's installation instructions. ~~A~~ Potable water-type trap seal primers ~~valve~~ shall conform to ASSE 1018. ~~or~~ Drainage waste-type and nonpotable water-type trap seal primers shall conform to ASSE 1044. Trap seal protection devices shall conform to ASSE 1072.

2. Add standard to Chapter 13 as follows:

ASSE
1072-06 Performance Requirements for Barrier Type Floor Drain Trap Seal Protection Devices.

Reason:

Part I- The current code text does not distinguish between nonpotable water-type/ waste-type trap seal primers and potable water-type trap seal primers. This change will make that distinction clear. This is necessary for where municipal-reclaimed water will be used for trap seal priming. The proposed text also includes the standard for trap seal protection devices. This standard regulates a new form of trap seal protection that does not rely on water or drainage waste-type primers. Trap seal protection devices are a green design concept that provides an effective means of preventing evaporation of the trap seal without the use of water.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard ASSE 1072-06 indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

ICCFILENAME: BALLANCO-P1-1002.4

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard ASSE 1072-06 indicated that in the opinion of ICC staff, the standard did comply with ICC standards criteria.

PART I- IPC
Committee Action: Disapproved

Committee Reason: There is concern that the floor drain strainer already restricts flow into the drain so installation of another device that would further restrict the flow would create problems. New text "shall be connected to the trap" is not accurate. There is a potential for device to be installed for the wrong application due to device identification issues that could be encountered at a later time.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julius Ballanco, P.E. JB Engineering and Code Consulting, P.C. representing Sure-Seal, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.4 Trap seals. Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm), or deeper for special designs relating to accessible fixtures. Where a trap seal is subject to loss by evaporation, a trap seal primer ~~shall be connected to the trap~~ or a trap seal protection device shall be installed. The discharge pipe from a trap seal primer shall connect to the trap at a point above the level of the trap seal. Trap seal protection devices shall be installed in accordance with the manufacturer's installation instructions. Potable water-type trap seal primers shall conform to ASSE 1018. Drainage waste-type and nonpotable water-type trap seal primers shall conform to ASSE 1044. Trap seal protection devices shall conform to ASSE 1072.

Commenter's Reason: The reason given by the Committee for disapproving this change is technically inaccurate. I testified to this inaccuracy. A claim was made that a floor drain trap seal protection device restricts the flow into the drain. The devices do not. There is even a test in the ASSE 1072 to verify this.

What I testified was that the grate for a floor drain restricts the flow, whereby the trap seal protection device does not. Others provided anecdotal testimony that the devices restrict flow. Yet, none of these testifiers reviewed the standard or data that proved otherwise. Their testimony should have been ruled out of order. Testimony at public hearing should be accurate, not hearsay.

As for the language, this was an easy modification if the Committee did not like the term, "shall be connect to the trap." I have reverted that text back to the original text.

The IPC must recognize green methods of accomplishing protection of the trap seal. The current method of using a water supply trap seal primer wastes precious water. Having the option to use a trap seal protection device saves water and is a green alternative.

Furthermore, there is no maintenance required for trap seal protection devices. This is another green feature to the concept. Water supply trap seal primers are notorious for failing and requiring maintenance. Engineers and contractors should be given the option to use a trap seal protection device to protect the trap seal.

Thousands of these devices have been installed in area where trap seal primers have either failed or where not installed. They have an excellent track record and are often the method of choice by the engineers for protecting the trap seal in floor drains.

Final Action: AS AM AMPC____ D

P136-09/10, Part II
IRC P3201.2

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E./JB Engineering and Code Consulting, P.C. representing Sure Seal

PART II - IRC

1. Revise as follows:

P3201.2 Trap seals and trap seal protection. Traps shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm). Traps for floor drains shall be ~~fitted with~~ connected to a trap seal primer, fitted with a trap seal protection device or be of deep seal design. The discharge pipe from a trap seal primer ~~valves~~ shall connect to the trap at a point above the level of the trap seal. Trap seal protection devices shall be installed in accordance with the manufacturer's installation instructions. Trap seal protection devices shall conform to ASSE 1072.

2. Add standard to Chapter 44 as follows:

ASSE
1072-06 Performance Requirements for Barrier Type Floor Drain Trap Seal Protection Devices.

Reason:
Part I- The current code text does not distinguish between nonpotable water-type/ waste-type trap seal primers and potable water-type trap seal primers. This change will make that distinction clear. This is necessary for where municipal-reclaimed water will be used for trap seal priming. The proposed text also includes the standard for trap seal protection devices. This standard regulates a new form of trap seal protection that does not rely on water or drainage waste-type primers. Trap seal protection devices are a green design concept that provides an effective means of preventing evaporation of the trap seal without the use of water.

Part II- The proposed text includes trap seal protection devices as a means to prevent trap evaporation. The added standard regulates this new form of trap seal protection that does not rely on water or drainage waste-type primers. Trap seal protection devices are a green design concept that provides an effective means of preventing evaporation of the trap seal without the use of water.
Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard ASSE 1072-06 indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

ICCFILENAME: BALLANCO-P1-1002.4

Public Hearing Results

PART II- IRC-P
Committee Action: Disapproved

Committee Reason: Consistent with action taken by IPC committee. Standard does not comply with ICC criteria.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C representing Sure-Seal requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

P3201.2 Trap seals and trap seal protection. Traps shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm). Traps for floor drains shall be fitted with ~~connected to~~ a trap seal primer, fitted with a trap seal protection device or be of deep seal design. The discharge pipe from a trap seal primer shall connect to the trap at a point above the level of the trap seal. Trap seal protection devices shall be installed in accordance with the manufacturer's installation instructions. Trap seal protection devices shall conform to ASSE 1072.

Commenter's Reason: The reason given by the Committee for disapproving this change is technically inaccurate. I testified to this inaccuracy. A claim was made that a floor drain trap seal protection device restricts the flow into the drain. The devices do not. There is even a test in the ASSE 1072 to verify this.

What I testified was that the grate for a floor drain restricts the flow, whereby the trap seal protection device does not. Others provided anecdotal testimony that the devices restrict flow. Yet, none of these testifiers reviewed the standard or data that proved otherwise. Their testimony should have been ruled out of order. Testimony at public hearing should be accurate, not hearsay.

As for the language, this was an easy modification if the Committee did not like the term, "shall be connect to the trap." I have reverted that text back to the original text.

The IPC must recognize green methods of accomplishing protection of the trap seal. The current method of using a water supply trap seal primer wastes precious water. Having the option to use a trap seal protection device saves water and is a green alternative.

Furthermore, there is no maintenance required for trap seal protection devices. This is another green feature to the concept. Water supply trap seal primers are notorious for failing and requiring maintenance. Engineers and contractors should be given the option to use a trap seal protection device to protect the trap seal.

Thousands of these devices have been installed in area where trap seal primers have either failed or where not installed. They have an excellent track record and are often the method of choice by the engineers for protecting the trap seal in floor drains.

The Committee was inaccurate when stating that the standard did not comply with the ICC policy. The staff had issued a statement indicating that the standard did comply. This should not have been given as a reason for disapproval since it was incorrect.

Final Action: AS AM AMPC____ D

P137-09/10
1003.1

Proposed Change as Submitted

Proponent: Judson Collins, JULYCO, representing himself.

Delete and substitute as follows:

~~**1003.1 Where required.** Interceptors and separators shall be provided to prevent the discharge of oil, grease, sand and other substances harmful or hazardous to the building drainage system, the public sewer, the private sewage disposal system or the sewage treatment plant or processes.~~

1003.1 Where required. Interceptors shall be provided and installed as required by Sections 1003.3, 1003.4, 1003.6, 1003.7 and 1003.8. In other occupancies or locations where fixtures discharge substances that could be detrimental to the drainage system, the sewer system or wastewater treatment processes, an approved interceptor shall be provided and installed.

Reason: The current text says "provide interceptors and separators to prevent discharge." It does not say where the discharge is to go. The intent of the text is to keep waste that is harmful to drainage systems, sewer systems or wastewater treatment processes from reaching them. Revising the section as proposed will clarify the intent of the section, give reference to the appropriate sections and reiterate that approved interceptors are required. The word "separators" is not used in the proposed text since the definition of the word is the same as that for "interceptor". Since the two words are used interchangeably and the code only defines "interceptor", "separators" was deleted.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: COLLINS-P11-1003.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Agreed with the proponent's reason statement which stated that the current language is saying that interceptors and separators should be installed to prevent discharge. The proposed language states the intent (capturing detrimental substances) better.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Judson Collins, JULYCO, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1003.1 Where required. ~~Interceptors shall be provided and installed as required by Sections 1003.3, 1003.4, 1003.6, 1003.7 and 1003.8. In other occupancies or locations where fixtures discharge substances that could be detrimental to the drainage system, the sewer system or wastewater treatment processes; an approved interceptor shall be provided and installed.~~ Interceptors and separators shall be installed in accordance with Sections 1003.3, 1003.4, 1003.6, 1003.7 and 1003.8. Interceptors and separators of an approved type shall also be installed where the waste flow contains hazardous or harmful substances that are detrimental to the building drainage system, public sewer system, private sewage disposal system, public sewage treatment system or sewage treatment processes. Interceptors and separators shall be required to be located so as to prevent the hazardous or harmful materials from entering the building drainage system and the building sewer.

Commenter's Reason: Although the original proposed code change was recommended for approval as submitted by the committee, it did not accomplish what was intended. The intent of this section is to have waste with substances detrimental to the building drainage system, public sewer system, private sewage system or sewage treatment plant or processes discharge through an approved interceptor to keep those substances from entering those systems. This modification better explains the intent than the original proposal did.

Staff Analysis: Action taken on this public should be coordinated with the action on P138.

Public Comment 2:

Richard Grace, Fairfax County, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: A public comment was submitted for P138 that has merged some of the wording from this change into it. Leaving both changes approved will provide for contradiction in the code.

Staff Analysis: Action taken on this public should be coordinated with the action on P138.

Final Action: AS AM AMPC____ D

P138-09/10
1003.1

Proposed Change as Submitted

Proponent: Richard Grace/Fairfax County/ VA Plumbing and Mechanical Inspectors/VA Building and Code Officials

Revise as follows:

1003.1 Where required. Interceptors and separators shall be provided to prevent the discharge of oil, grease, sand and other substances harmful or hazardous to the ~~building drainage system,~~ the public sewer, the private sewage system or the sewage treatment plant or processes.

Reason: With the incorporation of the new exception to Section 1003.3.4 it is abundantly clear that waste is permitted to flow within the building drainage system. This concept has always been the intent because in almost every application the waste must travel through some portion of the building drainage system in order to get to the interceptor. If the actual code text were applied literally the interceptors would need to attach directly to fixture outlets. That is not the intent. Striking this text will remove the misconception that a device is required to install adjacent to each and every fixture that discharges any liquid that may need to be separated prior to entering the public or private systems.

Cost Impact: None. There will be a cost savings.

ICCFILENAME: GRACE-P6-1003.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Because some jurisdictions require outdoor grease interceptors, the current section creates a conflict for those applications. Elimination of the indicated text solves those conflicts.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Richard Grace, Fairfax County representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA) requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1003.1 Where required. Interceptors and separators shall be provided and installed as required by Sections 1003.3, 1003.4, 1003.6, 1003.7 and 1003.8 ~~Interceptors and separators shall be provided~~ to prevent the discharge of oil, grease, sand and other harmful or hazardous substances ~~harmful or hazardous~~ to the public sewer, the private sewage system, or the sewage treatment plant or processes.

Commenter's Reason: P137 and P138 were both approved by the plumbing committee. If left as is, the two would have contradicting language. This proposed language takes the two and merges them together to provide specific requirements that are not contradicting. The relocation of the terms "harmful or hazardous" clarifies the intent of what cannot be discharged into these drainage systems.

Staff Analysis: Action on this public comment should be coordinated with the action on P137.

Public Comment 2:

Judson Collins, JULYCO, representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

~~**1003.1 Where required.** Interceptors and separators shall be provided to prevent the discharge of oil, grease, sand and other substances harmful or hazardous to the public sewer, the private sewage system or the sewage treatment plant or processes.~~

<u>**1003.1 Where required.** As required by Sections 1003.3, 1003.4, 1003.6, 1003.7 and 1003.8 and where waste contains substances that are hazardous or harmful to the building drainage system, public sewer, private sewage system or sewage treatment plant or processes, such waste shall discharge to these systems through an approved interceptor.</u>

Commenter's Reason: Although the original proposed code change was recommended for approval as submitted by the committee, it did not accomplish what was intended. The intent of this section is to have waste with substances detrimental to the building drainage system, public sewer system, private sewage system or sewage treatment plant or processes discharge through an approved interceptor to keep those substances from entering those systems. This modification better explains the intent than the original proposal did.

Staff Analysis: Action on this public comment should be coordinated with the action on P137.

Final Action: AS AM AMPC____ D

P140-09/10

1003.3.2

<u>Proposed Change as Submitted</u>

Proponent: Sid Cavanaugh, Cavanaugh Consulting representing In Sink Erator

Revise as follows:

1003.3.2 Food Waste Grinders. Where food waste grinders connect to grease interceptors, ~~a solids interceptor shall separate the discharge before connecting to the grease interceptor. Solids interceptor and~~ <u>the</u> grease interceptor shall be sized for the discharge of the food waste grinder. Emulsifiers, chemicals, enzymes and bacteria shall not discharge into the food waste grinder.

Reason: Current language implies solids interceptors are used in conjunction with the installation of all food waste grinders, but food waste grinders are connected to grease interceptors only when required by the authority having jurisdiction, and this should be the exception not the rule. Data indicates it is impractical to discharge food waste grinders into interceptors. Language that specifies using a solids interceptor upstream of all grease interceptors is illogical since none are manufactured large enough to accommodate food waste grinder

The intent of grease interceptors is to reduce the introduction of fats, oils and greases (FOG) into sewers. Sewer clogs associated with FOG are well documented, and results from a collaborative research project undertaken by the Water Environment Research Foundation published in the fall 2008 characterized the composition of sewer deposits and provided much insight on these blockages.[1] The data revealed that 84% of the FOG deposit samples analyzed contained high concentrations of saturated fatty acids and calcium, higher than normal background levels, and appeared to be metallic salts of fatty acids. One of the researchers, Dr. Kevin Keener, has reported that no food waste particles were evident in these deposits. The report suggests a chemical reaction is occurring in the sewers, saponification, with calcium chemically selected over sodium. These insoluble deposits are difficult to remove and provide significant challenges for sewage collection system managers and plumbers as well. A supplemental report to the FROG study provided additional insight on the effluent of grease interceptors. 90% of flows though interceptors are on average 1/3 the peak design flow, which equates to detention times in the order of hours, not minutes, interceptors are mainly acidic, with pH's in the range of 4-8, and dissolved oxygen concentrations are less than 0.5 mg/L.

Together, the information provided in these studies suggests FOG deposits may indeed be the result of free fatty acids from the effluent of grease interceptors reacting with calcium. If pumped and maintained infrequently, or retained solids digest anaerobically, or if interceptors are improperly sized, conditions are conducive for promoting the formation of FOG deposits. While it is inappropriate to introduce grease into sewers without remediation through such devices as interceptors, ground food waste should only be discharged directly to sanitary sewers, bypassing interceptors.

Ducoste, Joel J., Kevin M. Keener, John W. Groninger, Leon M. Holt. "Fats, Roots, Oils and Grease (FROG) in Centralized and Decentralized Systems." WERF. 2008

Cost Impact: Minimal.

ICCFILENAME: CAVANAUGH-P7-1003.3.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Grease interceptors cannot be sized to take the discharge of a food waste grinder without a solids interceptor upstream of the grinder.

Assembly Action: **None**

Individual Consideration Agenda

This items is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Sidney Cavanaugh, Cavanaugh Consulting, representing In-sink-erator, requests Approval as Submitted.

Commenter's Reason: The proposal was supported by the restaurant/kitchen industry and by all food waste grinder manufacturers. The current code wording is impractical and illogical since none of the solids interceptors currently available in the market are large enough to accommodate commercial food waste grinders and are therefore not used when food waste grinders are mandated or allowed to connect to large gravity type grease interceptors.

Public Comment 2:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Modified by this Public Comment

Modify the proposal as follows:

1003.3.1 Grease interceptors and automatic grease removal devices required. A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers without prerinse sinks. Grease interceptors and automatic grease removal devices shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged. Food waste grinders shall not discharge through a grease interceptor.

> **Exception:** Where required by the local jurisdiction or health authority, food waste grinders shall be permitted to discharge through a grease interceptor.

1003.3.2 Food Waste Grinders. Where a food waste grinder~~s~~ is required by the exception to Section 1003.3.1 to connect to a grease interceptor~~s~~, a solids interceptor shall separate the discharge before connecting to the grease interceptor. The solids interceptor and the grease interceptor shall be sized for the discharge of the food waste grinder. Emulsifiers, chemicals, enzymes and bacteria shall not discharge into the food waste grinder.

Commenter's Reason: A food waste grinder should not discharge through a grease interceptor. The purpose of a food waste grinder is to reduce the food waste to small enough particles, such that they can discharge directly to the sanitary drainage system. If they discharge to a grease interceptor, it defeats the purpose of having a food waste grinder. The food particles would be separated by the solids interceptor and grease interceptor.

Unfortunately, some health authorities and local jurisdictions are requiring food waste grinders to discharge through a grease interceptor. This has been done because installations are allowing grease to discharge to the POTW. The response has been to require everything to pass through the grease interceptor. This is unnecessary when there is a properly installed and maintained sanitary drainage system with grease interceptor.

By adding an exception, this allows the local jurisdictions and health authority to still require food waste grinders to discharge through a grease interceptor. Section 1003.3.2 is wordsmithed to address when a food waste grinder must discharge through a grease interceptor.

Staff Analysis: Section 102.10 of the code addresses situations where local, state or federal codes might override the code.

Final Action: AS AM AMPC____ D

P141-09/10
202, 1003.3.4, Chapter 13

Proposed Change as Submitted

Proponent: Rand Ackroyd, Rand Technical Consulting, representing The Plumbing and Drainage Institute

1. Delete and substitute as follows:

~~**GREASE INTERCEPTOR.** A plumbing appurtenance that is installed in a sanitary drainage system to intercept oily and greasy wastes from a wastewater discharge. Such device has the ability to intercept free-floating fats and oils.~~

GREASE INTERCEPTOR.

HYDRO-MECHANICAL. Plumbing appurtenances that are installed in the sanitary drainage system to intercept free-floating fats, oils and grease from wastewater discharge. Continuous separation is accomplished by air entrainment, buoyancy and interior baffling.

GRAVITY. Plumbing appurtenances of not less than 500 gallons (1893 L) capacity that are installed in the sanitary drainage system to intercept free-floating fats, oils and grease from wastewater discharge. Separation is accomplished by gravity during a retention time of not less than 30 minutes.

2. Revise as follows:

1003.3.4 Hydromechanical grease interceptors and automatic grease removal devices. Hydromechanical grease interceptors and automatic grease removal devices shall be sized in accordance with PDI G101, ASME.14.3 Appendix A or ASME A112.14.4. Hydromechanical grease interceptors and automatic grease removal devices shall be designed and tested in accordance with PDI G101, PDI G102, ASME.14.3 Appendix A or ASME A112.14.4. Hydromechanical grease interceptors and automatic grease removal devices shall be installed in accordance with the manufacturer's instructions. The section shall not apply to gravity grease interceptors.

~~**Exception:** Interceptors that have a volume of not less than 500 gallons (1893 L) and that are located outdoors shall not be required to meet the requirements of this section.~~

3. Add standard to Chapter 13 as follows:

PDI
G102 Testing and Certification for Grease Interceptors with FOG Sensing and Alarm Devices

Reason: The industry has standardized on the terms "Hydro-Mechanical" and "Gravity" for the two general types of grease interceptors in the plumbing industry. The requirements in Section 1003.3.4 and its subsections were never intended to apply to gravity grease interceptors. The new terminology makes a clear distinction between the two types in order for the code to be clear about which type of grease interceptor the requirements apply to.

PDI G102 covers the Testing and Certification for Grease Interceptors with FOG Sensing and Alarm Devices. This standard expands on the already recognized PDI G101 by including testing and certification of alarm devices that can be provided on interceptors already complying with PDI G101. The alarm device on a hydromechanical grease interceptor monitors the level of the grease captured in the unit and provides both a loud audible signal and a visible signal when the accumulated grease (FOG) in the interceptor needs to be removed. Standard PDI G102 is available for free downloading from the PDI website www.pdionline.org.

The exception to this section that was put in last cycle by another proponent was an attempt to distinguish between the two general types of grease interceptors in order to clarity that Section 1003.3.4 did not apply to gravity grease interceptors. The new proposed terminology provides the necessary clarification and thus, the exception is no longer needed. However, in the spirit of the exception, the last line of text was added to reinforce that the reader should not try to apply the requirements of this section (including the subsections that follow) to gravity grease interceptors.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Ackroyd-P3-1003.3.4

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard PDI G102 indicated that in the opinion of ICC staff, the standard did not comply with ICC standards criteria.

Committee Action: **Approved as Submitted**

Committee Reason: New terms and definitions are in alignment with product standards and industry terminology.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble, representing the ICC Referenced Standards Committee, requests Approval as Modified by this public comment.

Modify the proposal as follows:

1**003.3.4 Hydromechanical grease interceptors and automatic grease removal devices.** Hydromechanical grease interceptors and automatic grease removal devices shall be sized in accordance with PDI G101, ASME.14.3 Appendix A or ASME A112.14.4. Hydromechanical grease interceptors and automatic grease removal devices shall be designed and tested in accordance with PDI G101, ~~PDI G102,~~ ASME.14.3 Appendix A or ASME A112.14.4. Hydromechanical grease interceptors and automatic grease removal devices shall be installed in accordance with the manufacturer's instructions. The section shall not apply to gravity grease interceptors.

Remove standard in Chapter 13 as follows:

PDI
~~G102~~ ~~Testing and Certification for Grease Interceptors with FOG Sensing and Alarm Device~~

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically, and 3.6.2.1 which requires standards be written in mandatory language.

We therefore propose to have deleted the reference standard and subsequent reference to that standard as part of this proposal to modify the original proposal.

Final Action: AS AM AMPC____ D

P143-09/10
1003.4.2

Proposed Change as Submitted

Proponent: Bob Eugene/Underwriters Laboratories Inc/Underwriters Laboratories Inc

1. Revise as follows:

1003.4.2 Oil separator design. Oil separators shall be listed and labeled in accordance with UL 2215, or designed in accordance with Sections 1003.4.2.1 and 1003.4.2.2.

2. Add standards to Chapter 13 as follows:

UL
<u>2215-00</u> <u>Outline of Investigation for Oil/Water Separators</u>

Reason: This proposal provides an alternative for the use of listed oil/water separators that are built on-site. UL's Outline of Investigation includes a comprehensive set of construction and performance requirements that are used to evaluate and list oil/water separators used in garages and service stations. These requirements cover stationary gravity or pump fed aboveground and underground, atmospheric type oil/water separator systems intended to remove oil suspended in water from rainwater runoff or normal washdown of streets, highways, and parking lots at an inlet rate not exceeding the marked maximum influent concentration and flow rate. Oil/water separator systems covered by these requirements are fabricated, inspected, and tested for leakage before shipment from the factory as completely assembled units, or with instructions for field assembly of minor components. Over 20 companies currently have oil/water separators listed.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of the proposed new requirement UL 2215-00 indicated that, in the opinion of ICC staff, the requirement did not comply with ICC standards criteria.

ICCFILENAME: EUGENE-P1-1003.4.2

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard UL 2215-00 indicated that in the opinion of ICC staff, the standard did not comply with ICC standards criteria.

Committee Action: **Approved as Submitted**

Committee Reason: The UL outline provides a needed method for sizing criteria for oil separators.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble, ICC Referenced Standards Chair, representing the ICC Reference Standards Committee, requests Approved as Modified by this Public Comment.

Modify the proposal as follows:

1003.4.2 Oil separator design. Oil separators shall be listed and labeled ~~in accordance with UL 2215,~~ or designed in accordance with Sections 1003.4.2.1 and 1003.4.2.2.

UL
~~2215-00~~ ~~Outline of Investigation for Oil/Water Separators~~

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Sections 3.6.2.1 which requires standards to be written in mandatory language, and 3.6.3 which requires standards be promulgated according to a consensus process.

We therefore propose to have deleted the reference standard and subsequent reference to that standard as part of this proposal to modify the original proposal.

Final Action: AS AM AMPC____ D

P144-09/10
1003.9, 1003.10 (New)

Proposed Change as Submitted

Proponent: Cort Strain University of Colorado representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO).

1. Revise as follows:

1003.9 Venting of interceptors and separators. Interceptors and separators shall be designed so as not to become air bound where tight covers are utilized. ~~Each interceptor or separator shall be vented where subject to a loss of trap seal.~~ <u>The pipe connected to the outlet of an interceptor or separator shall be vented in accordance with the fixture trap venting requirements of Chapter 9. The invert of the outlet fitting of the interceptor or separator shall be considered as the trap weir elevation for the purposes of determining the maximum allowable distance from the outlet to the vent connection to the outlet pipe.</u>

2. Add new text as follows:

<u>**1003.10 Cleanout for outlet pipe of interceptors or separators.** A two-way cleanout arrangement shall be installed on the outlet pipe of interceptors and separators. The cleanout arrangement shall enable rodding of the outlet pipe in both the upstream and downstream directions.</u>

(Renumber subsequent sections)

Reason: Although interceptor or separator manufacturer's installation instructions might state that a vent is not required on outlet pipe of the unit, the fact is that most instructions are silent on the issue. So how is the code official supposed to know if a particular unit in a specific installation arrangement could develop siphon action? The truth is, no one really knows. Therefore, the words in Section 1003.9 are deleted because there really isn't any way to know if siphonage will occur. In our experience, a fair number of interceptors and separators do develop siphons which result in the discharge of collected contents into drain and sewer systems. The outlet pipes of interceptors and separators should be vented to prevent siphoning from occurring. The need for outlet pipe venting is supported by Section 10.3 of standard PDI-101 (a code referenced standard) that states: "Grease interceptors shall have a vented waste on the outlet side, sized in accordance with code requirements for venting traps to retain water seal and prevent siphoning". The text added to Section 1003.9 brings this requirement to light and provides the details for properly locating and sizing the vent.

Unlike a fixture trap that can be easily removed for access to rod a fixture drain, interceptors and separators are not easily removed and rarely have the provisions necessary to gain adequate access for rodding of the pipe connected to the outlet. This is a location that can require frequent rodding especially if the interceptor or separator is not cleaned at the necessary intervals. In many cases, as a necessity, cleanouts are often added after installation. Unfortunately, many of these after-the-fact cleanout installations do not get permitted or inspected resulting problems. The new section 1003.10 adds text to require a two way cleanout arrangement on the outlet pipe of interceptors and separators.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Strain-P2-1003.9

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Not every interceptor or separator has a "trap seal" or acts like a trap so the requirement for venting the outlet of every interceptor or separator is questionable. Installing two-way cleanouts on interceptor and separator outlets might introduce problems of damage to internal separator and interceptor components.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Cort Strain, University of Colorado, representing CAPMO, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1003.9 Venting of interceptors and separators. Interceptors and separators shall be designed so as not to become air bound where tight covers are utilized. The outlet pipe ~~connected to the outlet of~~ from an interceptor or separator shall be vented within the distance as indicated in Table 1003.9 ~~in accordance with the fixture trap venting requirements of Chapter 9.~~ by the connection of a dry vent to the outlet pipe. ~~The invert of the outlet fitting of the interceptor or separator shall be considered as the trap weir elevation for the purposes of determining the maximum allowable distance from the outlet to the vent connection to the outlet pipe~~. Dry vent piping shall be installed in accordance with Sections 905.1 though 905.5.

TABLE 1003.9
MAXIMUM DISTANCE FROM
INTERCEPTOR OR SEPARATOR OUTLET TO VENT

SIZE OF OUTLET PIPE (inches)	MAXIMUM SLOPE OF OUTLET PIPE (inch per foot)	MAXIMUM DISTANCE FROM OUTLET TO VENT (feet)
$1^1/_2$	$^1/_4$	6
2	$^1/_4$	8
3	$^1/_8$	12
4	$^1/_8$	16
5	$^1/_8$	20
6	$^1/_8$	24
8	$^1/_8$	32
10	$^1/_8$	40

(Underlining omitted in table for clarity)

1003.10 Cleanout for outlet pipe of interceptors or separators. A ~~two-way~~ cleanout ~~arrangement~~ shall be installed on the outlet pipe of interceptors and separators at a point not greater than 24 inches in developed pipe length from the outlet of the interceptor or separator. The cleanout ~~arrangement~~ shall enable rodding of the outlet pipe only in ~~both the upstream and downstream directions~~ the direction of flow.

Commenter's Reason: Although interceptor or separator manufacturer's installation instructions might state that a vent is not required on outlet pipe of the unit, the fact is that most instructions are silent on the issue. So how is the code official supposed to know if a particular unit in a specific installation arrangement could develop siphon action? The truth is, no one really knows. Therefore, the words in Section 1003.9 are deleted because there really isn't any way to know if siphonage will occur. In our experience, a fair number of interceptors and separators do develop siphons which result in the discharge of collected contents into drain and sewer systems. The outlet pipes of interceptors and separators should be vented to prevent siphoning from occurring. The need for outlet pipe venting is supported by Section 10.3 of standard PDI-101 (a code referenced standard) that states: "Grease interceptors shall have a vented waste on the outlet side, sized in accordance with code requirements for venting traps to retain water seal and prevent siphoning". The text added to Section 1003.9 brings this requirement to light and provides the details for properly locating and sizing the vent.

Unlike a fixture trap that can be easily removed for access to rod a fixture drain, interceptors and separators are not easily removed and rarely have the provisions necessary to gain adequate access for rodding of the pipe connected to the outlet. This is a location that can require frequent rodding especially if the interceptor or separator is not cleaned at the necessary intervals. In many cases, as a necessity, cleanouts are often added after installation. Unfortunately, many of these after-the-fact cleanout installations do not get permitted or inspected resulting problems. The new section 1003.10 adds text to require a cleanout on the outlet pipe of interceptors and separators.

Final Action: AS AM AMPC____ D

P151-09/10

1107 (New), 1107.1 (New), Chapter 13

Proposed Change as Submitted

Proponent: Robert Evans, CPD/ASPE Legislative Committee/ASPE

1. Add a new section as follows:

Section 1107
Siphonic Roof Drainage Systems

1107.1 General. Siphonic roof drainage systems shall be designed in accordance with ASPE 45.

2. Add standard to Chapter 13 as follows:

American Society of Plumbing Engineers
8614 Catalpa Avenue, Suite 1007
Chicago, IL 60656-1116

ASPE

45-2007	Siphonic Roof Drainage Systems

Reason: This section will add requirements for the design of siphonic roof drainage systems. ASPE developed a standard for the plumbing engineers to use when designing these systems. This is a complex design that needs to be properly addressed in the code. Without the reference to the proper standard, the plumbing official has no requirements by which to evaluate siphonic roof drainage systems.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard, ASPE 45-2007, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: EVANS-P1-1107 NEW

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard ASPE 45-2007 indicated that in the opinion of ICC staff, the standards did not comply with ICC standards criteria.

Committee Action: **Approved as Modified**

Modify the proposal as follows:

1107.1 General. Siphonic roof drains and drainage systems shall be designed in accordance with ASME A112.6.9 and ASPE 45.

Add standard to Chapter 13 as follows:

ASPE

A112.6.9-2005	Siphonic Roof Drains

Committee Reason: Agreed with the proponent's reason statement which stated that siphonic roof drain systems because of their complexity, need to have a standard for design and need to use a roof drain that meets a specific referenced standard.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble, ICC Referenced Standards Chair, representing the ICC Reference Standards Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Section 1107
Siphonic Roof Drainage Systems

1107.1 General. Siphonic roof drains and drainage systems shall be designed in accordance with ~~ASME A112.6.9 and ASPE 45~~ an approved manner.

~~American Society of Plumbing Engineers~~
~~8614 Catalpa Avenue, Suite 1007~~
~~Chicago, IL 60656-1116~~

~~**ASPE**~~
~~45-2007~~ ~~Siphonic Roof Drainage Systems~~

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.

We therefore propose to have deleted the reference standard and subsequent reference to that standard as part of this proposal to modify the original proposal.

Final Action: AS AM AMPC____ D

P152-09/10, Part I
202 (New), 301.3, Chapter 13 (New), Appendix C

Proposed Change as Submitted

Proponent: Guy Tomberlin of Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors, Virginia Building and Code Officials and ICC Region 7.

PART I – IPC

1. Add definition as follows:

GRAY WATER. Waste discharged from lavatories, bathtubs, showers, clothes washers and laundry trays.

2. Revise as follows:

301.3 Connections to drainage system. ~~All~~ Plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code. This section shall not be construed to prevent indirect waste systems required by Chapter 8.

Exception: Bathtubs, showers, lavatories, clothes washers and laundry trays shall not be required to discharge to the sanitary drainage system where such fixtures discharge to an approved gray water system for flushing of water closets and urinals or for subsurface landscape irrigation.

3. Delete Appendix C in its entirety without substitution

(Renumber subsequent appendices)

4. Add new chapter and text as follows:

Chapter 13
Gray Water Recycling Systems

SECTION 1301
GENERAL

1301.1 Scope. The provisions of Chapter 13 shall govern the materials, design, construction and installation of gray water systems for flushing of water closets and urinals and for subsurface landscape irrigation. See Figures 1301.1(1) and 1301.1(2).

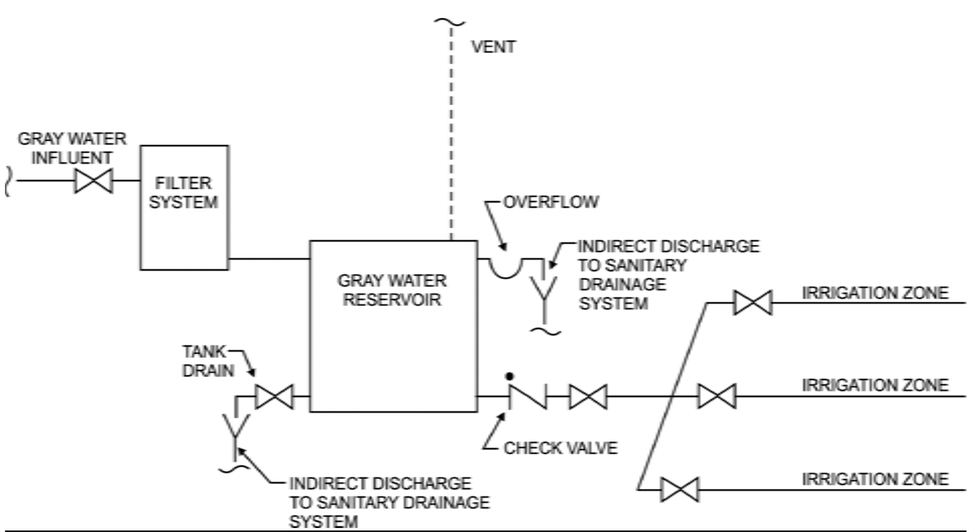


FIGURE 1301.1 (1)
GRAY WATER RECYCLING SYSTEM FOR SUBSURFACE LANDSCAPE IRRIGATION

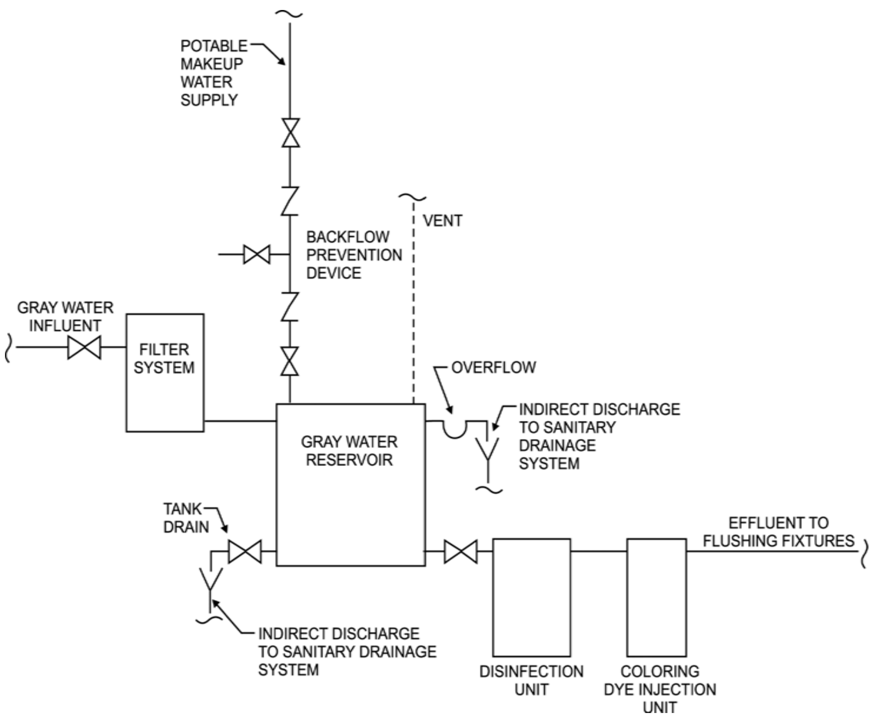


FIGURE 1301.1(2)
GRAY WATER RECYCLING SYSTEM FOR
FLUSHING WATER CLOSETS AND URINALS

1301.2 Installation. In addition to the provisions of Section 1301, systems for flushing of water closets and urinals shall comply with Section 1302 and systems for subsurface landscape irrigation shall comply with Section 1303. Except as provided for in this chapter, all systems shall comply with the provisions of the other chapters of this code.

1301.3 Materials. Above-ground drain, waste and vent piping for gray water systems shall conform to one of the standards listed in Table 702.1. Gray water underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

1301.4 Tests. Drain, waste and vent piping for gray water systems shall be tested in accordance with Section 312.

1301.5 Inspections. Gray water systems shall be inspected in accordance with Section 107.

1301.6 Potable water connections. Only connections in accordance with Section 1302.3 shall be made between a gray water recycling system and a potable water system.

1301.7 Waste water connections. Gray water recycling systems shall receive only the waste discharge of bathtubs, showers, lavatories, clothes washers or laundry trays.

1301.8 Collection reservoir. Gray water shall be collected in an approved reservoir constructed of durable, nonabsorbent and corrosion-resistant materials. The reservoir shall be a closed and gas-tight vessel. Access openings shall be provided to allow inspection and cleaning of the reservoir interior.

1301.9 Filtration. Gray water entering the reservoir shall pass through an approved filter such as a media, sand or diatomaceous earth filter.

1301.9.1 Required valve. A full-open valve shall be installed downstream of the last fixture connection to the gray water discharge pipe before entering the required filter.

1301.10 Overflow. The collection reservoir shall be equipped with an overflow pipe having the same or larger diameter as the influent pipe for the gray water. The overflow pipe shall be trapped and shall be indirectly connected to the sanitary drainage system.

1301.11 Drain. A drain shall be located at the lowest point of the collection reservoir and shall be indirectly connected to the sanitary drainage system. The drain shall be the same diameter as the overflow pipe required in Section 1301.10.

1301.12 Vent required. The reservoir shall be provided with a vent sized in accordance with Chapter 9 and based on the diameter of the reservoir influent pipe.

SECTION 13 02
SYSTEMS FOR FLUSHING WATER CLOSETS AND URINALS

1302.1 Collection reservoir. The holding capacity of the reservoir shall be a minimum of twice the volume of water required to meet the daily flushing requirements of the fixtures supplied with gray water, but not less than 50 gallons (189 L). The reservoir shall be sized to limit the retention time of gray water to a maximum of 72 hours.

1302.2 Disinfection. Gray water shall be disinfected by an approved method that employs one or more disinfectants such as chlorine, iodine or ozone that are recommended for use with the pipes, fittings and equipment by the manufacturer of the pipes, fittings and equipment.

1302.3 Makeup water. Potable water shall be supplied as a source of makeup water for the gray water system. The potable water supply shall be protected against backflow in accordance with Section 608. There shall be a full-open valve located on the makeup water supply line to the collection reservoir.

1302.4 Coloring. The gray water shall be dyed blue or green with a food grade vegetable dye before such water is supplied to the fixtures.

1302.5 Materials. Distribution piping shall conform to one of the standards listed in Table 605.4.

1302.6 Identification. Distribution piping and reservoirs shall be identified as containing nonpotable water. Piping identification shall be in accordance with Section 608.8.

SECTION 1303
SUBSURFACE LANDSCAPE IRRIGATION SYSTEMS

1303.1 Collection reservoir. Reservoirs shall be sized to limit the retention time of gray water to a maximum of 24 hours.

1303.1.1 Identification. The reservoir shall be identified as containing nonpotable water.

1303.2 Valves required. A check valve and a full-open valve located on the discharge side of the check valve shall be installed on the effluent pipe of the collection reservoir.

1303.3 Makeup water. Makeup water shall not be required for subsurface landscape irrigation systems. Where makeup water is provided, the installation shall be in accordance with Section 1302.3.

1303.4 Disinfection. Disinfection shall not be required for gray water used or subsurface landscape irrigation systems.

1303.5 Coloring. Gray water used for subsurface landscape irrigation systems shall not be required to be dyed.

1303.6 Estimating gray water discharge. The system shall be sized in accordance with the gallons-per-day-per-occupant number based on the type of fixtures connected to the gray water system. The discharge shall be calculated by the following equation:

$C = A \times B$

A = Number of occupants:
Residential–Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.
Commercial–Number of occupants shall be determined by the *International Building Code*®.

B = Estimated flow demands for each occupant:
Residential–25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.
Commercial–Based on type of fixture or water use records minus the discharge of fixtures other than those discharging gray water.

C = Estimated gray water discharge based on the total number of occupants.

1303.7 Percolation tests. The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.

1303.7.1 Percolation tests and procedures. At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.

1303.7.1.1 Percolation test hole. The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.

1303.7.1.2 Test procedure, sandy soils. The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section 1303.7.1.3.

1303.7.1.3 Test procedure, other soils. The hole shall be filled with clear water, and a minimum water depth of 12 inches (305mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: Any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than $^{1}/_{16}$ inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

1303.7.1.4 Mechanical test equipment. Mechanical percolation test equipment shall be of an approved type.

1303.7.2 Permeability evaluation. Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section 1303.7.1 for evaluating the soil.

1303.8 Subsurface landscape irrigation site location. The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining property. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table 1303.8. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.

TABLE 1303.8
LOCATION OF GRAY WATER SYSTEM

ELEMENT	MINIMUM HORIZONTAL DISTANCE	
	HOLDING TANK (feet)	IRRIGATION DISPOSAL FIELD (feet)
Buildings	5	2
Property line adjoining private property	5	5
Water wells	50	100
Streams and lakes	50	50
Seepage pits	5	5
Septic tanks	0	5
Water service	5	5
Public water main	10	10

For SI: 1 foot = 304.8 mm.

1303.9 Installation. Absorption systems shall be installed in accordance with Sections 1303.9.1 through 1303.9.5 to provide landscape irrigation without surfacing of gray water.

1303.9.1 Absorption area. The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table 1303.9.1.

TABLE 1303.9.1
DESIGN LOADING RATE

PERCOLATION RATE (minutes per inch)	DESIGN LOADING FACTOR (gallons per square foot per day)
0 to less than 10	1.2
10 to less than 30	0.8
30 to less than 45	0.72
45 to 60	0.4

For SI: 1 minute per inch = min/25.4 mm,
1 gallon per square foot = 40.7 L/m^2.

1303.9.2 Seepage trench excavations. Seepage trench excavations shall be a minimum of 1 foot (304 mm) to a maximum of 5 feet (1524 mm) wide. Trench excavations shall be spaced a minimum of 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be a maximum of 100 feet (30 480 mm) in developed length.

1303.9.3 Seepage bed excavations. Seepage bed excavations shall be a minimum of 5 feet (1524 mm) wide and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced a maximum of 5 feet (1524mm) and a minimum of 3 feet (914 mm) apart, and a maximum of 3 feet (914mm) and a minimum of 1 foot (305 mm) from the sidewall or headwall.

1303.9.4 Excavation and construction. The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

1303.9.5 Aggregate and backfill. A minimum of 6 inches of aggregate ranging in size from $^1/_2$ to $2^1/_2$ inches (12.7 mm to 64 mm) shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed a minimum of 2 inches (51 mm) over the top of the distribution pipe. The aggregate shall be covered with approved synthetic materials or 9 inches (229mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. A minimum of 9 inches (229 mm) of soil backfill shall be provided above the covering.

1303.10 Distribution piping. Distribution piping shall be not less than 3 inches (76mm) in diameter. Materials shall comply with Table 1303.10. The top of the distribution pipe shall be not less than 8 inches (203mm) below the original surface. The slope of the distribution pipes shall be a minimum of 2 inches (51 mm) andamaximumof4inches (102 mm) per 100 feet (30 480 mm).

TABLE 1303.10
DISTRIBUTION PIPE

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F 405
Polyvinyl chloride (PVC) plastic pipe	ASTM D 2729
Polyvinyl chloride (PVC) plastic pipe with a 3.5 inch O.D. and solid cellular core or composite wall.	ASTM F 1488

1303.11 Joints. Joints in distribution pipe shall be made in accordance with Section 705 of this code.

(Renumber subsequent chapters and sections)

Reason: The purpose of this proposal is to bring the gray water recycling systems information in the appendix of the code out of obscurity so the technology can be implemented. The use of gray water as an alternative water source is becoming highly desirable and popular due to the water huge water savings and the shortage of potable water supplies in some areas of the country. This new chapter will promote the reuse of gray water for subsurface irrigation use and the flushing of water closets and urinals. Utilizing the provisions contained within this new chapter will advance the LEED point system for the owners benefit. The unfortunate reality is where provisions are located within an Appendix they are typically subject to adoption at the local level. Moving the current provisions to be included in the body of the code will eliminate the undesirable situation where a locality my not promote this “Green” concept based on the fact that is not code, only an Appendix.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TOMBERLIN-P5-Chapter 13 NEW

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: Proposal lowers the safety within the building. Makes building owners wastewater purveyors. No standards exist for graywater quality. No approvals exist for equipment needed for graywater processing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Guy Tomberlin, Fairfax County, representing VA Plumbing and Mechanical Inspectors Association, VA Building and Code Officials Association and ICC Region VII, requests Approval as Submitted.

Commenter’s Reason: I want to first point out two very important facts related to this proposal. The first is this is the exact language taken from the current appendices of these two codes. This language was updated recently to incorporate mandatory, enforceable and easy to implement regulations to take advantage of the “green” technology that has been utilized successfully for century’s. The second is, the only 3 places that gray/recycled water is permitted to be used is for flushing water closets and urinals, and for lawn irrigation.

The testimony in opposition to this proposal was focused on 3 points: 1. The use of gray water to flush water closets could increase unsafe bacteria levels in a toilet tank and further this proposal did not require any type mandatory sampling of the water quality. Current code does not require bacteria level testing in water closet tanks and I would suggest after many years of continued use the water quality in the average toilet tank is not suitable for human consumption and nor should it be used as such. But the fact is this proposal does require colored dye be added to the gray water prior to its use. This was done for a very good reason, to make it absolutely clear that no one should attempt to consume the water. 2. Other provisions need to be added to these regulations. The current appendices are not 100% all inclusive and do not cover all the possible applications but they are a perfect groundwork that this technology can be built upon. There were approximately 2,200 code changes submitted to the International codes this cycle, I would submit that there will always be room for improvement to any code. 3. The Green Code is going to address this topic. That is correct, however the Green Code is currently in draft form and its widespread adoption is not confirmed just yet. These provisions are ready to implement today and have already been used in many applications successfully.

The truth is if we wait and do not adopt this environmentally friendly “green” technology now the industry will pass us by. Industry will continue to improve on the various applications associated with this technology and code modifications will continue to be the status quo, leaving it up to the code official to determine when and where these systems should be allowed. Many areas across the country suffer from drought and potable water shortages right now, this proposal only make sense. We have come full circle with water use and rediscovered its value. This is a huge step in the right direction to help preserve the environment for generations to come.

Public Comment 2:

Judson Collins, JULYCO, representing himself, requests Approval as Submitted.

Commenter’s Reason: The committee said there are other ways to handle gray water as a reason for disapproval. Granted there are other ways but no one is bringing any of them forward. This language already exists in the appendix of the code. However, since the majority of jurisdictions do not adopt an appendix, it is seldom used. Moving these requirements into the code does not make them mandatory. If someone wants to install a gray water system, these methods have been successfully used in areas of water conservation. If someone wants to use methods other than these, they always have the option of alternative materials, methods and equipment in Section 105.2.

Final Action: AS AM AMPC____ D

P152-09/10, Part II
IRC R202 (New), P2601.2, Section P3009 (New), Appendix O

Proposed Change as Submitted

Proponent: Guy Tomberlin of Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors, Virginia Building and Code Officials and ICC Region 7.

PART II - IRC

1. Add definition as follows:

GRAY WATER. Waste discharged from lavatories, bathtubs, showers, clothes washers and laundry trays.

2. Revise as follows:

P2601.2 Connections to drainage system. Plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code. This section shall not be construed to prevent indirect waste systems.

> **Exception:** Bathtubs, showers, lavatories, clothes washers and laundry trays shall not be required to discharge to the sanitary drainage system where such fixtures discharge to an approved gray water system for flushing of water closets and urinals or for subsurface landscape irrigation.

3. Delete Appendix O in its entirety without substitution

(Renumber subsequent appendices)

4. Add new section and text as follows:

SECTION P3009
GRAY WATER RECYCLING SYSTEMS

P3009.1 Scope. The provisions of Section P3009 shall govern the materials, design, construction and installation of gray water systems for flushing of water closets and urinals and for subsurface landscape irrigation. See Figures P3009.1(1) and P3009.1(2).

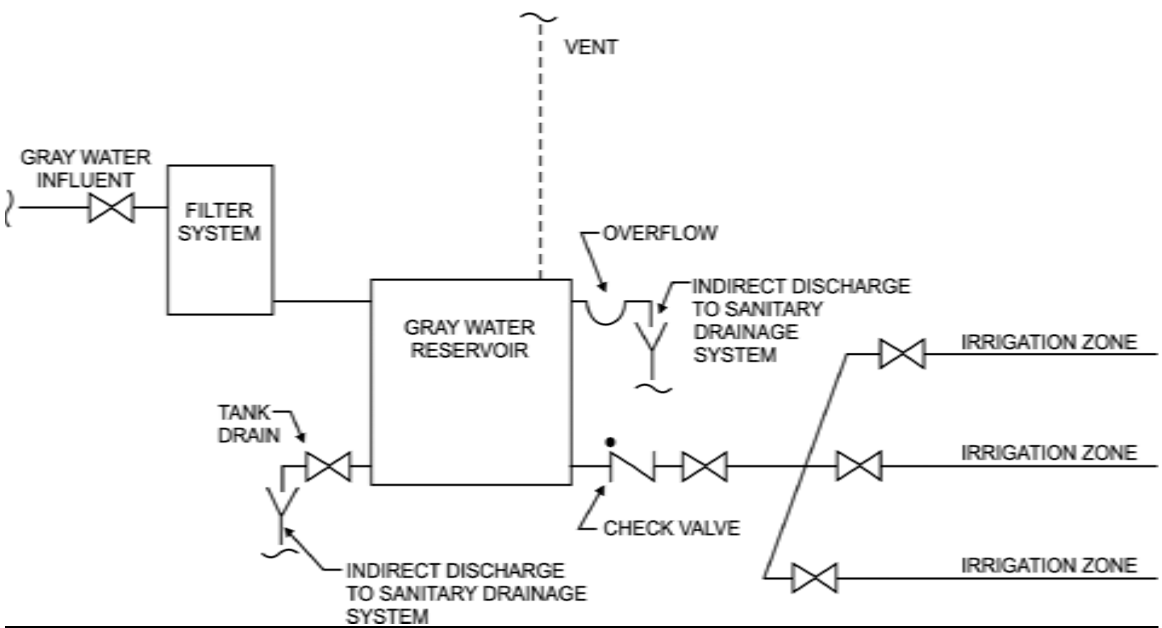


FIGURE P3009.1(1)
GRAY WATER RECYCLING SYSTEM FOR SUBSURFACE LANDSCAPE IRRIGATION

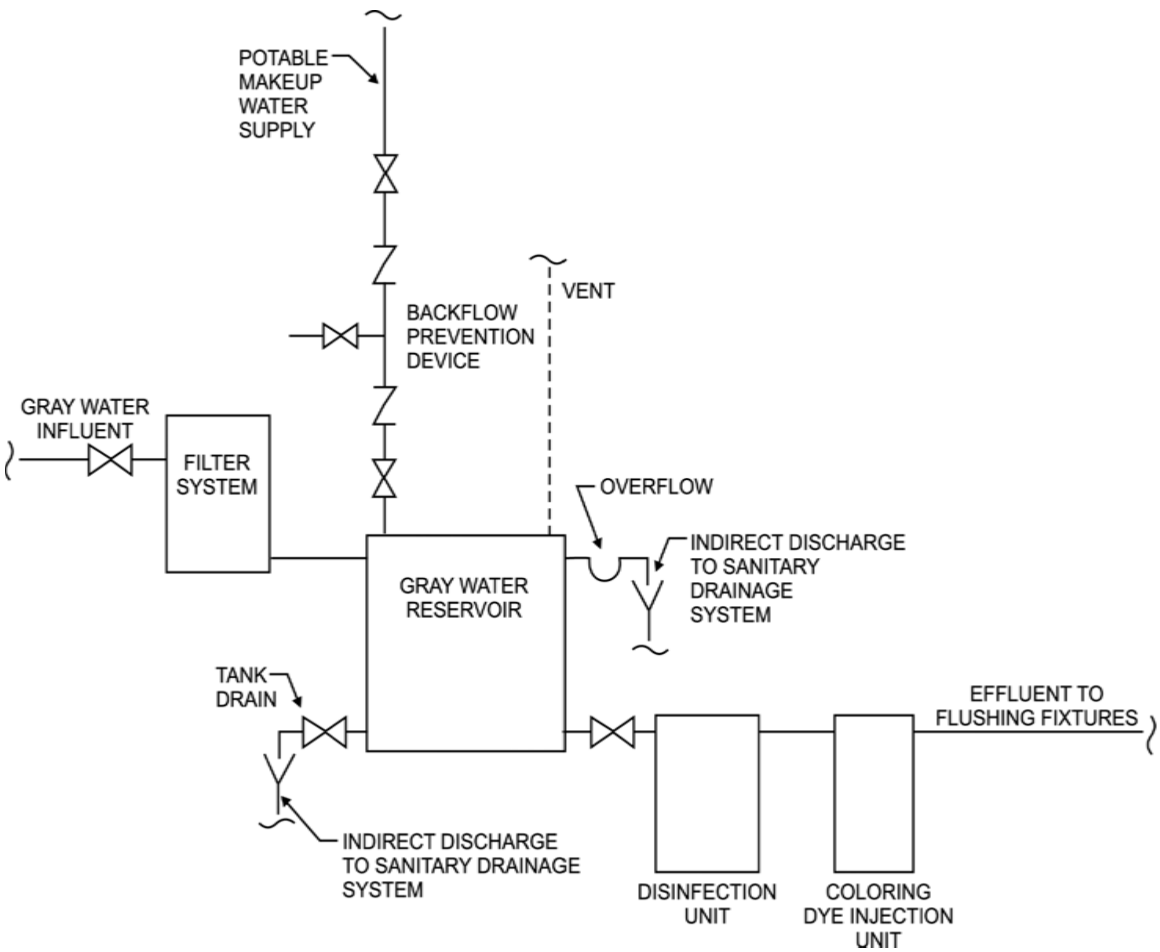


FIGURE P3009.1(2)
GRAY WATER RECYCLING SYSTEM FOR
FLUSHING WATER CLOSETS AND URINALS

P3009.2 Installation. In addition to the provisions of Section P3009, systems for flushing of water closets and urinals shall comply with Section P3009.13 and systems for subsurface landscape irrigation shall comply with Section P3009.14. Except as provided for in Section P3009, all systems shall comply with the provisions of the other sections of this code.

P3009.3 Materials. Above-ground drain, waste and vent piping for gray water systems shall conform to one of the standards listed in Table P3002.1(1). Gray water underground building drainage and vent pipe shall conform to one of the standards listed in Table P3002.1(2).

P3009.4 Tests. Drain, waste and vent piping for gray water systems shall be tested in accordance with Section P2503.

P3009.5 Inspections. Gray water systems shall be inspected in accordance with Section P2503.

P3009.6 Potable water connections. Only connections in accordance with Section 3009.13.1 shall be made between a gray water recycling system and a potable water system.

P3009.7 Waste water connections. Gray water recycling systems shall receive only the waste discharge of bathtubs, showers, lavatories, clothes washers or laundry trays.

P3009.8 Collection reservoir. Gray water shall be collected in an approved reservoir constructed of durable, nonabsorbent and corrosion-resistant materials. The reservoir shall be a closed and gas-tight vessel. Access openings shall be provided to allow inspection and cleaning of the reservoir interior.

P3009.9 Filtration. Gray water entering the reservoir shall pass through an approved filter such as a media, sand or diatomaceous earth filter.

P3009.9.1 Required valve. A full-open valve shall be installed downstream of the last fixture connection to the gray water discharge pipe before entering the required filter.

P3009.10 Overflow. The collection reservoir shall be equipped with an overflow pipe having the same or larger diameter as the influent pipe for the gray water. The overflow pipe shall be trapped and shall be indirectly connected to the sanitary drainage system.

P3009.11 Drain. A drain shall be located at the lowest point of the collection reservoir and shall be indirectly connected to the sanitary drainage system. The drain shall be the same diameter as the overflow pipe required in Section P3009.10.

P3009.12 Vent required. The reservoir shall be provided with a vent sized in accordance with Chapter 31 and based on the diameter of the reservoir influent pipe.

P3009.13 Flushing water systems. Systems for flushing water closets and urinals shall comply with Sections P3009.13.1 through P3009.13.6

P3009.13.1 Collection reservoir. The holding capacity of the reservoir shall be a minimum of twice the volume of water required to meet the daily flushing requirements of the fixtures supplied with gray water, but not less than 50 gallons (189 L). The reservoir shall be sized to limit the retention time of gray water to a maximum of 72 hours.

P3009.13.2 Disinfection. Gray water shall be disinfected by an approved method that employs one or more disinfectants such as chlorine, iodine or ozone that are recommended for use with the pipes, fittings and equipment by the manufacturer of the pipes, fittings and equipment.

P3009.13.3 Makeup water. Potable water shall be supplied as a source of makeup water for the gray water system. The potable water supply shall be protected against backflow in accordance with Section P2902. There shall be a full-open valve located on the makeup water supply line to the collection reservoir.

P3009.13.4 Coloring. The gray water shall be dyed blue or green with a food grade vegetable dye before such water is supplied to the fixtures.

P3009.13.5 Materials. Distribution piping shall conform to one of the standards listed in Table P2905.4.

P3009.13.6 Identification. Distribution piping and reservoirs shall be identified as containing nonpotable water. Piping identification shall be in accordance with Section P2901.1.

P3009.14 Landscape irrigation systems. Subsurface landscape irrigation systems shall comply with Sections P3009.14.1 through P3009.14.11

P3009.14.1 Collection reservoir. Reservoirs shall be sized to limit the retention time of gray water to a maximum of 24 hours.

P3009.14.1.1 Identification. The reservoir shall be identified as containing nonpotable water.

P3009.14.2 Valves required. A check valve and a full-open valve located on the discharge side of the check valve shall be installed on the effluent pipe of the collection reservoir.

P3009.14.3 Makeup water. Makeup water shall not be required for subsurface landscape irrigation systems. Where makeup water is provided, the installation shall be in accordance with Section 3009.13.3.

P3009.14.4 Disinfection. Disinfection shall not be required for gray water used or subsurface landscape irrigation systems.

P3009.14.5 Coloring. Gray water used for subsurface landscape irrigation systems shall not be required to be dyed.

P3009.14.6 Estimating gray water discharge. The system shall be sized in accordance with the gallons-per-day-per-occupant number based on the type of fixtures connected to the gray water system. The discharge shall be calculated by the following equation:

C = $A \times B$

A = Number of occupants:

Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.

B = Estimated flow demands for each occupant:

Residential–25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.

C = Estimated gray water discharge based on the total number of occupants.

P3009.14.7 Percolation tests. The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.

P3009.14.7.1 Percolation tests and procedures. At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.

P3009.14.7.1.1 Percolation test hole. The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.

P3009.14.7.1.2 Test procedure, sandy soils. The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section 3009.14.7.1.3.

P3009.14.7.1.3 Test procedure, other soils. The hole shall be filled with clear water, and a minimum water depth of 12 inches (305mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: Any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than $^{1}/_{16}$ inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

P3009.14.7.1.4 Mechanical test equipment. Mechanical percolation test equipment shall be of an approved type.

P3009.14.7.2 Permeability evaluation. Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section P3009.14.7.1 for evaluating the soil.

P3009.14.8 Subsurface landscape irrigation site location. The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining property. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table P3009.14.8. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.

TABLE P3009.14.8
LOCATION OF GRAY WATER SYSTEM

ELEMENT	MINIMUM HORIZONTAL DISTANCE	
	HOLDING TANK (feet)	IRRIGATION DISPOSAL FIELD (feet)
Buildings	5	2
Property line adjoining private property	5	5
Water wells	50	100
Streams and lakes	50	50
Seepage pits	5	5
Septic tanks	0	5
Water service	5	5
Public water main	10	10

For SI: 1 foot = 304.8 mm.

P3009.14.9 Installation. Absorption systems shall be installed in accordance with Sections P3009.14.9.1 through P3009.14.9.5 to provide landscape irrigation without surfacing of gray water.

P3009.14.9.1 Absorption area. The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table P3009.14.9.1.

TABLE P3009.14.9.1
DESIGN LOADING RATE

PERCOLATION RATE (minutes per inch)	DESIGN LOADING FACTOR (gallons per square foot per day)
0 to less than 10	1.2
10 to less than 30	0.8
30 to less than 45	0.72
45 to 60	0.4

For SI: 1 minute per inch = min/25.4 mm,
1 gallon per square foot = 40.7 L/m^2.

P3009.14.9.2 Seepage trench excavations. Seepage trench excavations shall be a minimum of 1 foot (304 mm) to a maximum of 5 feet (1524 mm) wide. Trench excavations shall be spaced a minimum of 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be a maximum of 100 feet (30 480 mm) in developed length.

P3009.14.9.3 Seepage bed excavations. Seepage bed excavations shall be a minimum of 5 feet (1524 mm) wide and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced a maximum of 5 feet (1524mm) and a minimum of 3 feet (914 mm) apart, and a maximum of 3 feet (914mm) and a minimum of 1 foot (305 mm) from the sidewall or headwall.

P3009.14.9.4 Excavation and construction. The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

P3009.14.9.5 Aggregate and backfill. A minimum of 6 inches of aggregate ranging in size from $^1/_2$ to $2^1/_2$ inches (12.7 mm to 64 mm) shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed a minimum of 2 inches (51 mm) over the top of the distribution pipe. The aggregate shall be covered with approved synthetic materials or 9 inches (229mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. A minimum of 9 inches (229 mm) of soil backfill shall be provided above the covering.

P3009.14.10 Distribution piping. Distribution piping shall be not less than 3 inches (76mm) in diameter. Materials shall comply with Table P3009.14.10. The top of the distribution pipe shall be not less than 8 inches (203mm) below the original surface. The slope of the distribution pipes shall be a minimum of 2 inches (51 mm) andamaximumof4inches (102 mm) per 100 feet (30 480 mm).

TABLE P3009.14.10
DISTRIBUTION PIPE

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F 405
Polyvinyl chloride (PVC) plastic pipe	ASTM D 2729
Polyvinyl chloride (PVC) plastic pipe with a 3.5 inch O.D. and solid cellular core or composite wall.	ASTM F 1488

P3009.14.11 Joints. Joints in distribution pipe shall be made in accordance with Section P3003.

(Renumber subsequent chapters and sections)

Reason: The purpose of this proposal is to bring the gray water recycling systems information in the appendix of the code out of obscurity so the technology can be implemented. The use of gray water as an alternative water source is becoming highly desirable and popular due to the water huge water savings and the shortage of potable water supplies in some areas of the country. This new chapter will promote the reuse of gray water for subsurface irrigation use and the flushing of water closets and urinals. Utilizing the provisions contained within this new chapter will advance the LEED point system for the owners benefit. The unfortunate reality is where provisions are located within an Appendix they are typically subject to adoption at the local level. Moving the current provisions to be included in the body of the code will eliminate the undesirable situation where a locality my not promote this “Green” concept based on the fact that is not code, only an Appendix.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TOMBERLIN-P5-Chapter 13 NEW

Public Hearing Results

PART II- IRC-P
Committee Action: **Disapproved**

Committee Reason: Proposed language is too restrictive as to the method that must be used. There are other ways to successfully process gray water.

Assembly Action: **None**

Individual Consideration Agenda

This items is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Guy Tomberlin, Fairfax County, representing VA Plumbing and Mechanical Inspectors Association, VA Building and Code Officials Association and ICC Region VII, requests Approval as Submitted.

Commenter’s Reason: See P152-09/10, Part I

Public Comment 2:

Judson Collins, JULYCO, representing self, requests Approval as Submitted.

Commenter's Reason: See P152-09/10, Part I

Final Action: AS AM AMPC____ D

P156-09/10, Part I
312.3

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA, PART II IS REPRODUCED FOR INFORMATION PURPOSES ONLY FOLLOWING ALL OF PART I

Proposed Change as Submitted

Proponent: Judson Collins, JULYCO, representing himself.

PART I - IPC

Revise as follows:

312.3 Drainage and vent air test. Plastic piping shall not be tested using air. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperatures or the seating of gaskets shall be made prior to the beginning of the test period.

Reason:
PART I- Section 312.1 does not allow air to be used for testing any plastic piping plumbing system. Section 312.5 repeats the prohibition for water system testing. Section 312.3 does not. This proposal will identify the prohibition in Section 312.3.

Cost Impact: None

COLLINS-P7-312.3

Public Hearing Results

PART I- IPC
Committee Action: **Approved as Submitted**

Committee Reason: Proposed language is already in Section 312.1 but needs to be in this section to reinforce this important safety requirement.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Don Surrena, CBO, representing National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: This prohibition for air testing plastic pipe is already in the IPC two subsections before the proposed change, in section 312.1. It states: "All plumbing system piping shall be tested with either water or, for piping systems other than plastic, by air." There is no need to repeat code requirements for a particular product. If this is permitted where does it end? How many other products will need to be explained again within the code and how many times? Is it always necessary to go to the lowest denominator to give instructions? How will the code user learn how the code works or where different parts of the code are relative to the topic being looked at? Will each section need to have any and all cross references shown? How much redundant information is needed to be put into the code?

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

P156-09/10- PART II- IRC

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or air with no evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than 10 feet (3048 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. <u>Plastic piping shall not be tested using air.</u> The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes.

Reason: PART II- The IRC should reflect the same concern for safety during testing as does the IPC.

Cost Impact: None

PART II- IRC-P
Committee Action: Disapproved

Committee Reason: No concrete data provided on failures and injuries. If air testing of plastic piping is performed properly, it is safe.

Assembly Action: None

P158-09/10, Part I
504.7.3 (New)

<u>Proposed Change as Submitted</u>

Proponent: Douglas Sabbag, Resource Conservation Technologies, Inc.

PART I – IPC

Revise as follows:

<u>**504.8 Leak detector required.** Upon water heater installation, an alarm device shall be installed in the drain pan. The alarm shall sense when the water level in the drain pan exceeds ½ inch in depth and shall produce an audible alert.</u>

Reason: Water Heaters are generally considered a maintenance-free appliance, but they are also one of the single most damaging appliances in the home. Because water heaters are continually under pressure, even small pressurized leaks can quickly flood and devastate a home. Whether at home or at work, these flooding events can go undetected for hours or even days.

It is a common occurrence that water heaters leak, especially near the end of their standard or expected life cycle. Leaking water heaters are usually found months or years after their initial installation with their associated damages. One common cause of leaking is when the first two to three courses of galvanized threads begin to deteriorate since water is in contact with the copper and galvanized piping. This corrosion at the connections into the water heater, eventually lead to leaks.

A slow leak can cause a water heater to rust and the surrounding floors and walls to decay. The price tag from such damage can be significant: water heater failures cost an average of more than $4,444 per incident. (http://www.disastersafety.org/text.asp?id=water_heaters)

Besides the frequently extensive damages to the surrounding building materials caused from the leaking water, there is also a very substantial loss of water occurring nationally and internationally from leaking hot water tanks. In just one county in Florida, i.e., Manatee County, it is estimated that there are currently 1,282 leaking water heaters, with a conservative water loss, (at one drop per second), of 2,700 gallons per year, per leaking water heater, or a total of 3,461,400 gallons of wasted water per year. At the ¼ GPM of loss rate, which given the pressurized water condition is frequently the case, the same number of leaking water heaters: (1,282) cause 572,351 gallons of lost water in one day; which extends to 208,908,229 gallons in a year.

On a national level, it is estimated that there are 957,788 leaking hot water heaters. At the ¼ GPM rate of leakage, that equals 156,058,166,261 gallons wasted in a year. One hundred and fifty six BILLION GALLONS of WASTED WATER.

The associated energy which was required to provide that wasted potable water is likewise, extensive.

Cost Impact: A simple to install audible alarm costs under $30.

ICCFILENAME: SABBAAG-P1-504.7.3 NEW

<u>Public Hearing Results</u>

PART I- IPC
Committee Action: Disapproved

Committee Reason: Adding an alarm to a pan would appear to be redundant. The required pan provides sufficient safety for the application.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Daniel Fish, representing Fish Construction, requests Approval as Modified by this public comment.

Modify the proposal as follows:

504.8 Leak <u>detection</u> ~~detector required~~. Upon <u>installation of a</u> water heater ~~installation~~, an alarm device shall be installed ~~in the drain pan~~ <u>in the pan's waste pipe.</u> The alarm shall sense when ~~the water level in the drain pan exceeds ½ inch in depth~~ <u>water is drained through the pan's waste pipe</u> and shall produce an audible alert, <u>utilize a phone or wireless notification system, or both</u>.

Commenter's Reason: Alarm and/or notification systems should be installed below the drainline in order to get the earliest notification when a leak is present. Relying on the drainline if iffy at best. Most of the time they are clogged or plugged. Even when it does work, large amounts of water could be lost before most building owners would notice. Early notification can save thousands of dollars in repairs and is a very simple step. Phone and/or wireless is a plus, especially for unattended buildings, where someone would not be present to hear the alarm. I feel any alarm system would benefit the building industry. Early detection would mean money savings, property protection, and energy savings.

Final Action: AS AM AMPC____ D

P158-09/10, Part II
IRC P2801.5.3 (New)

Proposed Change as Submitted

Proponent: Douglas Sabbag, Resource Conservation Technologies, Inc.

PART II – IRC

Revise as follows:

<u>**P2801.5.3 Leak detector required.** Upon water heater installation, an alarm device shall be installed in the drain pan. The alarm shall sense when the water level in the drain pan exceeds ½ inch in depth and shall produce an audible alert.</u>

Reason: Water Heaters are generally considered a maintenance-free appliance, but they are also one of the single most damaging appliances in the home. Because water heaters are continually under pressure, even small pressurized leaks can quickly flood and devastate a home. Whether at home or at work, these flooding events can go undetected for hours or even days.

It is a common occurrence that water heaters leak, especially near the end of their standard or expected life cycle. Leaking water heaters are usually found months or years after their initial installation with their associated damages. One common cause of leaking is when the first two to three courses of galvanized threads begin to deteriorate since water is in contact with the copper and galvanized piping. This corrosion at the connections into the water heater, eventually lead to leaks.

A slow leak can cause a water heater to rust and the surrounding floors and walls to decay. The price tag from such damage can be significant: water heater failures cost an average of more than $4,444 per incident. (http://www.disastersafety.org/text.asp?id=water_heaters)

Besides the frequently extensive damages to the surrounding building materials caused from the leaking water, there is also a very substantial loss of water occurring nationally and internationally from leaking hot water tanks. In just one county in Florida, i.e., Manatee County, it is estimated that there are currently 1,282 leaking water heaters, with a conservative water loss, (at one drop per second), of 2,700 gallons per year, per leaking water heater, or a total of 3,461,400 gallons of wasted water per year. At the ¼ GPM of loss rate, which given the pressurized water condition is frequently the case, the same number of leaking water heaters: (1,282) cause 572,351 gallons of lost water in one day; which extends to 208,908,229 gallons in a year.

On a national level, it is estimated that there are 957,788 leaking hot water heaters. At the ¼ GPM rate of leakage, that equals 156,058,166,261 gallons wasted in a year. One hundred and fifty six BILLION GALLONS of WASTED WATER.

The associated energy which was required to provide that wasted potable water is likewise, extensive.

Cost Impact: A simple to install audible alarm costs under $30.

ICCFILENAME: SABBAAG-P1-504.7.3 NEW

Public Hearing Results

PART II- IRC-P
Committee Action: **Disapproved**

Committee Reason: No standard or specification for what this alarm unit is and if it alarms, it will only be useful if someone is present to actually hear it.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dan Fish, representing Fish Construction, requests Approval as Modified by this public comment.

Modify the proposal as follows:

Part II - IRC

P2801.5.3 Leak <u>detection</u> ~~detector required~~. Upon <u>installation of a</u> water heater ~~installation~~, an alarm device shall be installed ~~in the drain pan~~ <u>in the pan's waste pipe.</u> The alarm shall sense when ~~the water level in the drain pan exceeds ½ inch in depth~~ <u>water is drained through the waste pipe</u> and shall produce an audible alert, <u>utilize a phone or wireless notification system, or both</u>.

Commenter's Reason: See P158-09/10, Part I

Final Action: AS AM AMPC____ D

P159-09/10, Part I
904.5

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County Colorado, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

904.5 Location of vent terminal. An open vent terminal from a drainage system shall not be located directly beneath any door, openable window, or other air intake opening of the building or of an adjacent building, and any such vent terminal shall not be within 10 feet (3048 mm) horizontally of such an opening unless it is at least ~~2 feet (610 mm)~~ <u>3 feet (914 mm)</u> above the top of such opening.

Reason: This dimension is inconsistent with many of the other code books such as IMC-401.4 #3; IRC-G2427.6.6 and G2427.8 #1; IFGC-503.6.7; IFGC-618.5 and IFGC-503.8 #1. This 3-foot dimension has been around for years and was also found in the legacy codes. It's very important that the entire family of codes is consistent. It's important that sources of contamination don't make their way into building openings and 3 feet will best accomplish this.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-P1-904.5

Public Hearing Results

PART I- IPC
Committee Action: **Disapproved**

Committee Reason: No need to make this code consistent with IMC or IFGC. If odor is an issue, just make vent pipe taller.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: This is consistent with the approval of RM-10 which recognizes that plumbing vents are a contaminant source, and needs to be 3 feet above air intakes. 8 other code sections say the same thing. It is imperative that there be consistency in the code as it relates to this subject matter.

Final Action: AS AM AMPC____ D

P159-09/10, Part II
IRC P3103.5

Proposed Change as Submitted

Proponent: Guy McMann, Jefferson County Colorado, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

Revise as follows:

P3103.5 Location of vent terminal. An open vent terminal from a drainage system shall not be located less than 4 feet (1219 mm) directly beneath any door, openable window, or other air intake opening of the building or of an adjacent building, nor shall any such vent terminal be within 10 feet (3048 mm) horizontally of such an opening unless it is at least ~~2 feet (610 mm)~~ 3 feet (914 mm) above the top of such opening

> **Reason:** This dimension is inconsistent with many of the other code books such as IMC-401.4 #3; IRC-G2427.6.6 and G2427.8 #1; IFGC-503.6.7; IFGC-618.5 and IFGC-503.8 #1. This 3-foot dimension has been around for years and was also found in the legacy codes. It's very important that the entire family of codes is consistent. It's important that sources of contamination don't make their way into building openings and 3 feet will best accomplish this.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCMANN-P1-904.5

Public Hearing Results

PART II- IRC
Committee Action: **Disapproved**

Committee Reason: No technical justification for the change.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.

Commenter's Reason: See P159-09/10, Part I

Final Action: AS AM AMPC____ D

RP1-09/10
P2503.5.1

Proposed Change as Submitted

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (PPFA) for Plastic Pipe and Fittings Association (PPFA).

Revise as follows:

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or, for piping systems other than plastic, by air with no evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than 10 feet (3048 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes.

Reason: To carry over the language on air testing of plastic piping systems from the IPC to the IRC. This change would correct an oversight in the IRC section. IPC Section 312.1 "Required tests", contains the specific language: **"**All plumbing system piping shall be tested with either water or, for piping systems other than plastic, by air. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submitted to final tests." The reason for this language is that under some conditions, air testing poses additional risks for installers. The IRC should reflect the same language as found in the IPC.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CUDAHY-RP1-P2503.5.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Air testing gives the installer a needed alternate method of testing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Cudahy, PPFA (Plastic Pipe and Fittings Association), requests Approval as Submitted.

Commenter's Reason: As was stated by many at the initial hearing, the practice of testing piping systems with compressed gas or air carries with it the potential for injury to anyone on the work site. This practice is not permitted for use with plastic pipe in the IPC, the NSPC, the UPC or in the standards for these piping products.

Physics are no different in the IRC than the IPC. If a catastrophic failure occurs during a water test, someone might get wet. If a catastrophic failure occurs during an air test, workers can be, and have been, blinded, injured or killed. That is a significant difference in outcome. This code should be consistent with the others in regards to this safe work practice issue.

PPFA encourages that this item be approved as submitted.

Final Action: AS AM AMPC____ D

RP9-09/10
2904 (New)

Proposed Change as Submitted

Proponent: Guy Tomberlin, Fairfax County, Virginia representing the Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and the Virginia Building and Code Officials Association (VBCOA)

Add new text as follows:

SECTION 2904
HOT WATER SUPPLY SYSTEMS

2904.1 Where required. Hot water shall be supplied to all plumbing fixtures and equipment utilized for bathing, washing or culinary purposes.

P2904.2 Hot water supply temperature maintenance. Where the developed length of hot water piping from the source of hot water supply to the furthest fixture exceeds 40 feet (12192 mm), the hot water supply system shall be provided with a recirculating pump system to maintain hot water temperature to a point that is not further than 40 feet (12 192 mm) in developed pipe length from any fixture.

P2904.2.1 Piping insulation. Circulating hot water system piping shall be insulated in accordance with Section N1103.4.

P2904.2.2 Hot water system controls. Circulating hot water system pump controls shall be in accordance with Section N1103.4.

2904.2.3 Recirculating pump. Where a thermostatic mixing valve is used in a system with a hot water recirculating pump, the hot water or tempered water return line shall be routed to the coldwater inlet pipe of the water heater and the cold water inlet pipe or the hot water return connection of the thermostatic mixing valve.

Reason: Current IRC provides no guidance for the hot water piping installed in a dwelling unit. Several hundred feet of hot water piping can be installed with no regard to energy conservation. Water heaters are being installed in remote locations based on space allotment. Significant water and energy are wasted waiting for the hot water to get to the fixture. These are similar to the provisions that have always been included in the IPC .

Cost Impact: The code change proposal could increase the cost of construction.

ICCFILENAME: TOMBERLIN-RP3-P2904 NEW

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Fifty feet is too short of a distance. Language doesn't account for "home run" type systems. Circulating systems are too expensive. No data to support the need for these systems in a home.

Assembly Action: **Approved as Modified**

P2904.2 Hot water supply temperature maintenance. Where the developed length of hot water piping from the source of hot water supply to the furthest fixture exceeds ~~40~~ 50 feet (~~12192~~ 15240mm), the hot water supply system shall be provided with a recirculating pump system to maintain hot water temperature to a point that is not further than ~~40~~ 50 feet (~~12 192~~ 15240mm) in developed pipe length from any fixture.

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Michael Cudahy, representing self, requests Approved as Modified by this Public Comment.

Modify the proposal as follows:

P2904.2 Hot water supply temperature maintenance. Where the developed length of hot water piping from the source of hot water supply to the furthest fixture exceeds 50 feet (15240 mm), the hot water supply system shall be provided with a ~~recirculating pump~~ hot water priming system to ~~maintain hot water temperature to a point that is~~ cause the source of hot water to be not further than ~~50~~ 20 feet (6096 mm) in developed pipe length from any fixture.

Commenter's Reason: While common recirculation systems do reduce the wait time for hot water at fixtures, they actually waste *more energy via heat loss* in the pipe and a small amount of energy to use the pump. The waste occurs whenever the system is pumping, either 24/7, or even on a timer.

Modern "on demand" *hot water priming systems* exist that use a motion detector or control button to "prime" the hot water loop, and stop as soon as the temperature in the line by the serviced fixture increases slightly when measured by a thermocouple.

These systems are a dramatic improvement over traditional recirculation systems as they save *both* water and energy and are the greener option for homes. Pumps run for only minutes a day, not hours.

Without this modification, this proposal will save *water* but waste *energy*.

If the code is to encourage conservation, hot water priming systems, not recirculation systems, are the greener option.

I suspect others in the area of greenbuilding and water and energy conservation will recommend this type of technology and I urge the FAH support this and similar recommendations.

Also, a fifty foot "run out" fixture branch from a loop seems like an excessive length. Twenty feet seems completely achievable.

Public Comment 2:

Robert Hall, representing Viega LLC, requests Disapproval.

Commenter's Reason: Fifty feet is an arbitrary distance with no technical merit. Such a code change will cause undue expense to the builder and homeowner. Energy evaluation reports substantiate energy savings and efficiency of hot water systems by comparing different piping methods such as, two-pipe and home-run systems. Other factors include the type of piping materials (copper, CPVC, or PEX), sizing pipe to accommodate fixture flow rate, and of coarse the distance from the water heater to the fixture. All of the afore mentioned items should be considered prior to making a decision weather or not a circulation pump is needed. The 50 feet "best guess" approach should be disapproved!

Public Comment 3:

Gary Kozan, representing Ridgeway Plumbing, requests Disapproval.

This code change, appropriately DISAPPROVED 8-3 by the IRC committee, is much too costly and restrictive. It mandates the installation of hot water circulating systems, while disregarding other available techniques of improving hot water delivery time by using "home-run" systems, reduced pipe sizing, and piping overhead rather than below ground.

Practically every new home has at least one plumbing fixture that exceeds 50 feet developed length from the water heater. That's not far at all. Approving this change would mean installing a hot water recirculation system in every new home. Such a system, consisting of an additional hot water return line, an insulated circulation loop, circulating pump, controls, and a power source, would cost at least $500 per house.

A properly designed hot water system takes into account the fixture type, flow rate, frequency of use, and pipe size, as well as the distance from the hot water source. For example, a ¾" pipe holds twice as much water as a ½" pipe, and four times as much as 3/8". Also, underground hot water pipes will cool down quicker than piping run overhead.

Homeowners do not tolerate a long wait for hot water to the kitchen sink and master bath. This can usually be overcome by direct hot water runs, sized appropriately. Seldom-used fixtures such as powder rooms, guest baths, bar sinks, etc. yield negligible energy and water savings. Experienced plumbing contractors already know when a hot water circulating system is called for, and when it is not. I urge disapproval.

Final Action: AS AM AMPC____ D

RP12-09/10
P2904.1

Proposed Change as Submitted

Proponent: Richard J. Prospal, on behalf of The American Society of Sanitary Engineering

1. Revise as follows:

P2904.1 General. Where installed, residential fire sprinkler systems, or portions thereof, shall be in accordance with NFPA 13D or Section P2904, which shall be considered equivalent to NFPA 13D. Section P2904 shall apply to stand-alone and multipurpose wet-pipe sprinkler systems that do not include the use of antifreeze. A multipurpose fire sprinkler system shall supply domestic water to both fire sprinklers and plumbing fixtures. Installers of multipurpose fire sprinkler systems shall meet the requirements of ASSE 7010. A stand-alone sprinkler shall system shall be separate and independent from the water distribution system. A backflow preventer shall not be required to separate a stand-alone system from the water distribution system.

2. Add standard to Chapter 44 as follows:

ASSE
7010 - 2008, Professional Qualifications Standard for Plumbing-Based Residential Fire Protection Systems Installers for One and Two-Family Dwellings

Reason: The installers of multipurpose residential fire sprinkler systems must be qualified and pass a certification process assuring the general public of their knowledge of NFPA 13D and Section P2904.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard, ASSE 7010-2008, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: PROSPAL-RP-1-P2904.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed standard does not meet ICC criteria and the added requirement may conflict with some state backflow prevention programs.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Bickford, CBO, Chief Plumbing Inspector, City of Pompano Beach, Florida, requests Approval as Submitted.

Commenter's Reason: The staff analysis that the ASSE 7010 standard does not comply with ICC criteria is a bit confusing. This standard is an ANSI accredited consensus document. The committee reason for rejection is also incorrect, this document does not have any impact on backflow requirements. The ASSE 7010 is a Professional Qualification Standard for installers of plumbing based residential fire sprinkler systems. The object of the ASSE 7010 standard is to verify minimum knowledge needed to install residential fire sprinkler systems. This standard is an ANSI consensus document which has no impact on backflow requirements. Adoption of this standard would verify that installers of Residential Fire Sprinkler systems have the skills needed to install these important life safety systems.

Final Action: AS AM AMPC____ D

INTERNATIONAL BUILDING CODE – MEANS OF EGRESS

E1-09/10
1001.4 (New) (IFC [B] 1001.4 (New))

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

Add new text as follows:

1001.4 Fire safety and evacuation plans: Fire safety and evacuation plans shall be provided for all occupancies and buildings where required by the *International Fire Code*. Such fire safety and evacuation plans shall comply with the applicable provisions of Sections 401.2 and 404 of the *International Fire Code*.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Review of NIST WTC Recommendations". The scope of the activity is noted as:

> Review the recommendations issued by NIST in its report entitled "Final Report on the Collapse of the World Trade Center Towers", issued September 2005, for applicability to the building environment as regulated by the I-Codes. To evaluate the necessity of developing code changes in response to the NIST report.

This proposal is similar to E3-07/08 last cycle. However, based on fire service input, it has been expanded to include the reference to Section 401.2 of the IFC, which states:

> 401.2 Approval. Where required by this code, fire safety plans, emergency procedures and employee training programs shall be approved by the fire code official.

This added reference identifies the scope of responsibility of the evaluation of the plans.

The purpose of this code change proposal is to provide consistent requirements for jurisdictions regarding requirements for fire safety and evacuation plans. We feel fire safety and evacuation plans are important issues that impact occupant egress during an emergency and therefore meets the intent of the IBC and needs to be addressed. In addition, many jurisdictions across the country currently have adopted the IBC, however many of these same jurisdictions have not adopted the IFC. This reference will ensure that at least the fire safety and evacuation plans of the IFC are adopted by reference. Enforcement of the provisions is not an issue based on the reference to Section 401.2. The provisions are clearly within the scope of the IFC.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Heilstedt-E2-1001.4

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal would provide uniformity throughout the codes. This will assure that all means of egress issues in the IFC and IBC are addressed before the certificate of occupancies is issued. This will assist the fire department when they perform means of egress maintenance reviews.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

George Kellogg, Rocklin, CA, representing Sacramento Valley Association of Building Officials, requests Disapproval.

Commenter's Reason: Fire Safety and Evacuation plans are documents that require annual maintenance and are required to include a number of provisions not a part of the building codes. Minor changes in building use or changes in business procedures can trigger a modification to the Fire

Safety and Evacuation Plan that would not trigger a building permit. Additionally, building department personnel typically are only trained to apply Chapter 10 means of egress requirements and do not have the training or expertise to evaluate all of the other important aspects of an adequate Fire Safety and Evacuation Plan—putting the review of the plan in the building code would in fact create the false impression that building department approval of plans would indicate that the required Fire Safety and Evacuation Plan is completely adequate and correct. This is clearly within the purview of the Fire official. While there needs to be communication between Building and Fire officials for new construction activity, there is no need for revised fire and evacuation plans required by the Fire Code to be reviewed by the Building official. As stated by the proponent, this proposal is essentially the same as E3-07/08 (that was overturned and soundly defeated by code officials at the Final Action Hearings in Minnesota) excepting the addition of a reference to section 401.2 of the IFC. As also stated by the proponent, this added code reference was intended to clarify the enforcement responsibility for the Fire Safety and evacuation plan. However it appears to add a new level of confusion. IFC section 401.2 states: “Approval. Where required by this code,” [the IFC or IBC?] “fire safety and evacuation plans, emergency procedures, and employee training programs shall be approved by the fire code official.” Clearly, IBC section 1001.4 is the enforcement responsibility of the Building Code official. Will this change now require the Building official to be responsible for the fire official’s actions???

This change adds confusion for enforcement authority and responsibility, and does not improve the IBC or the IFC. Current IFC code contains all of the provisions necessary for requiring and enforcing Fire Safety and Evacuation plans and clearly requires enforcement authority and responsibility with the Fire Code official. No changes to either code are necessary to provide the level of egress safety and planning provided by the Fire Safety and Evacuation Plan.

Public Comment 2:

John E. Rosenquist, representing United Conveyor Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1001.4 Fire safety and evacuation plans: Fire safety and evacuation plans shall be provided for all occupancies and buildings where required by the *International Fire Code*. Such fire safety and evacuation plans shall comply with the applicable provisions of Sections 401.2 and 404 of the *International Fire Code*. <u>All industrial occupancies shall comply with OSHA 2008, CFR 29, part 1910 Subpart E, and to the requirements of NFPA 101, Chapter 40, Industrial Occupancies.</u>

Add new standard to Chapter 35 as follows:

<u>Occupational Safety and Health Administration</u>
<u>OSHA 2008, CFR 29, part 1910, Occupational Safety and Health Standards, Subpart E, Means of Egress</u>

Commenter’s Reason: Industrial facilities are designed to conform to the safety and egress requirements of OSHA 2008, CFR 29, part 1910 Subpart E, and to the requirements of NFPA 101, Chapter 40, Industrial Occupancies.

The IBC Building Code cannot override the requirements of Federal work place safety and egress rules. It would be better if IBC referenced NFPA 101 for all egress requirements as does OSHA. NFPA 101 encompasses everything covered by IBC with far more clarity and breadth of scope.

Analysis: The standard, OSHA 2008, CFR 29, was not reviewed or considered by the IBC Code Development committee and it was not considered by the hearing attendees at the time of the code development hearings. Section 3.6.3.1 of Council Policy #28, *Code Development,* requires that new standards be introduced in the original code change proposal, therefore, the introduction of a new standard via a public comment is not in accordance with the process required by CP# 28 for adding new standards to the code.

Final Action: AS AM AMPC____ D

E2-09/10
1002.1 (IFC [B] 1002.1)

<u>Proposed Change as Submitted</u>

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

CORRIDOR. An enclosed exit access component that defines and provides a path of egress travel ~~to an exit~~.

Reason: The current definition of “CORRIDOR” is somewhat misleading. Obviously, there are two types of corridors: Fire-resistance rated and non-fire-resistance rated. Section 1018.6 states, “<u>Fire-resistance-rated</u> corridors shall be continuous from the point of entry to an exit…” This provision supports the philosophy that once a given level of protection is achieved, such level of protection shall not be reduced until arrival at the exit discharge. With the non-fire-resistance rated corridor, however, there is no inherent level of protection. It is not uncommon in building design for non-rated corridors to connect open office areas without leading to an exit. The proposed language will correlate with the definition of ‘aisle” in declaring that unprotected exit access components provide a path of egress travel, but not necessarily directly to an exit. This proposal eliminates potential confusion created by the current definition and lets the technical requirements of Section 1018.6 stand on their own merit. Approval of this proposal will resolve a potential conflict in stated intent for commonly used corridor provisions.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Keith-E2-1002.1-Corridor

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The change in the definition could cause confusion for applications for fire-resistance-rated corridors. The entire chapter should be investigated for possible consequences.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Submitted.

Commenter's Reason: Disapproval of Item E2-09/10 by the ICC Means of Egress Code Committee demonstrates the need for clarification of this very subtle provision. A "corridor" is defined in Section 1002.1 as, "An enclosed exit access component that defines and provides a path of egress travel to an exit." Essentially, there are two types of corridors. Based on a number of variables shown at Table 1018.1, a corridor may be of either fire-resistance rated or nonfire-resistance rated construction.

Corridors and aisles are the two most commonly used exit access components. An "aisle" is defined in Section 1002.1 as, "An unenclosed exit access component that defines and provides a path of egress travel." Aisles are obviously a non-rated means of egress component and may or may not lead directly to an exit. Accordingly, that requirement is not stated in the definition of "aisle."

The continuity requirements for corridors are specified in Section 1018.6. That section states, "Fire-resistance-rated corridors shall be continuous from the point of entry to an exit, and shall not be interrupted by intervening rooms." If all corridors were required to be of fire-resistance rated construction, the definition of corridor would be accurate. Section 1018.6 implies, however, that non-fire-resistance rated corridors need not lead to an exit and may be interrupted by intervening rooms. This is consistent with the usage and requirements for aisles. There is no technical or philosophical reason for a non-rated corridor with unprotected openings to be held to the same design standard as a fire-resistance rated corridor. Section 1018.6 properly makes that distinction; however, the definition of corridor at Section 1002.1 does not.

Section 1018 contains no requirement for non-fire-resistance rated corridors to be continuous to an exit. Although definitions are not intended to include technical requirements, the current reference to an "exit" in the definition could be regarded as an implied or de facto requirement. The proposed language will correlate with the definition of "aisle" in declaring that unprotected exit access components shall provide a path of egress travel, but not necessarily directly to an exit. This proposal eliminates potential confusion created by the current definition and lets the technical requirements of Section 1018.6 stand on their own merit. Approval of this proposal will resolve a potential conflict in stated intent for a commonly used means of egress component.

Final Action: AS AM AMPC____ D

E4-09/10
1002.1 (IFC [B] 1002.1)

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXIT. That portion of a means of egress system ~~which is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel~~ between the exit access and the exit discharge or public way. Exit~~s~~ components include exterior exit doors at the level of exit discharge, ~~vertical~~ exit enclosures, exit passageways, horizontal exits, exterior exit stairways~~,~~ and exterior exit ramps ~~and horizontal exits~~.

Reason: The current definition of "EXIT" contains several technical inaccuracies. It contains some absolute information that is not necessarily applicable to all exit components. Obviously, exterior exit stairways and exterior exit ramps are not interior spaces nor are they necessarily constructed of fire-resistance rated construction and opening protectives. Accordingly, this specific language has been removed from the definition. This proposal also acknowledges that some exit components (i.e. an exterior exit door at the level of discharge) may lead directly to the public way. The term exit "component" was added to the definition of exit so as to be consistent with numerous other means of egress provisions. (Please see the definition of "EXIT ENCLOSURE" and "EXIT PASSAGEWAY.") Additionally, the title of Section 1022 was changed from "vertical exit enclosures" to "exit enclosures" in the 2009 Edition of the IBC. The term "vertical" has been removed from the proposed definition so as to be consistent with current terminology. The definition of "EXIT" is fundamental to proper means of egress system design. It is imperative that it be informative and precise. The proposed language will eliminate confusion and misunderstanding as to what the IBC intends.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Keith-E1-1001.1-Exit

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Adding the "or public way" is confusing when the exit is not directly on a street or public sidewalk. It appears to eliminate the 'exit discharge' component of the means of egress system.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

EXIT. That portion of a means of egress system between the exit access and the exit discharge or public way. Exit components include exterior exit doors at the level of exit discharge, ~~exit enclosures~~ interior exit stairways, interior exit ramps, exit passageways, horizontal exits, exterior exit stairways and exterior exit ramps.

Commenter's Reason: The CTC agrees with the intent of E4 that the reference to public way is a correct reference for exits that discharge directly to a public way and that when the exit discharges directly to a public way there does not need to be an exit discharge component in the means of egress system. The modification is to coordinate E4-09/10 with change E5-09/10. Since the intent of the proposed modification to E4-09/10 is to coordinate with E5-09/10, if E5-09/10 is approved we would urge ICC staff to place E-4 after E-5 in the hearing order.

Final Action: AS AM AMPC____ D

E5-09/10, Part I

403, 408, 410, 414, 415, 705, 707, 708, 709, 712, 715, 716, 803, 804, [F]909, 1002, 1006, 1007, 1009, 1010, 1015, 1016, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1110, 2606, 3007, 3008; (IFC 909, 914.3.1.1, [B]1002, [B]1006, [B]1007, [B]1009, [B]1010, [B]1015, [B]1016, [B]1021, [B]1022, [B]1023, [B]1024, [B]1025, [B]1026, [B]1027, [B]1028, 1803.12.1.2, 2705.4.4); (IMC [F] 513.5)

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

PART I – IBC MEANS OF EGRESS

Revise as follows:

SECTION 1002 (IFC [B] 1002)
DEFINITIONS

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.**EXIT.** That portion of a means of egress system ~~which is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel~~ between the exit access and the exit discharge. Exit~~s~~ components include exterior exit doors at the level of exit discharge, ~~vertical exit enclosures~~ interior exit stairways, interior exit ramps, exit passageways, horizontal exits, exterior exit stairways~~,~~ and exterior exit ramps ~~and horizontal exits~~.

EXIT ACCESS DOORWAY. A door or access point along the path of egress travel from an occupied room, area or space where the path of egress enters an intervening room, corridor, ~~unenclosed~~ exit access stair or ~~unenclosed~~ exit access ramp.

EXIT ACCESS RAMP. An interior ramp that is not a required interior exit ramp.

EXIT ACCESS STAIRWAY. An interior stairway that is not a required interior exit stairway.

~~**EXIT ENCLOSURE.** An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a vertical or horizontal direction to the exit discharge or the public way.~~

INTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

INTERIOR EXIT STAIRWAY. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

SECTION 1009 (IFC [B] 1009)
STAIRWAYS

1009.1 (IFC [B] 1009.1)General. Stairways serving occupied portions of a building shall comply with the requirements of this section.

1009.2 (IFC [B] 1009.2) Interior exit stairways. Interior exit stairways shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1.

1009.2.1 (IFC [B] 1009.2.1) Where required. Interior exit stairways shall be included, as necessary, to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance.

1009.2.2 (IFC [B] 1009.2.2) Enclosure. All interior exit stairways shall be enclosed in accordance with the provisions of Section 1022.

1009.3 (IFC [B] 1009.3) Exit access stairways. Floor openings between stories created by exit access stairways shall be enclosed.

Exceptions:

1. In other than Group I-2 and I-3 occupancies, exit access stairways that serve, or atmospherically communicate between, only two stories, are not required to be enclosed.
2. Exit access stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
3. In buildings with only Group B or M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.
4. In other than Groups B and M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the floor opening does not connect more than four stories, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. 5. Exit access stairways within an atrium complying with the provisions of Section 404 are not required to be enclosed.
6. Exit access stairways and ramps in open parking garages that serve only the parking garage are not required to be enclosed.
7. Stairways serving outdoor facilities where all portions of the means of egress are essentially open to the outside are not required to be enclosed.
8. Exit access stairways serving stages complying with Section 410.5.3.1 and 1015.6 are not required to be enclosed.
9. Stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.
10. In Group I-3 occupancies, exit access stairways constructed in accordance with Section 408.5 are not required to be enclosed.

1009.3.1 (IFC [B] 1009.3.1) Construction. Where required, enclosures for exit access stairways shall be constructed in accordance with this section. Exit access stairway enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.

1009.3.1.1 (IFC [B] 1009.3.1.1) Materials. Exit access stairway enclosures shall be of materials permitted by the building type of construction.

1009.3.1.2 (IFC [B] 1009.3.1.2) Fire-resistance rating. Exit access stairway enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more, and not less than 1 hour where connecting less than four stories. The number of stories connected by the exit access stairway enclosures shall include any basements, but not any mezzanines. Exit access stairway enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.

1009.3.1.3 (IFC [B] 1009.3.1.3) Continuity. Exit access stairway enclosures shall have continuity in accordance with Section 707.5 for fire barriers or Section 712.4 for horizontal assemblies as applicable.

1009.3.1.4 (IFC [B] 1009.3.1.4) Openings. Openings in an exit access stairway enclosure shall be protected in accordance with Section 715 as required for fire barriers. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 715.4.8.3.

1009.3.1.4.1 (IFC [B] 1009.3.1.4.1) Prohibited openings. Openings other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.

1009.3.1.5 (IFC [B] 1009.3.1.5) Penetrations. Penetrations in an exit access stairway enclosure shall be protected in accordance with Section 713 as required for fire barriers.

1009.3.1.5.1 (IFC [B] 1009.3.1.5.1) Prohibited penetrations. Penetrations other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.

1009.3.1.6 (IFC [B] 1009.3.1.6) Joints. Joints in an exit access stairway enclosure shall comply with Section 714.

1009.3.1.7 (IFC [B] 1009.3.1.7) Ducts and air transfer openings. Penetrations of an exit access stairway enclosure by ducts and air transfer openings shall comply with Section 716.

1009.3.1.8 (IFC [B] 1009.3.1.8) Exterior walls. Where exterior walls serve as a part of an exit access stairway enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply.

1009.4 ~~1009.1~~ (IFC [B] 1009.4 ~~1009.1~~) Stairway width. *(No change to text)*

(Renumber subsequent sections)

SECTION 1010
RAMPS

1010.2 (IFC [B] 1010.2) Enclosure. All interior exit ramps shall be enclosed in accordance with the applicable provisions of Section 1022. Exit access ramps shall be enclosed in accordance with the provisions of Section 1009.3 for enclosure of stairways.

(Renumber subsequent sections)

~~1010.7~~ 1010.8 (IFC [B] ~~1010.7~~ 1010.8) Ramp construction. All ramps shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood handrails shall be permitted for all types of construction. ~~Ramps used as an exit shall conform to the applicable requirements of Sections 1022.1 through 1022.6 for exit enclosures.~~

SECTION 1016 (IFC [B] 1016)
EXIT ACCESS TRAVEL DISTANCE

1016.1 (IFC [B] 1016.1) General ~~Travel distance limitations.~~ Travel distance within the exit access portion of the means of egress system shall be in accordance with this section. ~~Exits shall be so located on each story such that the maximum length of exit access travel, measured from the most remote point within a story along the natural and unobstructed path of egress travel to an exterior exit door at the level of exit discharge, an entrance to a vertical exit enclosure, an exit passageway, a horizontal exit, an exterior exit stairway or an exterior exit ramp shall not exceed the distances given in Table 1016.1.~~

~~Exceptions:~~

1. ~~Travel distance in open parking garages is permitted to be measured to the closest riser of open exit stairways.~~
2. ~~In outdoor facilities with open exit access components and open exterior exit stairways or exit ramps, travel distance is permitted to be measured to the closest riser of an exit stairway or the closest slope of the exit ramp.~~
3. ~~In other than occupancy Groups H and I, the exit access travel distance to a maximum of 50 percent of the exits is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps when connecting a maximum of two stories. The two connected stories shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.~~
4. ~~In other than occupancy Groups H and I, exit access travel distance is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps in the first and second stories above grade plane in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. The first and second stories above grade plane shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.~~

5. ~~Where applicable, travel distance on unenclosed exit access stairways or ramps and on connecting stories shall also be included in the travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stairway.~~

1016.2 (IFC [B] 1016.2) Limitations. Exit access travel distance shall not exceed the values given in Table 1016.2.

TABLE ~~1016.1~~ 1016.2 (IFC [B] TABLE ~~1016.1~~ 1016.2)
EXIT ACCESS TRAVEL DISTANCE[a]
(Portions of table not shown remain unchanged)

~~1016.2~~ 1016.2.1 (IFC [B] ~~1016.2~~ 1016.2.1) Exterior egress balcony increase. Exit access travel distances specified in ~~Section 1016.1~~ Table 1016.2 shall be increased up to an additional 100 feet (30 480 mm) provided the last portion of the exit access leading to the exit occurs on an exterior egress balcony constructed in accordance with Section 1019. The length of such balcony shall not be less than the amount of the increase taken.

1016.3 (IFC [B] 1016.3) Measurement. Exit access travel distance shall be measured from the most remote point within a story along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an exit.

Exceptions:

1. In open parking garages, exit access travel distance is permitted to be measured to the closest riser of an exit access stairway or the closest slope of an exit access ramp.
2. In outdoor facilities with open exit access components, exit access travel distance is permitted to be measured to the closest riser of an exit access stairway or the closest slope of an exit access ramp.

1016.3.1 (IFC [B] 1016.3.1) Exit access stairways and ramps. Travel distance on exit access stairways or ramps shall be included in the exit access travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stair and landings. The measurement along ramps shall be made on the walking surface in the center of the ramp and landings.

SECTION 1021(IFC [B] 1021)
NUMBER OF EXITS AND ~~CONTINUITY~~ EXIT CONFIGURATION

1021.1 (IFC [B] 1021.1) General. Each story and occupied roof shall have the minimum number of exits, or access to exits, as specified in this section. The required number of exits, or exit access stairways or ramps providing access to exits, from any story shall be maintained until arrival at grade or a public way. Exits or access to exits from any story shall be configured in accordance with this section. Each story above the second story of a building shall have a minimum of one interior or exterior exit stairway, or interior or exterior exit ramp. At each story above the second story that requires a minimum of three or more exits, or access to exits, a minimum of 50% of the required exits shall be interior or exterior exit stairways, or interior or exterior exit ramps.

Exceptions:

1. Interior exit stairways and interior exit ramps are not required in open parking garages where the means of egress serves only the open parking garage.
2. Interior exit stairways and interior exit ramps are not required in outdoor facilities where all portions of the means of egress are essentially open to the outside.

~~**1021.1 (IFC [B] 1021.1) Exits from stories.** All spaces within each story shall have access to the minimum number of approved independent exits as specified in Table 1021.1 based on the occupant load of the story. For the purposes of this chapter, occupied roofs shall be provided with exits as required for stories.~~

~~**Exceptions:**~~

1. ~~As modified by Section 403.15 (Additional exit stairway).~~
2. ~~As modified by Section 1021.2.~~
3. ~~Exit access stairways and ramps that comply with Exception 3 or 4 of Section 1016.1 shall be permitted to provide the minimum number of approved independent exits required by Table 1021 on each story.~~
4. ~~In Groups R-2 and R-3 occupancies, one means of egress is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.~~
5. ~~Within a story, rooms and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.~~

~~The required number of exits from any story shall be maintained until arrival at grade or the public way.~~

~~TABLE 1021.1 (IFC [B] TABLE 1021.1)~~
~~**MINIMUM NUMBER OF EXITS FOR OCCUPANT LOAD**~~

~~**OCCUPANT LOAD (persons per story)**~~	~~**MINIMUM NUMBER OF EXITS (per story)**~~
~~1-500~~	~~2~~
~~501-1,000~~	~~3~~
~~More than 1,000~~	~~4~~

~~**1021.1.2 (IFC [B] 1021.1.2) Parking structures.** Parking structures shall not have less than two exits from each parking tier, except that only one exit is required where vehicles are mechanically parked. Unenclosed vehicle ramps shall not be considered as required exits unless pedestrian facilities are provided.~~

~~**1021.1.3 (IFC [B] 1021.1.3) Helistops.** The means of egress from helistops shall comply with the provisions of this chapter, provided that landing areas located on buildings or structures shall have two or more exits. For landing platforms or roof areas less than 60 feet (18 288 mm) long, or less than 2,000 square feet (186 m^2) in area, the second means of egress is permitted to be a fire escape, alternating tread device or ladder leading to the floor below.~~

1021.2 (IFC [B] 1021.2) <u>Number of exits</u> ~~Single exits.~~ ~~Only one exit shall be required from Group R-3 occupancy buildings or from stories of other buildings as indicated in Table 1021.2. Occupancies shall be permitted to have a single exit in buildings otherwise required to have more than one exit if the areas served by the single exit do not exceed the limitations of Table 1021.2. Mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with a single exit shall not be located more than one story below grade plane.~~ <u>Two exits, or exit access stairways or ramps providing access to exits, from any story or occupied roof shall be provided where one of the following conditions exists:</u>

1. <u>The occupant load exceeds one of the values in Table 1021.2.</u>
2. <u>The exit access travel distance exceeds that specified in Table 1021.2 as determined in accordance with the provisions of Section 1016.1.</u>
3. <u>Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.</u>

<u>Exceptions:</u>

1. <u>Rooms, areas and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.</u>
2. <u>Group R-3 occupancy buildings shall be permitted to have a one exit.</u>
3. <u>Parking garages where vehicles are mechanically parked shall be permitted to have one exit,</u>
4. <u>Air traffic control towers shall be provided with the minimum number of exits specified in Section 412.3.</u>
5. <u>Individual dwelling units with a maximum occupant load of 20 in Group R-2 and R-3 occupancies shall be permitted to one exit.</u>
6. <u>Group R-3 and R-4 congregate residences shall be permitted to have one exit.</u>

<u>Where one exit, or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with one exit shall not be located more than one story below grade plane.</u>

TABLE 1021.2 (IFC [B] TABLE 1021.2)
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT

STORY	OCCUPANCY	MAXIMUM OCCUPANTS (OR DWELLING UNITS) PER ~~FLOOR~~ STORY	~~AND~~ MAXIMUM EXIT ACCESS TRAVEL DISTANCE
First story or basement	A, B[b] ~~[d]~~, E[c] ~~[e]~~, F[b] ~~[d]~~, M, U, S[b] ~~[d]~~	49 occupants ~~and~~	75 feet
	H-2, H-3	3 occupants ~~and~~	25 feet
	H-4, H-5, I, R	10 occupants ~~and~~	75 feet
	S	29 occupants ~~and~~	100 feet
Second story	B~~[b]~~, F, M, S~~[a]~~	29 occupants ~~and~~	75 feet
	R-2	4 dwelling units ~~and~~	50 feet
Third story	R-2[a] ~~[c]~~	4 dwelling units ~~and~~	50 feet
Fourth story and above	NP	NA	NA

For SI: 1 foot = 3048.mm
NP – Not Permitted
NA – Not Applicable
~~a. For the required number of exits for parking structures, see Section 1021.1.2.~~
~~b. For the required number of exits for air traffic control towers, see Section 412.3.~~
~~c.~~ a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1026.
~~d.~~ b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.
~~e.~~ c. Day care occupancies shall have a maximum occupant load of 10.

1021.2.1 (IFC [B] 1021.2.1) Three or more exits. Three exits, or exit access stairways or ramps providing access to exits at other stories, shall be provided from any story or occupied roof with an occupant load of 501-1,000. Four exits, or exit access stairways or ramps providing access to exits at other stories, shall be provided from any story or occupied roof with an occupant load greater than 1,000.

1021.2.2 (IFC [B] 1021.2.2) Additional exits. In buildings over 420 feet in height, additional exits shall be provided in accordance with Section 403.5.2.

1021.3 (IFC [B] 1021.3) Exit configuration ~~continuity~~. Exits, or exit access stairways or ramps providing access to exits at other stories, shall be arranged in accordance with the provisions of Section 1015.2 through 1015.2.2. Exits shall be continuous from the point of entry into the exit to the exit discharge.

1021.3.1 (IFC [B] 1021.3.1) Access to exits at adjacent levels. Access to exits at other levels shall be by stairways or ramps. Where access to exits occurs from adjacent building levels, the horizontal and vertical exit access travel distance to the closest exit shall not exceed that specified in Section 1016.1. Access to exits at other levels shall be from an adjacent story.

> **Exception:** Landing platforms or roof areas for helistops that are less than 60 feet (18 288 mm) long, or less than 2,000 square feet (186 m^2) in area, shall be permitted to access the second exit by a fire escape, alternating tread device or ladder leading to the story or level below.

1021.4 (IFC [B] 1021.4) Vehicular ramps. Vehicular ramps shall not be considered as an exit access ramp unless pedestrian facilities are provided.

~~**1021.4 (IFC [B] 1021.4) Exit door arrangement.** Exit door arrangement shall meet the requirements of Sections 1015.2 through 1015.2.2.~~

SECTION 1022 (IFC [B] 1022)
~~EXIT ENCLOSURES~~ INTERIOR EXIT STAIRWAYS AND RAMPS

1022.1 (IFC [B] 1022.1) General. Interior exit stairways and interior exit ramps serving as an exit component in a means of egress system shall comply with the requirements of this section. Interior exit stairways and ramps shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An interior exit stairway or ramp shall not be used for any purpose other than as a means of egress.

~~1022.1~~ 1022.2 (IFC [B] ~~1022.1~~ 1022.2) ~~Enclosures required~~ Construction. Enclosures for interior exit stairways and ~~interior exit~~ ramps shall be ~~enclosed with~~ constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. Interior exit stairway and ramp ~~Exit~~ enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps ~~exit enclosure~~ shall include any basements, but not any mezzanines. Interior exit stairways and ramps ~~exit enclosures~~ shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. ~~Exit enclosures shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An exit enclosure shall not be used for any purpose other than means of egress.~~

~~Exceptions~~ Exception: Interior exit stairways and ramps in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.

1. ~~In all occupancies, other than Groups H and I occupancies, a stairway is not required to be enclosed when the stairway serves an occupant load of less than 10 and the stairway complies with either Item 1.1 or 1.2. In all cases, the maximum number of connecting open stories shall not exceed two.~~
   - ~~1.1 The stairway is open to not more than one story above its level of exit discharge; or~~
   - ~~1.2 The stairway is open to not more than one story below its level of exit discharge.~~
2. ~~Exits in buildings of Group A-5 where all portions of the means of egress are essentially open to the outside need not be enclosed.~~
3. ~~Stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.~~
4. ~~Stairways in open parking structures that serve only the parking structure are not required to be enclosed.~~
5. ~~Stairways in Group I-3 occupancies, as provided for in Section 408.3.8, are not required to be enclosed.~~
6. ~~Means of egress stairways as required by Sections 410.5.3 and 1015.6.1 are not required to be enclosed.~~
7. ~~Means of egress stairways from balconies, galleries and press boxes as provided for in Section 1028.5.1, are not required to be enclosed.~~

~~1022.2~~ 1022.3 (IFC [B] ~~1022.2~~ 1022.3) Termination. ~~Exit enclosures~~ Interior exit stairways and ramps shall terminate at an exit discharge or a public way.

Exception: ~~An exit enclosures~~ Interior exit stairways and ramps shall be permitted to terminate at an exit passageway complying with Section 1023, provided the exit passageway terminates at an exit discharge or a public way.

~~1022.2.1~~ 1022.3.1 (IFC [B] ~~1022.2.1~~ 1022.3.1) Extension. Where ~~an exit enclosures~~ interior exit stairways and ramps are ~~is~~ extended to an exit discharge or a public way by an exit passageway, the ~~exit enclosure~~ interior exit stairway and ramp shall be separated from the exit passageway by a fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 712, or both. The fire-resistance rating shall be at least equal to that required for the ~~exit enclosure~~ interior exit stairway and ramp. A fire door assembly complying with Section 715.4 shall be installed in the fire barrier to provide a means of egress from the ~~exit enclosure~~ interior exit stairway and ramp to the exit passageway. Openings in the fire barrier other than the fire door assembly are prohibited. Penetrations of the fire barrier are prohibited.

Exception: Penetrations of the fire barrier in accordance with Section 1022.4 shall be permitted.

~~1022.3~~ 1022.4 (IFC [B] ~~1022.3~~ 1022.4) Openings and penetrations. ~~Exit enclosure~~ Interior exit stairway and ramp opening protectives shall be in accordance with the requirements of Section 715.

Openings ~~in exit enclosures~~ interior exit stairways and ramps other than unprotected exterior openings shall be limited to those necessary for exit access to the enclosure from normally occupied spaces and for egress from the enclosure.

Elevators shall not open into ~~an exit enclosures~~ Interior exit stairways and ramps.

~~1022.4~~ 1022.5 (IFC [B] ~~1022.4~~ 1022.5) Penetrations. Penetrations into and openings through ~~an exit enclosure~~ Interior exit stairways and ramps are prohibited except for required exit doors, equipment and ductwork necessary for independent ventilation or pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication systems and electrical raceway serving the ~~exit enclosure~~ interior exit stairway and ramp and terminating at a steel box not exceeding 16 square inches (0.010 m^2). Such penetrations shall be protected in accordance with Section 713. There shall be no penetrations or communication openings, whether protected or not, between adjacent ~~exit enclosures~~ interior exit stairways and ramps.

~~1022.5~~ 1022.6 (IFC [B] ~~1022.5~~ 1022.6) Ventilation. Equipment and ductwork for ~~exit enclosure~~ interior exit stairway and ramp ventilation as permitted by Section 1022.4 shall comply with one of the following items:

1. Such equipment and ductwork shall be located exterior to the building and shall be directly connected to the ~~exit enclosure~~ interior exit stairway and ramp by ductwork enclosed in construction as required for shafts.
2. Where such equipment and ductwork is located within the ~~exit enclosure~~ interior exit stairway and ramp, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or such air shall be conveyed through ducts enclosed in construction as required for shafts.
3. Where located within the building, such equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the fire-resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 715 for shaft enclosures.

The ~~Exit enclosure~~ interior exit stairway and ramp ventilation systems shall be independent of other building ventilation systems.

~~1022.6~~ 1022.7 (IFC [B] ~~1022.6~~ 1022.7) ~~Exit enclosure~~ Interior exit stairway and ramp exterior walls. Exterior walls of the ~~an exit enclosure~~ interior exit stairway and ramp shall comply with the requirements of Section 705 for exterior walls. Where nonrated walls or unprotected openings enclose the exterior of the stairway and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than ¾ hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or to the roof line, whichever is lower.

~~1022.7~~ 1022.8 (IFC [B] ~~1022.7~~ 1022.8) Discharge identification. ~~A stairway in an exit enclosure~~ ~~An~~ interior exit stairway and ramp shall not continue below its level of exit discharge unless an approved barrier is provided at the level of exit discharge to prevent persons from unintentionally continuing into levels below. Directional exit signs shall be provided as specified in Section 1011.

~~1022.8~~ 1022.9 (IFC [B] ~~1022.8~~ 1022.9) Floor identification signs. A sign shall be provided at each floor landing in ~~exit enclosures~~ an interior exit stairway and ramp connecting more than three stories designating the floor level, the terminus of the top and bottom of the ~~exit enclosure~~ interior exit stairway and ramp and the identification of the stair or ramp. The signage shall also state the story of, and the direction to, the exit discharge and the availability of roof access from the ~~enclosure~~ interior exit stairway and ramp for the fire department. The sign shall be located 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions. Floor level identification signs in tactile characters complying with ICC A117.1 shall be located at each floor level landing adjacent to the door leading from the ~~enclosure~~ interior exit stairway and ramp into the corridor to identify the floor level.

~~1022.8.1~~ 1022.9.1 (IFC [B] ~~1022.8.1~~ 1022.9.1) Signage requirements. Stairway identification signs shall comply with all of the following requirements:

1. The signs shall be a minimum size of 18 inches (457 mm) by 12 inches (305 mm).
2. The letters designating the identification of the ~~stair enclosure~~ interior exit stairway and ramp shall be a minimum of 11/2 inches (38 mm) in height.
3. The number designating the floor level shall be a minimum of 5 inches (127 mm) in height and located in the center of the sign.
4. All other lettering and numbers shall be a minimum of 1 inch (25 mm) in height.
5. Characters and their background shall have a nonglare finish. Characters shall contrast with their background, with either light characters on a dark background or dark characters on a light background.
6. When signs required by Section 1022.8 are installed in ~~interior exit enclosures~~ the interior exit stairways and ramps of buildings subject to Section 1024, the signs shall be made of the same materials as required by Section 1024.4.

~~1022.9~~ 1022.10 (IFC [B] ~~1022.9~~ 1022.10) Smokeproof enclosures and pressurized stairways and ramps. In buildings required to comply with Section 403 or 405, each of the ~~exit enclosures~~ interior exit stairways and ramps serving a story with a floor surface located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access or more than 30 feet (9144 mm) below the finished floor of a level of exit discharge serving such stories shall be a smokeproof enclosure or pressurized stairway or ramp in accordance with Section 909.20.

SECTION 403
HIGH-RISE BUILDINGS

403.2.3 Structural integrity of interior exit stairways ~~exit enclosures~~ and elevator hoistway enclosures. For high-rise buildings of occupancy category III or IV in accordance with Section 1604.5, and for all buildings that are more than 420 feet (128 000 mm) in building height, enclosures for interior exit stairways ~~exit enclosures~~ and elevator hoistway enclosures shall comply with Sections 403.2.3.1 through 403.2.3.4.

403.2.3.1 Wall assembly. The wall assemblies making up the enclosures for interior exit stairways ~~exit enclosures~~ and elevator hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C 1629/C 1629M.

403.2.3.2 Wall assembly materials. The face of the wall assemblies making up the enclosures for interior exit stairways ~~exit enclosures~~ and elevator hoistway enclosures that are not exposed to the interior of the enclosures for interior exit stairways ~~exit enclosures~~ or elevator hoistway enclosure shall be constructed in accordance with one of the following methods:

1. The wall assembly shall incorporate not less than two layers of impact-resistant construction board each of which meets or exceeds Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C 1629/C 1629M.
2. The wall assembly shall incorporate not less than one layer of impact-resistant construction material that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C 1629/C 1629M.
3. The wall assembly incorporates multiple layers of any material, tested in tandem, that meet or exceed Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C 1629/C 1629M.

403.5.1 Remoteness of interior exit stairways ~~enclosures~~. ~~The~~ Required interior exit ~~stairway~~ stairways ~~enclosures~~ shall be separated by a distance not less than 30 feet (9144 mm) or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the ~~exit stairway enclosures~~ interior exit stairways. In buildings with three or more interior exit stairway ~~enclosures~~, at least two of the interior exit stairway ~~enclosures~~ shall comply with this section. Interlocking or scissor stairs shall be counted as one interior exit stairway.

403.5.4 Smokeproof ~~exit~~ enclosures. Every required exit stairway serving floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall comply with Sections 909.20 and 1022.9.

SECTION 408
GROUP I-3

408.3.8 Interior exit stairway and ramp construction ~~enclosures~~. One ~~of the required~~ interior exit stairway or ramp ~~exit enclosures~~ in each building shall be permitted to have glazing installed in doors and interior walls at each landing level providing access to the ~~enclosure~~ interior exit stairway or ramp, provided that the following conditions are met:

1. The interior exit stairway or ramp ~~exit enclosures~~ shall not serve more than four floor levels.
2. Exit doors shall not be less than 3/4-hour fire door assemblies complying with Section 715.4
3. The total area of glazing at each floor level shall not exceed 5,000 square inches ($3m^2$) and individual panels of glazing shall not exceed 1,296 square inches ($0.84\ m^2$).
4. The glazing shall be protected on both sides by an automatic sprinkler system. The sprinkler system shall be designed to wet completely the entire surface of any glazing affected by fire when actuated.
5. The glazing shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler system operates.
6. Obstructions, such as curtain rods, drapery traverse rods, curtains, drapes or similar materials shall not be installed between the automatic sprinklers and the glazing.

SECTION 410
STAGES AND PLATFORMS

410.5.3.1 Stairway and ramp enclosure. Exit access stairways and ramps serving the stage are not required to be enclosed. Exit access stairways serving the lighting and access catwalks, galleries and gridirons are not required to be enclosed.

SECTION 705
EXTERIOR WALLS

705.2 Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways and ramps shall also comply with Sections 1019 and 1026, respectively. Projections shall not extend beyond the distance determined by the following three methods, whichever results in the lesser projection:

1. A point one-third the distance from the exterior face of the wall to the lot line where protected openings or a combination of protected and unprotected openings are required in the exterior wall.
2. A point one-half the distance from the exterior face of the wall to the lot line where all openings in the exterior wall are permitted to be unprotected or the building is equipped throughout with an automatic sprinkler system installed under the provisions of Section 705.8.2.
3. More than 12 inches (305 mm) into areas where openings are prohibited.

Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section.

SECTION 707
FIRE BARRIERS

707.3.2 Interior exit stairway and ramp construction ~~enclosures~~. The fire-resistance rating of the fire barrier separating building areas from an interior exit stairway or ramp shall comply with Section 1022.1.

707.3.3 Enclosures for exit access stairways. The fire-resistance rating of the fire barrier separating building areas from an exit access stairway or ramp shall comply with Section 1009.3.1.2.

707.4 Exterior walls. Where exterior walls serve as a part of a required fire-resistance-rated shaft or stairway or ramp ~~exit~~ enclosure, or separation, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure or separation requirements shall not apply.

Exception: Exterior walls required to be fire-resistance rated in accordance with Section 1019 for exterior egress balconies, Section ~~1022.6~~ 1022.7 for interior exit stairways and ramps ~~enclosures~~ and Section 1026.6 for exterior exit stairways and ramps ~~and stairways~~.

707.5.1 Supporting construction. The supporting construction for fire barriers shall be protected to afford the required fire-resistance rating of the fire barrier supported. Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 717.2 at every floor level.

Exceptions:

1. The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided in Section 415.6.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type.
2. Shaft enclosures shall be permitted to terminate at a top enclosure complying with Section 707.12.
3. Supporting construction for 1-hour fire barriers required by Table 508.2.5 in buildings of Type IIB, IIIB and VB construction is not required to be fire-resistance rated unless required by other sections of this code.
4. Interior exit stairway and ramp enclosures required by Section 1022.2 and exit access stairway and ramp enclosures required by Section 1009.3 shall be permitted to terminate at a top enclosure complying with Section 707.12.

707.6 Openings. Openings in a fire barrier shall be protected in accordance with Section 715. Openings shall be limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single opening shall not exceed 156 square feet (15 m^2). Openings in enclosures for exit access stairways and ramps, interior exit stairways and ramps ~~exit enclosures~~ and exit passageways shall also comply with Sections 1022.3 and 1023.5, respectively.

Exceptions:

1. Openings shall not be limited to 156 square feet (15 m^2) where adjoining floor areas are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a fire door serving ~~an~~ enclosures for exit access stairways, exit access ramps, interior exit stairways and interior exit ramps ~~exit enclosures~~.
3. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective has been tested in accordance with ASTME 119 orUL263 and has a minimum fire-resistance rating not less than the fire-resistance rating of the wall.
4. Fire window assemblies permitted in atrium separation walls shall not be limited to a maximum aggregate width of 25 percent of the length of the wall.
5. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a fire door assembly in a fire barrier separating an enclosures for exit access stairways, exit access ramps, interior exit stairways and interior exit ramps ~~exit enclosures~~ from an exit passageway in accordance with Section 1022.2.1.

707.7.1 Prohibited penetrations. Penetrations into ~~an~~ enclosures for exit access stairways, exit access ramps, interior exit stairways, interior exit ramps ~~exit enclosures~~ or an exit passageway shall be allowed only when permitted by Section 1009.3.1.5, ~~1022.4~~ 1022.5 or 1023.6, respectively.

SECTION 708
SHAFT ENCLOSURES

708.1 General. The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Exit access stairways and exit access ramps shall be protected in accordance with the applicable provisions of Section 1009. Interior exit stairways and interior exit ramps shall be protected in accordance with the requirements of Section 1022. ~~Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.~~

708.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure ~~complying with this section~~.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening ~~or stairway that is not a portion of the means of egress~~ protected according to Item 2.1 or 2.2.
   2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator ~~or stairway~~ and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. The shutters shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.
3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 713.4.
4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 716.6. Grease ducts shall be protected in accordance with the International Mechanical Code.

5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with the provisions for atriums in Section 404.
6. A shaft enclosure is not required for approved masonry chimneys where annular space is fireblocked at each floor level in accordance with Section 717.2.5.
7. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   7.1. Does not connect more than two stories.
   ~~7.2. Is not part of the required means of egress system.~~
   7.3. Is not concealed within the construction of a wall or a floor/ceiling assembly.
   7.4. Is not open to a corridor in Group I and R occupancies.
   7.5. Is not open to a corridor on nonsprinklered floors in any occupancy.
   7.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   7.7. Is limited to the same smoke compartment.
8. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.
9. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 714.

~~11. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1.~~

11~~12~~. Floor openings protected by floor fire doors in accordance with Section 712.8.

~~13. In Group I-3 occupancies, a shaft enclosure is not required for floor openings in accordance with Section 408.5.~~

12~~14~~. A shaft enclosure is not required for elevator hoistways in open or enclosed parking garages that serve only the parking garage.

13~~15~~. In open or enclosed parking garages a shaft enclosure is not required to enclose mechanical exhaust or supply duct systems when such duct system is contained within and serves only the parking garage.

14~~16~~. Where permitted by other sections of this code.

708.3 Construction. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.

~~708.3~~ 708.4 Materials. *(No change to text)*

~~708.4~~ 708.5 Fire-resistance rating. *(No change to text)*

~~708.5~~ 708.6 Continuity. *(No change to text)*

~~708.6~~ 708.7Exterior walls. Where exterior walls serve as a part of a required shaft enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply.

> **Exception:** Exterior walls required to be fire-resistance rated in accordance with Section 1019.2 for exterior egress balconies, Section ~~1022.6~~ 1022.7 for interior exit stairways and ramps ~~exit enclosures~~ and Section 1026.6 for exterior exit stairways and ramps ~~and stairways~~.

(Renumber subsequent sections)

SECTION 709
FIRE PARTITIONS

709.5 Exterior walls. Where exterior walls serve as a part of a required fire-resistance-rated separation, such walls shall comply with the requirements of Section 705 for exterior walls, and the fire-resistance-rated separation requirements shall not apply.

> **Exception:** Exterior walls required to be fire-resistance rated in accordance with Section 1019.2 for exterior egress balconies, Section 1022.6 for interior exit stairways and ramps ~~exit enclosures~~ and Section 1026.6 for exterior exit stairways and ramps ~~and stairways~~.

SECTION 712
HORIZONTAL ASSEMBLIES

712.4 Continuity. Assemblies shall be continuous without openings, penetrations or joints except as permitted by this section and Sections 708.2, 713.4, 714, 1009.3 and 1022.1. Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained. Unprotected skylights shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 704.10. The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.

Exception: In buildings of Type IIB, IIIB or VB construction, the construction supporting the horizontal assembly is not required to be fire-resistance-rated at the following:

1. Horizontal assemblies at the separations of incidental uses as specified by Table 508.2.5, provided the required fire-resistance rating does not exceed 1 hour.
2. Horizontal assemblies at the separations of dwelling units and sleeping units as required by Section 420.3.
3. Horizontal assemblies at smoke barriers constructed in accordance with Section 710.

SECTION 715
OPENING PROTECTIVES

TABLE 715.4
FIRE DOOR AND FIRE SHUTTER FIRE PROTECTION RATINGS

TYPE OF ASSEMBLY	REQUIRED ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)
Fire barriers having a required fire-resistance rating of 1 hour: ~~Shaft, exit~~ Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways, interior exit ramps and exit passageway walls	1	1
Other fire barriers	1	3/4

(Portions of table not shown remain unchanged)

715.4.4 Doors in ~~exit enclosures~~ interior exit stairways and ramps and exit passageways. Fire door assemblies in interior exit stairways and ramps ~~exit enclosures~~ and exit passageways shall have a maximum transmitted temperature end point of not more than 450ºF (250ºC) above ambient at the end of 30 minutes of standard fire test exposure.

Exception: The maximum transmitted temperature rise is not required in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

715.4.6.1 Fire door labeling requirements. Fire doors shall be labeled showing the name of the manufacturer or other identification readily traceable back to the manufacturer, the name or trademark of the third-party inspection agency, the fire protection rating and, where required for fire doors in interior exit stairways and ramps ~~exit enclosures~~ and exit passageways by Section 715.4.4, the maximum transmitted temperature end point. Smoke and draft control doors complying with UL 1784 shall be labeled as such and shall also comply with Section 715.4.6.3. Labels shall be approved and permanently affixed. The label shall be applied at the factory or location where fabrication and assembly are performed.

715.4.7.2 ~~Exit and~~ Elevator, stairway and ramp protectives. Approved fire-protection-rated glazing used in fire door assemblies in elevator, stairways and ramps ~~exit~~ enclosures shall be so located as to furnish clear vision of the passageway or approach to the elevator, ~~ramp or~~ stairway or ramp.

SECTION 716
DUCT AND TRANSFER OPENINGS

716.5.2 Fire barriers. Ducts and air transfer openings of fire barriers shall be protected with approved fire dampers installed in accordance with their listing. Ducts and air transfer openings shall not penetrate enclosures for stairways ramps ~~exit enclosures~~ and exit passageways except as permitted by Sections 1022.4 and 1023.6, respectively.

Exception: Fire dampers are not required at penetrations of fire barriers where any of the following apply:

1. Penetrations are tested in accordance with ASTM E119 or UL 263 as part of the fire-resistance-rated assembly.
2. Ducts are used as part of an approved smoke control system in accordance with Section 909 and where the use of a fire damper would interfere with the operation of a smoke control system.
3. Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, are in areas of other than Group Hand are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than No. 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

SECTION 803
WALL AND CEILING FINISHES

TABLE 803.9
INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

GROUP	SPRINKLERED[l]			NONSPRINKLERED		
	Interior exit stairways, interior exit ramps ~~exit enclosures~~ and exit passageways[a, b]	Corridors and enclosure for exit access stairways and exit access ramps	Rooms and enclosed spaces[c]	Interior exit stairways, interior exit ramps ~~exit enclosures~~ and exit passageways[a, b]	Corridors and enclosure for exit access stairways and exit access ramps	Rooms and enclosed spaces[c]

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 square foot = $0.0929m^2$.

a. Class C interior finish materials shall be permitted for wainscotting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.11.1.

b. In other than Group I-3 occupancies ,~~exit enclosures of~~ in buildings less than three stories above grade plane ~~of other than Group I-3~~, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.

c. Requirements for rooms and enclosed spaces shall be based upon spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered enclosing spaces and the rooms or spaces on both sides shall be considered one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall not be less than Class B materials.

e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.

f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

g. Class B material is required where the building exceeds two stories.

h. Class C interior finish materials shall be permitted in administrative spaces.

i. Class C interior finish materials shall be permitted in rooms with a capacity of four persons or less.

j. Class B materials shall be permitted as wainscotting extending not more than 48 inches above the finished floor in corridors and exit access stairways and ramps.

k. Finish materials as provided for in other sections of this code.

l. Applies when ~~the exit enclosures, exit passageways, corridors or rooms and enclosed spaces are~~ protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

SECTION 804
INTERIOR FLOOR FINISH

804.4 Interior floor finish requirements. In all occupancies, interior floor finish and floor covering materials <u>for interior exit stairways and ramps</u> ~~exit enclosures~~, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux as specified in Section 804.4.1.

804.4.1 Minimum critical radiant flux. Interior floor finish and floor covering materials in <u>enclosures for</u> <u>stairways and ramp</u> ~~exit enclosures~~, exit passageways and corridors shall not be less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I-4, M, R-1, R-2 and S. In all areas, floor covering materials shall comply with the DOCFF-1 “pill test” (CPSC 16 CFR, Part 1630).

> **Exception:** Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required, and materials complying with the DOC FF-1 “pill test” (CPSC 16 CFR, Part 1630) are permitted in any area where Class II Materials are required.

SECTION 1006 (IFC [B] 1006)
MEANS OF EGRESS ILLUMINATION

1006.3 (IFC [B] 1006.3) Illumination emergency power. The power supply for means of egress illumination shall normally be provided by the premises’ electrical supply.

In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Aisles and unenclosed egress stairways in rooms and spaces that require two or more means of egress.
2. Corridors, <u>interior exit stairways and ramps</u> ~~exit enclosures~~ and exit passageways in buildings required to have two or more exits.
3. Exterior egress components at other than their levels of exit discharge until exit discharge is accomplished for buildings required to have two or more exits.
4. Interior exit discharge elements, as permitted in Section 1027.1, in buildings required to have two or more exits.
5. Exterior landings as required by Section 1008.1.6 for exit discharge doorways in buildings required to have two or more exits.

The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Chapter 27.

SECTION 1007 (IFC [B] 1007)
ACCESSIBLE MEANS OF EGRESS

1007.2 (IFC [B] 1007.2) Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with Section 1104.
2. Interior exit stairways complying with Sections 1007.3 and 1022.
<u>3.</u> <u>Interior exit access stairways between two stories complying with Sections 1007.3 and 1009.3.</u>
~~3.~~<u>4</u> Exterior exit stairways complying with Sections 1007.3 and 1026.
~~4.~~<u>5</u>. Elevators complying with Section 1007.4.
~~5.~~<u>6</u>. Platform lifts complying with Section 1007.5.
~~6.~~<u>7</u>. Horizontal exits complying with Section 1025.
~~7.~~<u>8</u>. Ramps complying with Section 1010.
~~8.~~<u>9</u>. Areas of refuge complying with Section 1007.6.

Exceptions:

1. Where the exit discharge is not accessible, an exterior area for assisted rescue shall be provided in accordance with Section 1007.7.
2. Where the exit stairway is open to the exterior, the accessible means of egress shall include either an area of refuge in accordance with Section 1007.6 or an exterior area for assisted rescue in accordance with Section 1007.7.

1007.3 (IFC [B] 1007.3) Stairways. In order to be considered part of an accessible means of egress, ~~an exit access stairway as permitted by Section 1016.1~~ ~~or exit~~ a stairway between stories shall have a clear width of 48 inches (1219 mm) minimum between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or shall be accessed from either an area of refuge complying with Section 1007.6 or a horizontal exit. Exit access stairways that connect levels in the same story are not permitted as part an accessible means of egress.

Exceptions:

~~1. The area of refuge is not required at open exit access or exit stairways as permitted by Sections 1016.1 and 1022.1 in buildings that are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

1.~~2.~~ The clear width of 48 inches (1219 mm) between handrails is not required ~~at exit access stairways as permitted by Section 1016.1or exit stairways~~ in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

2.~~3.~~ Areas of refuge are not required at ~~exit~~ stairways in buildings equipped throughout by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

3.~~4.~~ The clear width of 48 inches (1219 mm) between handrails is not required for ~~exit~~ stairways accessed from a horizontal exit.

4.~~5.~~ Areas of refuge are not required at ~~exit~~ stairways serving open parking garages.

5.~~6.~~ Areas of refuge are not required for smoke protected seating areas complying with Section 1028.6.2.

6.~~7.~~ The areas of refuge are not required in Group R-2 occupancies.

1007.6 (IFC [B] 1007.6) Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1. Every required area of refuge shall have direct access to a stairway ~~within an exit enclosure~~ complying with Sections 1007.3 ~~and 1022~~ or an elevator complying with Section 1007.4. Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier.

~~**Exceptions:**~~

~~1. A stairway serving an area of refuge is not required to be enclosed where permitted in Sections 1016.1 and 1022.1.~~

~~2. A smokeproof enclosure is not required for an elevator lobby used as an area of refuge where the elevator is not required to be enclosed.~~

1007.6.2 (IFC [B] 1007.6.2) Separation. Each area of refuge shall be separated from the remainder of the story by a smoke barrier complying with Section 710 or a horizontal exit complying with Section 1025. Each area of refuge shall be designed to minimize the intrusion of smoke.

Exception: Areas of refuge located within an ~~exit~~ enclosure for exit access stairways or interior exit stairways.

1007.7.2 (IFC [B] 1007.7.2) Exterior ~~exit~~ stairway. Exterior ~~exit~~ stairways that are part of the means of egress for the exterior area for assisted rescue shall provide a clear width of 48 inches (1219 mm) between handrails.

1007.8 (IFC [B] 1007.8) Two-way communication. A two-way communication system shall be provided at the elevator landing on each accessible floor that is one or more stories above or below the story of exit discharge complying with Sections 1007.8.1 and 1007.8.2.

Exceptions:

1. Two-way communication systems are not required at the elevator landing where the two-way communication system is provided within areas of refuge in accordance with Section 1007.6.3.
2. Two-way communication systems are not required on floors provided with ~~exit~~ ramps conforming to the provisions of Section 1010.

SECTION 1015 (IFC [B] 1015)
EXIT AND EXIT ACCESS DOORWAYS

1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access doorways. Where two exits or exit access doorways are required from any portion of the exit access, the exit doors or exit access doorways shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access doorways. Interlocking or scissor stairs shall be counted as one ~~exit~~ stairway.

Exceptions:

1. Where ~~exit~~ ~~enclosures~~ interior exit stairways are ~~provided as a portion of the required exit and are~~ interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the exit doors or exit access doorways shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

SECTION 1023 (IFC [B] 1023)
EXIT PASSAGEWAYS

1023.3 (IFC [B] 1023.3) Construction. Exit passageway enclosures shall have walls, floors and ceilings of not less than 1-hour fire-resistance rating, and not less than that required for any connecting ~~exit~~ ~~enclosure~~ interior exit stairway or ramp. Exit passageways shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both.

1023.5 (IFC [B] 1023.5) Openings and penetrations. Exit passageway opening protectives shall be in accordance with the requirements of Section 715.

Except as permitted in Section 402.4.6, openings in exit passageways other than exterior openings shall be limited to those necessary for exit access to the exit passageway from normally occupied spaces and for egress from the exit passageway.

Where an ~~exit~~ ~~enclosure~~ interior exit stairway or ramp is extended to an exit discharge or a public way by an exit passageway, the exit passageway shall also comply with Section 1022.2.1.

Elevators shall not open into an exit passageway.

SECTION 1024 (IFC [B] 1024)
LUMINOUS EGRESS PATH MARKINGS

1024.2 (IFC [B] 1024.2) Markings within exit components ~~enclosures~~. Egress path markings shall be provided in ~~exit enclosures, including~~ ~~vertical exit~~ ~~enclosures~~ interior exit stairways, interior exit ramps and exit passageways, in accordance with Sections 1024.2.1 through 1024.2.6.

1024.2.4 (IFC [B] 1024.2.4) Perimeter demarcation lines. Stair landings and other floor areas within ~~exit~~ ~~enclosures~~ interior exit stairways, interior exit ramps and exit passageways, with the exception of the sides of steps, shall be provided with solid and continuous demarcation lines on the floor or on the walls or a combination of both. The stripes shall be 1 to 2 inches (25mm to 51 mm) wide with interruptions not exceeding 4 inches (102 mm).

Exception: The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

1024.2.4.1 (IFC [B] 1024.2.4.1) Floor-mounted demarcation lines. Perimeter demarcation lines shall be placed within 4 inches (102 mm) of the wall and shall extend to within 2 inches (51 mm) of the markings on the leading edge of landings. The demarcation lines shall continue across the floor in front of all doors.

Exception: Demarcation lines shall not extend in front of exit <u>discharge</u> doors that lead out of an exit ~~enclosure~~ and through which occupants must travel to complete the exit path.

1024.2.4.2 (IFC [B] 1024.2.4.2) Wall-mounted demarcation lines. Perimeter demarcation lines shall be placed on the wall with the bottom edge of the stripe no more than 4 inches (102 mm) above the finished floor. At the top or bottom of the stairs, demarcation lines shall drop vertically to the floor within 2 inches (51 mm) of the step or landing edge. Demarcation lines on walls shall transition vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path. Where the wall line is broken by a door, demarcation lines on walls shall continue across the face of the door or transition to the floor and extend across the floor in front of such door.

Exception: Demarcation lines shall not extend in front of exit <u>discharge</u> doors that lead out of an exit ~~enclosure~~ and through which occupants must travel to complete the exit path.

1024.2.6 (IFC [B] 1024.2.6) Doors <u>within the exit path</u> ~~from exit~~ ~~enclosures~~. Doors through which occupants ~~within an exit~~ ~~enclosure~~ must pass in order to complete the exit path shall be provided with markings complying with Sections 1024.2.6.1 through 1024.2.6.3.

1024.3 (IFC [B] 1024.3) Uniformity. Placement and dimensions of markings shall be consistent and uniform throughout the same ~~exit~~ enclosure.

1024.5 (IFC [B] 1024.5) Illumination. ~~Exit~~ ~~enclosures~~ Where photoluminescent exit path markings are installed shall be provided with the minimum means of egress illumination required by Section 1006 for at least 60 minutes prior to periods when the building is occupied.

SECTION 1025 (IFC [B] 1025)
HORIZONTAL EXIT

1025.4 (IFC [B] 1025.4) Capacity of refuge area. The refuge area of a horizontal exit shall be a space occupied by the same tenant or a public area and each such refuge area shall be adequate to accommodate the original occupant load of the refuge area plus the occupant load anticipated from the adjoining compartment. The anticipated occupant load from the adjoining compartment shall be based on the capacity of the horizontal exit doors entering the refuge area. The capacity of the refuge area shall be computed based on a net floor area allowance of 3 square feet (0.2787 m^2) for each occupant to be accommodated therein.

Exception: The net floor area allowable per occupant shall be as follows for the indicated occupancies:

1. Six square feet (0.6 m^2) per occupant for occupancies in Group I-3.
2. Fifteen square feet (1.4 m^2) per occupant for ambulatory occupancies in Group I-2.
3. Thirty square feet (2.8 m^2) per occupant for nonambulatory occupancies in Group I-2.

The refuge area into which a horizontal exit leads shall be provided with exits adequate to meet the occupant requirements of this chapter, but not including the added occupant load imposed by persons entering it through horizontal exits from other areas. At least one refuge area exit shall lead directly to the exterior or to an <u>interior exit stairway or ramp</u> ~~exit enclosure~~.

Exception: The adjoining compartment shall not be required to have a stairway or door leading directly outside, provided the refuge area into which a horizontal exit leads as stairways or doors leading directly outside and are so arranged that egress shall not require the occupants to return through the compartment from which egress originates.

SECTION 1026 (IFC [B] 1026)
EXTERIOR EXIT ~~RAMPS AND~~ STAIRWAYS <u>AND RAMPS</u>

1026.6 (IFC [B] 1026.6) Exterior ~~ramps and~~ stairway and ramp protection. Exterior exit ~~ramps and~~ stairways and ramps shall be separated from the interior of the building as required in Section 1022.1. Openings shall be limited to those necessary for egress from normally occupied spaces.

Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are no more than two stories above grade plane where a level of exit discharge serving such occupancies is the first story above grade plane.
2. Separation from the interior of the building is not required where the exterior ~~ramp or~~ stairway or ramp is served by an exterior ramp or balcony that connects two remote exterior stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be a minimum of 50 percent of the height of the enclosing wall, with the top of the openings no less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the interior of the building is not required for an exterior ~~ramp or~~ stairway or ramp located in a building or structure that is permitted to have unenclosed ~~interior~~ exit access stairways in accordance with Section 1009.3 ~~1022.1~~.
4. Separation from the interior of the building is not required for exterior ~~ramps or~~ stairways or ramps connected to open-ended corridors, provided that Items 4.1 through 4.4 are met:
   - 4.1 The building, including corridors, ~~ramps or~~ stairways or ramps, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   - 4.2 The open-ended corridors comply with Section 1018.
   - 4.3 The open-ended corridors are connected on each end to an exterior exit ~~ramp or~~ stairway or ramp complying with Section 1026.
5. At any location in an open-ended corridor where a change of direction exceeding 45 degrees 0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior ~~ramp or~~ stairway or ramp shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

SECTION 1027 (IFC [B] 1027)
EXIT DISCHARGE

1027.1 (IFC [B] 1027.1) General. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide direct access to grade. The exit discharge shall not reenter a building. The combined use of Exceptions 1 and 2 below shall not exceed 50 percent of the number and capacity of the required exits.

Exceptions:

1. A maximum of 50 percent of the number and capacity of ~~the exit enclosures~~ interior exit stairways and ramps is permitted to egress through areas on the level of discharge provided all of the following are met:
   - 1.1 Such ~~exit~~ enclosures egress to a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the ~~exit~~ enclosure.
   - 1.2 The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the ~~exit~~ enclosure.
   - 1.3 The egress path from the ~~exit enclosure~~ interior exit stairway and ramp on the level of exit discharge is protected throughout by an approved automatic sprinkler system. All portions of the level of exit discharge with access to the egress path shall either be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of ~~exits~~ interior exit stairways or ramps.
2. A maximum of 50 percent of the number and capacity of the ~~exit enclosures for~~ interior exit stairways and ramps is permitted to egress through a vestibule provided all of the following are met:
   - 2.1 The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating for the ~~exit~~ enclosure.
   - 2.2 The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   - 2.3 The area is separated from the remainder of the level of exit discharge by construction providing protection at least the equivalent of approved wired glass in steel frames.
   - 2.4 The area is used only for means of egress and exits directly to the outside.
3. ~~Stairways in open parking garages complying with Section 1022.1, Exception 4, are permitted to egress through the open parking garage at their levels of exit discharge.~~

4. Horizontal exits complying with Section 1025 shall not be required to discharge directly to the exterior of the building.

SECTION 1028 (IFC [B] 1028)
ASSEMBLY

~~**1028.5.1 (IFC [B] 1028.5.1) Enclosure of openings.** Interior stairways and other vertical openings shall be enclosed in an exit enclosure in accordance with Section 1009, as provided in Section 1022.1, except that stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities. At least one accessible means of egress is required from a balcony, gallery or press box level containing accessible seating locations in accordance with Section 1007.3 or 1007.4.~~

SECTION 1110
SIGNAGE

1110.3 Other signs. Signage indicating special accessibility provisions shall be provided as shown:

1. Each assembly area required to comply with Section 1108.2.7 shall provide a sign notifying patrons of the availability of assistive listening systems.

   Exception: Where ticket offices or windows are provided, signs are not required at each assembly area provided that signs are displayed at each ticket office or window informing patrons of the availability of assistive listening systems.

2. At each door to an area of refuge, an exterior area for assisted rescue, an egress stairway, exit passageway and exit discharge, signage shall be provided in accordance with Section 1011.3.
3. At areas of refuge, signage shall be provided in accordance with Section 1007.11.
4. At exterior areas for assisted rescue, signage shall be provided in accordance with Section 1007.11.
5. At two-way communication systems, signage shall be provided in accordance with Section 1007.8.2.
6. Within ~~exit~~ ~~enclosures~~ <u>interior exit stairways and ramps</u>, signage shall be provided in accordance with Section 1022.8.

SECTION 2606
LIGHT-TRANSMITTING PLASTICS

2606.7 Light-diffusing systems. Unless the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, light-diffusing systems shall not be installed in the following occupancies and locations:

1. Group A with an occupant load of 1,000 or more.
2. Theaters with a stage and proscenium opening and an occupant load of 700 or more.
3. Group I-2.
4. Group I-3.
5. ~~Vertical exit~~ ~~enclosures~~ <u>Interior exit stairways and ramps</u> and exit passageways.

SECTION 3007
FIRE SERVICE ACCESS ELEVATOR

3007.4.1 Access. The fire service access elevator lobby shall have direct access to an ~~exit~~ enclosure <u>for an interior exit stairway</u>.

3007.5 Standpipe hose connection. A Class I standpipe hose connection in accordance with Section 905 shall be provided in the the ~~exit~~ ~~enclosure~~ <u>interior exit stairway and ramp</u> having direct access from the fire service access elevator lobby.

SECTION 3008
OCCUPANT EVACUATION ELEVATORS

3008.11.1 Access. The occupant evacuation elevator lobby shall have direct access to an ~~exit~~ ~~enclosure~~ <u>interior exit stairway or ramp</u>.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Unenclosed Interior Stairways". The scope of the activity is noted as:

Scope: The current code allows limited use of unenclosed exit stairs. During the previous code development cycles, numerous code changes have been submitted to clarify the intent and application of the code provisions relative to issues such as: exit versus exit access; travel distance measurements; contribution to the minimum number of required exits; etc. Due to the inter-relationship of code provisions, this requires a comprehensive analysis in order to clarify the code requirements.

Objectives:

A. The Unenclosed Interior Stairway Work Group will answer the following questions based on the current Means of Egress system that is composed of exit, exit access and exit discharge components:
   1. Can an unenclosed interior stairway qualify as an exit?
   2. If an un-enclosed interior stairway can qualify as an exit what is the entrance to the exit (where does the exit begin)?
   3. If an un-enclosed interior stairway can qualify as an exit where does the exit discharge begin (where does the exit end)?
   4. How is travel distance measured when an un-enclosed interior stairway is used as an element in a means of egress?
   5. Does the Minimum Number of Exits Section (1019.1 in the 2006 IBC) require entry to the required exits on each story?

B. The Unenclosed Interior Stairway Work Group will draft recommend code changes, as determined necessary, to effectively communicate the code requirements based on the answers to the above questions.

(Note that all references to stairs in this reason statement are inclusive of ramps)

Preface: Over that last several code development cycles, there have been numerous proposals intended to address the technical relationships between unenclosed interior stairways, travel distance and the required numbers and location of exits. Through these various proposals, it became evident that there was considerable confusion and disagreement as to what the IBC actually requires or implies. Although some minor changes were approved over time, cumulatively, they did little to resolve the underlying technical question being what part of the three part means of egress system is an unenclosed stair between stories. More specifically: Are stairs that are required to meet means of egress design requirements such as number of exits or exit access travel distance but allowed to be unenclosed an exit or an exit access? Are stairs that are not required for means of egress and supplemental but required to be enclosed do to the number of stories connected required to be protected as a shaft or as an exit enclosure? How should travel distance be measured when unenclosed stairs are part of the path of travel? Can required exits per floor be on an adjacent floor and accessed through an open stair?

At the hearings in Palm Springs the ICC Means of Egress Code Development Committee determined that proper attention could not be provided to the issues in that forum and referred the dilemma to the ICC Code Technology Committee. The CTC agreed that the issue should be researched and assigned a study group to investigate the matter and develop a code change proposal to resolve the issues.

This proposal is based on the following concepts:

All stairs within a building are elements of the means of egress system and must comply with chapter 10
Unenclosed stairways are not exits
All Exit Stairways, to qualify as an exit, must be enclosed with a fire rated enclosure consisting of exit stair shafts and passageways based on current exit enclosure provisions
All stairways that are permitted to be open or are not required stairways for egress purposes are Exit Access Stairways
Exit access stairways must be enclosed with fire rated enclosures based on shaft provisions or may be open in accordance exceptions based on the current exceptions;
Exit access travel distance is measured to an entrance to an exit
Exit access travel distance includes the travel distance on Exit access stairways
Entrances to exits on each story are not mandatory and access to exits on other stories is permissible within certain limitations

The code change in general: All of the current exceptions that will allow for an unenclosed opening to accommodate a stairway in chapter 7 and 10 are being relocated to proposed section 1009.3 including current exceptions to sections 708,1016, and 1022. Section 708 for shaft enclosures is being modified to only address floor openings that do not contain a stairway. All enclosure requirements for stairways, exit or exit access, will originate in section 1009. All fire rated enclosure requirements for exit stairs will remain in chapter 10 and exit access stair enclosure requirements will be placed in proposed section 1009.3 based on current section 708 construction requirements. Ramps will be treated the same as stairways. The new formalized concept of Exit Access Stairway is codified in proposed section 1009.3. New definitions are proposed for Exit Access Stairway(ramp) and Interior Exit Stairway(Ramp).

Specific section change explanations:

Modifications to current section 1002- The definition of Exit is proposed to be modified to remove the fire rated construction provisions from the definition because the construction requirements belong in the code text of section 1022. The definition should be focused on what the exit is, which is simply the component that is between the exit access and the exit discharge. The list of components that qualify as exits has been retained. Additionally "Exit Enclosure" is proposed to be replaced with new terms "Interior Exit Stairway" and "Interior Exit Ramp". This concept is that the exit stairway or ramp in its entirety comprises the exit component, not just the enclosure. New definitions are proposed for Exit Access Ramp and Stairway to support the new concept of their use in proposed section 1009.3. The concept is that all interior stairways and ramps that are not formal exits, whether they are required means of egress components or not, are exit access components.

Modifications to current section 1009-In general, the concept with the changes to 1009 and companion changes to other sections is that 1009 is the point source for all requirements relating to interior stair code requirements including opening protection requirements. Figuratively speaking all stairs lead to section 1009. New sections 1009.1 through 1009.4 have been proposed for addition to current section 1009. 1009.1 establishes that all stairways serving occupied portions of a building must comply with section 1009, whether the stairs are required or not. 1009.2 establishes that exit stairs must lead out of the building directly or through an exit passageway or exit discharge component as is currently required. Section 1009.2.1 establishes the general requirement for when an exit stairway is required. Section 1009.2.2 directs the code user to section 1022 for detailed requirements for construction of the exit stairway including the current enclosure requirements. Proposed section 1009.3 is the new section established to regulate enclosure of exit access stairs. The base line is that all exit access stairs must be enclosed with exceptions to follow. All of the current exceptions in sections 708,1016, and 1022 have been moved to this section, as exceptions to the baseline requirement for enclosure because all open stairs are exit access stairs per this proposal. The exceptions either in text or concept are in 1009.3 with every attempt made to keep them as they are currently applied. New section 1009.3.1 and sub-sections are the construction requirements for enclosure of exit access stairs with the exit access stair would not qualify for one of the exceptions that would allow the stairway to be unenclosed. These requirements have been copied from section 708 Shaft enclosures because current code allows stairways that are not used as exits to meet shaft enclosure requirements of current section 708; current exit enclosure requirements of 1022 are only applicable to required exit stairs.

New section 1010.2-This section is proposed as simply a cross reference for ramps so that they are designed for enclosure no differently than stairways.

Modifications to current section 1016.1-The section is proposed for re-organization based on separation general provisions from specific design provisions. Exceptions 1 and 2 to 1016.1 were moved to proposed section 1016.3 due to conversion of existing section 1016.1 into a general section. Exceptions 3 and 4 to 1016.1 were deleted because the intended use of those exceptions is now captured in proposed modifications to current section 1021.1 and 1021.3.1.

Modifications to current section 1016.1- Exit access added for consistency and the table reference was changed to 1016.2 because this proposal includes changing the table number and reference section.

New section 1016.3- New section 1016.3 is proposed to separate the measurement requirements of exit access travel distance into a standalone section for better clarity and order.

Modifications to current section 1021.1-Changed the section to a general section. The first sentence proposed replacement is a mix of language clean and addition of the proposed new terms “exit and exit access stairways or ramps”. The added second underlined text that proposes to require at least one exit stairway serving each story above the section is the relocation of the concept intended by current exceptions 3 and 4 to 1016.1 that have been proposed for deletion. Exceptions for open parking garages and outdoor facilities were relocated to this section. All of the specific provisions regarding required number of exits were moved from the proposed general section 1021.1 to a new section 1021.2.

Modifications to current section 1021.2-The bulk of this sections changes are to improve the format and flow of the section in keeping with moving specific requirements out of the beginning General section and laying out the requirements for number of exits and configuration in a more logical format. Proposed section 1021.3.1 has a provision that limits the access of exits on another floor to an adjacent level.

Modifications to current section 1022-The section title is proposed to be changed to the new term Interior Exit Stairways and Ramps. Some minor editorial changes have been made to the section and the new terms have been inserted into the text. The deleted last two sentences of 1022.1 (proposed 1022.2) were relocated to proposed section 1009.2.

New Section 410.5.3.1- Based on deletion of current exception #6 to 1022.1 the allowance for open stairs serving stages and support areas has been relocated to chapter 4 under the current stage exit provisions in chapter 4. This is cross referenced in proposed 1009.3 Exception #7.

New exception #3 to Section 706-Added cross-reference to top of shaft enclosure allowance in current section 707.12 to allow use for exit and exit access stair termination. This was done in conjunction with adding exit access stair enclosure requirements, modeled after shaft enclosure requirements, into section 1009.

Modifications to current section 708-Added the sentence in general section 708.1 that removes stair openings from regulation by section 708 and directs the code user to section 1009 for all stair opening protection requirements. As a companion to the intent of that change current exceptions numbers 2 (stair part), 7.2, 11 and 13 that address permissible unenclosed floor openings for stairs have been proposed for deletion and to be moved to section 1009.3: current #2 to proposed 1009.3 Exception #3; current #7.2 and #11 to proposed 1009.3 Exception #1; current #13 to proposed 1009.3 Exception #9. See below for a comparison of the suggested revisions between the Open Stairway study group recommendations and the Vertical Openings committee.

Proposed new section 708.3-Shaft enclosure construction provisions were moved out of the general section in 708.1 and into a new section titled Construction.

Modifications to current section 708.3-In current sections 1002 and 1022 the term “Exit Enclosure” is proposed to be replaced with new terms “Interior Exit Stairway” and “Interior Exit Ramp”. This change is companion to that change in term.

Modification to Sections following the main proposal are correlative items to match the proposed revisions to terminology and are not intended to change the scope of the code. Sections that were also reviewed for correlation, but are not proposed to be revised include 403, 408, 410, 414, 415, 705, 707, 708, 709, 712, 715, 716. 803, 804, 909, 1006, 1007, 1015, 1023, 1024, 1025, 1026, 1027, 1028, 1110, 2606, 3007, 3008.

Comparison of CTC proposals for open stairway and vertical openings:
This is a comparison between the overlapping portions of the proposals from the Vertical opening study group and the Open stairway study group. The text in the columns is to compare requirements that may be addressing the same type of provisions. The CTC committee did not feel that there were conflicts in these two proposals, however, in the interest of providing complete information to those participating in the code change process, this matrices should make reviewing for potential conflicts much easier. The first half is the exceptions currently in 708.2 and Section 1022 (exit access stairways). The 2nd half is the construction requirements.

Open Stairway Proposals	Vertical opening Proposals
	~~Section 708~~ Section 712
	~~Shaft Enclosures~~ Vertical Openings
For Stairways – **1009.3 Exit access stairways.** Floor openings between stories created by exit access stairways shall be enclosed. **Exceptions:** (See below) *For Ramps –* **1010.2 Enclosure.** All interior exit ramps shall be enclosed in	**~~708.1~~ 712.1 General.** The provisions of this section shall apply to the vertical opening applications listed in Sections 712.1.1 through 712.1.18. ~~shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.~~

Open Stairway Proposals	Vertical opening Proposals
accordance with the applicable provisions of Section 1022. Exit access ramps shall be enclosed in accordance with the applicable provisions of Section 1009.3. **708.1 General.** The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Exit access stairways and ramps shall be protected in accordance with the applicable provisions of Section 1009. Interior exit stairways and ramps shall be protected in accordance with the requirements of Section 1022. ~~Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.~~	
	~~**708.2 Shaft enclosure required.** Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.~~ ~~**Exceptions:**~~
	712.1.1 Smoke compartments. Vertical openings contained entirely within a shaft enclosure complying with Section 709 shall be permitted.
1009.3 - 2. Exit access stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.	~~**708.2 -1.**~~ **712.1.2 Individual dwelling unit.** ~~A shaft enclosure is not required for~~ Unconcealed vertical openings totally within an individual residential dwelling unit and connecting four stories or less shall be permitted.
708.2 – 2. A shaft enclosure is not required in a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening ~~or stairway that is not a portion of the means of egress~~ protected according to Item 2.1 or 2.2;	~~**708.2 -2.**~~ **712.1.3 Escalator and Stairway Openings.** ~~A shaft enclosure is not required in~~ Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~for~~ an escalator opening or stairway that is not a portion of the means of egress shall be protected according to Item ~~2.1 or 2.2~~ 712.1.3.1 or 712.1.3.2:
708.2 - 2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator ~~or stairway~~ and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.	~~**708.2 - 2.1.**~~ **712.1.3.1 Opening size.** Where the area of the ~~floor~~ vertical opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
	~~**708.2 - 2.2.**~~ **712.1.3.2 Automatic shutters**. Where the vertical opening is protected by approved power-operated automatic shutters at every penetrated floor. The shutters shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.11 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.
	~~**708.2 - 3.**~~ **712.1.4 Penetrations.** ~~A shaft enclosure is not required for p~~Penetrations by pipe, tube, conduit, wire, cable and vents shall be protected in accordance with Section ~~713.4~~ 712.4.
	~~**708.2 - 4.**~~ **712.1.5 Ducts.** ~~A shaft enclosure is not required for~~ Penetrations by ducts shall be protected in accordance with Section 716.6. Grease ducts shall be protected in accordance with the *International Mechanical Code*.
1009.3 - 4. Exit access stairways within an atrium complying with the provisions of Section 404 need not be enclosed.	~~**708.2 - 5.**~~ **712.1.6 Atriums.** In other than Group H occupancies, ~~a shaft enclosure is not required for floor openings complying with the provisions for~~ atriums ~~in~~ complying with Section 404 shall be permitted.
	~~**708.2 - 6.**~~ **712.1.7 Masonry chimney.** ~~A shaft enclosure is not required for a~~Approved masonry chimneys shall be permitted where the annular space is fireblocked at each floor level in accordance with Section 717.2.5.

Open Stairway Proposals	Vertical opening Proposals
1009.3 - 1. In other than Group I-2 and I-3 occupancies, exit access stairways that serve, or atmospherically communicate between, only two stories, need not be enclosed. **708.2 - 7.** In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following: 7.1. Does not connect more than two stories. ~~7.2. Is not part of the required means of egress system.~~ 7.3. Is not concealed within the construction of a wall or a floor/ceiling assembly. 7.4. Is not open to a corridor in Group I and R occupancies. 7.5. Is not open to a corridor on nonsprinklered floors in any occupancy. 7.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures. 7.7. Is limited to the same smoke compartment.	**~~708.2 - 7.~~ 712.1.8 Two story openings**. In other than Groups I-2 and I-3~~,~~ ~~a shaft enclosure is not required for~~ a floor opening that is not used as one of the applications listed in this section shall be permitted if it complies with all the items below ~~or an air transfer opening that complies with the following:~~ ~~7.1~~ 1. Does not connect more than two stories. ~~7.2~~ 2. Does not contain a stairway or ramp required by Chapter 10. ~~Is not part of the required means of egress system~~. 3 Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments. ~~7.3~~ 4. Is not concealed within the construction of a wall or a floor/ceiling assembly. ~~7.4~~ 5. Is not open to a corridor in Group I and R occupancies. ~~7.5~~ 6. Is not open to a corridor on nonsprinklered floors ~~in any occupancy~~. ~~7.6~~ 7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures. ~~7.7. Is limited to the same smoke compartment~~.
1009.3 - ~~-~~5. Exit access stairways and ramps in open parking garages that serve only the parking garage are not required to be enclosed.	**~~708.2 - 8.~~ 712.1.9 Parking garages**. ~~A shaft enclosure is not required for~~ Automobile ramps in open and enclosed parking garages shall be permitted where constructed in accordance with Sections 406.3 and 406.4, respectively.
	~~708.2 -~~ ~~9.~~ **712.1.10 Mezzanine.** ~~A shaft enclosure is not required for~~ vertical ~~floor~~ openings between a mezzanine complying with Section 505 and the floor below shall be permitted. ~~and the floor below.~~
	~~708.2 - 10.~~ 712.1.11 Joints. ~~A shaft enclosure is not required for~~ Joints shall be permitted where complying ~~protected by a fire-resistant joint system in accordance~~ with Section ~~714~~ 715.
1009.2 - 3. In buildings with only group B or M occupancies , exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. ~~**708.2 - 11.** A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1.~~	**~~708.2 - 11.~~ 712.1.12 Unenclosed stairs and ramps.** A ~~shaft enclosure shall not be required for~~ vertical floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1 shall be permitted.
	~~708.2 - 12.~~ 712.1.13 Floor Fire Doors. ~~Floor~~ Vertical openings shall be permitted where protected by floor fire doors in accordance with Section ~~712.8~~ 711.8.
1009.3 - 9. In Group I-3 occupancies, an exit access enclosure is not required for floor openings in accordance with Section 408.5. ~~**708.2 - 13.** In Group I-3 occupancies, a shaft enclosure is not required for floor openings in accordance with Section 408.5.~~	**~~708.2 - 13.~~ 712. 1.14. Group I-3.** In Group I-3 occupancies, ~~a shaft enclosure is not required for floor~~ vertical openings shall be permitted in accordance with Section 408.5.
	~~708.2 - 14.~~ 712.1.15 Elevators in parking garages. ~~A shaft enclosure is not required for e~~ vertical openings for elevator hoistways in open or enclosed parking garages that serve only the parking garage, and complying with 406.3 and 406.4 respectively, shall be permitted..
	~~708.2 - 15.~~ 712.1.16 Duct systems in parking garages. Vertical openings for mechanical exhaust or supply duct systems in open or enclosed parking garages ~~a shaft enclosure is not required to enclose mechanical exhaust or supply duct systems~~ complying with 406.3 and 406.4 respectively, shall be permitted to be unenclosed where ~~when~~ such duct system is contained within and serves only the parking garage.
	712.1.17 Nonfire-resistance-rated joints. Joints in or between floors without a required fire-resistance rating shall be permitted in accordance with section 711.4.1.
	~~708.2 - 16.~~ 712.1.18 Openings otherwise permitted. Vertical openings shall be ~~Where~~ permitted where allowed by other sections of this code
1009.3 - 6. Stairways serving outdoor facilities where all portions of the means of egress are essentially open to the outside.	
1009.3 - 7. Exit access stairways serving stages shall comply with	

Open Stairway Proposals	Vertical opening Proposals
Section 410.5.3.1 and 1015.6.	
1009.3 - 8. Exit access stairways serving balconies, galleries and press boxes shall comply with Section 1028.5.1.	
	SECTION 713
	SHAFT ENCLOSURES
1009.3.1 Construction. Where required, enclosures for exit access stairways shall be constructed in accordance with this section. Exit access stairway enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.	**713.1 General.** The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 711, or both.
1009.3.1.1 Materials. Exit access stairway enclosures shall be of materials permitted by the building type of construction.	**~~708.3~~ 713.2 Materials.** The shaft enclosure shall be of materials permitted by the building type of construction.
1009.3.1.2 Fire-resistance rating. Exit access stairway enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more, and not less than 1 hour where connecting less than four stories. The number of stories connected by the exit access stairway enclosures shall include any basements, but not any mezzanines. Exit access stairway enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.	**~~708.4~~ 713.3 Fire-resistance rating.** Shaft enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four *stories* or more, and not less than 1 hour where connecting less than four *stories*. The number of *stories* connected by the shaft enclosure shall include any basements but not any *mezzanines*. Shaft enclosures shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours. Shaft enclosures shall meet the requirements of Section 703.2.1.
1009.3.1.3 Continuity. Exit access stairway enclosures shall have continuity in accordance with Section 707.5 for fire barriers or Section 712.4 for horizontal assemblies as applicable.	**~~708.5~~ 713.4 Continuity.** Shaft enclosures shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 712, or both, and shall have continuity in accordance with Section 707.5 for *fire barriers* or Section 712.4 for *horizontal assemblies* as applicable.
1009.3.1.8 Exterior walls. Where exterior walls serve as a part of an exit access stairway enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply. **~~708.6~~ 708.7Exterior walls.** Where exterior walls serve as a part of a required shaft enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply. **Exception:** Exterior walls required to be fire-resistance rated in accordance with Section 1019.2 for exterior egress balconies, Section ~~1022.6~~ 1022.7 for enclosures for interior exit stairways and ramps ~~exit enclosures~~ and Section 1026.6 for exterior exit ramps and stairways.	**~~708.6~~ 713.5 Exterior Walls.** Where exterior walls serve as a part of a required shaft enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply. **Exception:** Exterior walls required to be fire-resistance rated in accordance with Section 1019.2 for exterior egress balconies, Section 1022.6 for exit enclosures and Section 1026.6 for exterior exit ramps and stairways.
1009.3.1.4 Openings. Openings in an exit access stairway enclosure shall be protected in accordance with Section 715 as required for fire barriers. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 715.4.8.3.	**~~708.7~~ 713.6 Openings.** Openings in a shaft enclosure shall be protected in accordance with Section 715 as required for *fire barriers*. Doors shall be self- or automatic closing by smoke detection in accordance with Section 715.4.8.3.
1009.3.1.4.1 Prohibited openings. Openings other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.	**~~708.7.1~~ 713.6.1 Prohibited openings.** Openings other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures.
1009.3.1.5 Penetrations. Penetrations in a shaft enclosure shall be protected in accordance with Section 713 as required for fire barriers.	**~~708.8~~ 713.7 Penetrations.** Penetrations in a shaft enclosure shall be protected in accordance with Section 713 as required for *fire barriers*.
1009.3.1.5.1 Prohibited penetrations. Penetrations other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.	**~~708.8.1~~ 713.7.1 Prohibited penetrations.** Penetrations other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures.
1009.3.1.6 Joints. Joints in an exit access stairway enclosure shall comply with Section 714.	**~~708.9~~ 713.8 Joints.** Joints in a shaft enclosure shall comply with Section 714.
1009.3.1.7 Ducts and air transfer openings. Penetrations of an exit access stairway enclosure by ducts and air transfer openings shall comply with Section 716.	**~~708.10~~ 713.9 Duct and air transfer openings.** Penetrations of a shaft enclosure by ducts and air transfer openings shall comply with Section 716.
	~~708.11~~ 713.10 Enclosure at the bottom. (No change to text)
706.5 Continuity. Fire barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or	**~~708.12~~ 713.11 Enclosure at top.** A shaft enclosure that does not extend to the underside of the roof sheathing, deck or slab of the building shall be

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deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, such as the space above a suspended ceiling. The supporting construction for fire barriers shall be protected to afford the required fire-resistance rating of the fire barrier supported, except for 1-hour fire-resistance-rated incidental use area separations as required by Table 508.2 in buildings of Type IIB, IIIB and VB construction. Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 717.2 at every floor level. **Exceptions:** 1. The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided in section 415.6.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type. 2. Shaft enclosures shall be permitted to terminate at a top enclosure complying with Section 707.12. <u>3. Interior exit stairway and ramp enclosures required by Section 1009.2.2 and exit access stairway and ramp enclosures required by Section 1009.3 shall be permitted to terminate at a top enclosure complying with Section 707.12.</u>	enclosed at the top with construction of the same *fire-resistance rating* as the topmost floor penetrated by the shaft, but not less than the *fire-resistance rating* required for the shaft enclosure.
	~~**708.13**~~ <u>**713.12**</u> **Refuse and laundry chutes** (No change to text and subsections)
	~~**708.14**~~ <u>**713.13**</u> **Elevator, dumbwaiter and other hoistways.** (No change to text and subsections)

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME:Heilsted-G8-410.5.3.1

<u>Public Hearing Results</u>

PART I IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Committee Reason: The revisions for stairways will clarify when exit access stairways (i.e., monumental, convenience and mezzanines stairways) are part or the means of egress, including protection, travel distance and enclosure requirements. The proposal coordinates the issue throughout the codes for this important issue. The committee proposal also coordinates with the proposal for vertical openings, FS56-09/10.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

403.5.1 Remoteness of interior exit stairways. Required interior exit stairways shall be separated by a distance not less than 30 feet (9144 mm) or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the <u>enclosures surrounding the</u> interior exit stairways. In buildings with three or more interior exit stairway, at least two of the interior exit stairway shall comply with this section. Interlocking or scissor stairs shall be counted as one interior exit stairway.

~~**410.5.3.1 Stairway and ramp enclosure.** Exit access stairways and ramps serving the stage are not required to be enclosed. Exit access stairways serving the lighting and access catwalks, galleries and gridirons are not required to be enclosed.~~

1007.6.2 Separation. Each area of refuge shall be separated from the remainder of the story by a smoke barrier complying with Section 709 or a horizontal exit complying with Section 1025. Each area of refuge shall be designed to minimize the intrusion of smoke.

> **Exception:** Areas of refuge located within an enclosure <u>complying with Sections 1009.3.1</u> for exit access stairways or <u>Section 1022.2</u> for interior exit stairways.

1009.3 Exit access stairways. Floor openings between stories created by exit access stairways shall be enclosed.

Exceptions:

1 – 7. *(No change to current text)*
8. Exit access stairways serving stages, platforms and technical production areas ~~complying with Section 410.5.3.1 and 1015.6~~ in accordance with Section 410.6.2 are not required to be enclosed.
9 – 10 *(No change to current text)*

(Portions of proposal not shown remain unchanged)

Commenter's Reason: 403.5.1: When Section 403.5.1 was put in, the intent was to get separation between the enclosures to prevent a catastrophic event from taking out multiple exit enclosures. This section is specific to the enclosures not the stairs themselves. This modification is intended to make it clear that the measurement for separation is to be taken from the enclosure, not the stair itself or the door into the enclosure.

410.5.1 and 1009.3: G67 revised the provisions for stages in Section 410.5.3 and 1015.6 and deleted section 410.5.3 entirely. G67 was approved as submitted without any opposition and developed with the cooperation of theater designers. In addition, G67 has deleted the definition for fly galleries and gridirons and replace them with a definition for technical production areas. G67 addressed the exit and exit access stairway questions in new Section 410.6 in a manner that works with the new format proposed in E5. G67 addresses un-enclosed stairways serving stages in new section 410.6.2 sot the revision to exception #8 to 1009.3 correlates with the new section and the new term from G67 "technical production area". Since this change was not opposed in any way it is assumed that it will be approved on the consent agenda and proposed section 410.5.1 in E5 will not be necessary. There is concern that the code correlating committee may not meet prior to the final action hearing and may not view removing 410.5.1 from the code if G67 is passed.

1007.6.2: The exception to 1007.6.2 was modified to make it clear that a stair enclosure must be fire rated in compliance with the specific code sections that specify how to fire rate an exit or exit access stair. This is being proposed to make it clear that a non-rated architectural enclosure around a stair, that is permitted to be un-enclosed, is not acceptable to be used in place of a rated enclosure wall to protect an area of refuge.

Public Comment 2:

Mike Ashley C.B.O. representing the Alliance for Fire & Smoke Containment & Control, Inc. requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXIT. That portion of a means of egress system which is separated from other interior building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel spaces of a between the exit access and the exit discharge. Exits ~~components~~ include exterior exit doors at the level of exit discharge, vertical exit enclosures ~~interior exit stairways, interior exit ramps,~~ exit passageways, horizontal exits, exterior exit stairways, and exterior exit ramps and horizontal exits.

~~**EXIT ACCESS STAIRWAY.** An interior stairway that is not a required interior exit stairway.~~

EXIT ENCLOSURE. An exit component that is separated from other interior spaces of a building or structure by fireresistance-rated construction and opening protectives, and provides for a protected path of egress travel in a vertical or horizontal direction to the exit discharge or the public way.

SECTION 1009 (IFC [B] 1009)
STAIRWAYS

1009.3 (IFC [B] 1009.3) Exit access stairways. Floor openings between stories created by exit access stairways shall be enclosed.

~~**Exceptions:**~~

1. ~~In other than Group I-2 and I-3 occupancies, exit access stairways that serve, or atmospherically communicate between, only two stories, are not required to be enclosed.~~
2. ~~Exit access stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.~~
3. ~~In buildings with only Group B or M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.~~
4. ~~In other than Groups B and M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the floor opening does not connect more than four stories, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.~~
5. ~~Exit access stairways within an atrium complying with the provisions of Section 404 are not required to be enclosed.~~
6. ~~Exit access stairways and ramps in open parking garages that serve only the parking garage are not required to be enclosed.~~
7. ~~Stairways serving outdoor facilities where all portions of the means of egress are essentially open to the outside are not required to be enclosed.~~
8. ~~Exit access stairways serving stages complying with Section 410.5.3.1 and 1015.6 are not required to be enclosed.~~
9. ~~Stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.~~
10. ~~In Group I-3 occupancies, exit access stairways constructed in accordance with Section 408.5 are not required to be enclosed.~~

SECTION 1016 (IFC [B] 1016)
EXIT ACCESS TRAVEL DISTANCE

1016.1 (IFC [B] 1016.1) General. Travel distance within the exit access portion of the means of egress system shall be in accordance with this section.

Exceptions:

1. Travel distance in open parking garages is permitted to be measured to the closest riser of open exit stairways.
2. In outdoor facilities with open exit access components and open exterior exit stairways or exit ramps, travel distance is permitted to be measured to the closest riser of an exit stairway or the closest slope of the exit ramp.
3. In other than occupancy Groups H and I, the exit access travel distance to a maximum of 50 percent of the exits is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps when connecting a maximum of two stories. The two connected stories shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.
4. In other than occupancy Groups H and I, exit access travel distance is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps in the first and second stories above grade plane in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. The first and second stories above grade plane shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.
5. Where applicable, travel distance on unenclosed exit access stairways or ramps and on connecting stories shall also be included in the travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stairway.

SECTION 1022 (IFC [B] 1022)
EXIT ENCLOSURES INTERIOR EXIT STAIRWAYS AND RAMPS

1022.2 (IFC [B] 1022.2) Enclosures required Construction. Enclosures for interior exit stairways and interior exit ramps shall be enclosed with constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. Interior exit stairway and ramp Exit enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps exit enclosure shall include any basements, but not any mezzanines. Interior exit stairways and ramps exit enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. Exit enclosures shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An exit enclosure shall not be used for any purpose other than means of egress.

Exception: Interior exit stairways and ramps in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.

SECTION 708
SHAFT ENCLOSURES

708.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this section.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening protected according to Item 2.1 or 2.2.
   - 2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   - 2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. The shutters shall be of noncombustible construction and have a fireresistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.
3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 713.4.
4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 716.6. Grease ducts shall be protected in accordance with the International Mechanical Code.
5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with he provisions for atriums in Section 404.
6. A shaft enclosure is not required for approved masonry chimneys where annular space is fireblocked at each floor level in accordance with Section 717.2.5.
7. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   - 7.1. Does not connect more than two stories.
   - 7.2. Is not concealed within the construction of a wall or a floor/ceiling assembly.
   - 7.3. Is not open to a corridor in Group I and R occupancies.
   - 7.4. Is not open to a corridor on nonsprinklered floors in any occupancy.
   - 7.5. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   - 7.6. Is limited to the same smoke compartment.
8. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.

9. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 714.
11. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1.

~~11~~12. Floor openings protected by floor fire doors in accordance with Section 712.8.
13. In Group I-3 occupancies, a shaft enclosure is not required for floor openings in accordance with Section 408.5.
~~12~~14. A shaft enclosure is not required for elevator hoistways in open or enclosed parking garages that serve only the parking garage.
~~13~~15. In open or enclosed parking garages a shaft enclosure is not required to enclose mechanical exhaust or supply duct systems when such duct system is contained within and serves only the parking garage.
~~14~~16. Where permitted by other sections of this code.

SECTION 1007 (IFC [B] 1007)
ACCESSIBLE MEANS OF EGRESS

1007.6 (IFC [B] 1007.6) Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1. Every required area of refuge shall have direct access to a stairway within an exit enclosure complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4. Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier.

Exceptions:

1. A stairway serving an area of refuge is not required to be enclosed where permitted in Sections 1016.1 and 1022.1.
2. A smokeproof enclosure is not required for an elevator lobby used as an area of refuge where the elevator is not required to be enclosed.

SECTION 1028 (IFC [B] 1028)
ASSEMBLY

1028.5.1 (IFC [B] 1028.5.1) Enclosure of openings. Interior stairways and other vertical openings shall be enclosed in an exit enclosure in accordance with Section 1009, as provided in Section 1022.1, except that stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities. At least one accessible means of egress is required from a balcony, gallery or press box level containing accessible seating locations in accordance with Section 1007.3 or 1007.4.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: With over 260 changes to this proposal many of the changes are technical and were not discussed at the hearings. Many of the changes reduce the level of protection for exits and areas of refuge. If changes are to be made to the codes they should only be made to make the buildings safer for the occupants and for protection of property.

Public Comment 3:

David Collins, FAIA, Cincinnati, Ohio representing the American Institute of Architects, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1022.2 (IFC [B] 1022.2) Construction. Enclosures for interior exit stairways and ramps shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. Interior exit stairway and ramp enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps shall include any basements, but not any mezzanines. Interior exit stairways and ramps shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.

Exceptions:

1. Interior exit stairways and ramps in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.
2. Interior exit stairways or ramp located in an atrium that complies with Section 404.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: In the reasons for disapproval of G52-09/10, the committee commented that it wasn't clear how that change would coordinate with E5-09/10. This change establishes that an exit stairway or ramp located in an atrium would be acceptable as an exit.

Public Comment 4:

Jason Thompson, National Concrete Masonry Alliance, representing Masonry Allinaces for Codes and Standards, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXIT. That portion of a means of egress ~~system~~ which is separated from interior spaces of a building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel between the exit access and the exit discharge, or which provides a refuge area, or which discharges directly to the exterior. Exit components include exterior exit doors at the level of exit discharge, interior exit stairways, interior exit ramps, exit passageways, horizontal exits, exterior exit stairway, and exterior exit ramps.

EXIT ENCLOSURE. An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a vertical or horizontal direction to the exit discharge or the public way.

INTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits, ~~or~~ exit access travel distance or exit capacity, and provides for a protected path of egress travel to the exit discharge or public way.

INTERIOR EXIT STAIRWAY. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits, ~~or~~ exit access travel distance or exit capacity, and provides for a protected path of egress travel to the exit discharge or public way.

REFUGE AREA. An area within a building or structure that is accessed through a horizontal exit and provides an area adequate to accommodate the occupant load of the area plus the occupant load served by the horizontal exit.

SECTION 1009 (IFC [B] 1009)
STAIRWAYS

1009.2.1 (IFC [B] 1009.2.1) Where required. Interior exit stairways shall be included, as necessary, to meet one or more means of egress design requirements, such as required number of exits, ~~or~~ exit access travel distance or exit capacity.

SECTION 1021 (IFC [B] 1021)
NUMBER OF EXITS AND EXIT CONFIGURATION

1021.1 (IFC [B] 1021.1) General. Each story and occupied roof shall have the minimum number of exits, or access to exits, as specified in this section. The required number of exits, or exit access stairways or ramps providing access to exits, from any story shall be maintained ~~until arrival at grade~~ to the exit discharge or a public way. Exits or access to exits from any story shall be configured in accordance with this section. Each story above the second story of a building shall have a minimum of one interior or exterior exit stairway, or interior or exterior exit ramp. At each story above the second story that requires a minimum of three or more exits, or access to exits, a minimum of 50% of the required exits shall be interior or exterior exit stairways, or interior or exterior exit ramps.

Exceptions:

1. Interior exit stairways and interior exit ramps are not required in open parking garages where the means of egress serves only the open parking garage.
2. Interior exit stairways and interior exit ramps are not required in outdoor facilities where all portions of the means of egress are essentially open to the outside.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: We have submitted this Public Comment requesting approval as modified of this Code Change because of our concerns about the significant changes in the definition for "Exit" and the deletion of the definition for "Exit Enclosure." We have also made some editorial clarifications to the definitions for "Interior Exit Ramp" and "Interior Exit Stairway" and added a new definition for "Refuge Area." And we made an editorial change to Sections 1009.2.1 and 1021.1.

We believe the revisions we have proposed provide significant improvements to this very comprehensive Code Change Proposal. Regarding the definition for "Exit," we strongly believe that the original wording that has been deleted in this Code Change Proposal needs to be reinstated as it relates to the description of the exit being separated from the interior of the building by fire-resistance rated construction in order to provide a protected path of egress travel. We have also added some additional language that addresses the functioning of a horizontal exit as a nontraditional exit in the sense that it does not provide a protected path to the exterior or discharge directly to the exterior. Instead it provides a refuge area for the occupants to evacuate into to escape the fire on the side of the horizontal exit wall from which they are evacuating. Thus, there was a need to provide a definition for "refuge area" based on the provisions contained in Section 1025 Horizontal Exits. This definition will make it clear that the "refuge area" is different than the "area of refuge" used in the accessible means of egress requirements in Section 1007.

We have also made it clear that an exit may simply discharge to the exterior such as is the case for an exterior exit door. We have also reinstated the definition for "Exit Enclosure" since we believe it provides guidance to the users of the code as to what its function is since it is a critical means of egress component. Both the term "exit" and "exit enclosure" have been used successfully in the code for many years and provide important guidance to the users of the code in determining how they fit into the total means of egress system. We see no justification for the drastic changes to the definition for "Exit" and the deletion of the definition of "Exit Enclosure" as helping to further clarify the code requirements for means of egress. In fact, it is our concern that they may, in fact, actually confuse the application of Chapter 10 for means of egress, especially for novice users of the code.

Regarding our proposed revisions to the definitions for "Interior Exit Ramp" and "Interior Exit Stairway," we simply added another means of egress design requirement, namely that of exit capacity, which is just as critical as the other two components mentioned in the definitions for number of exits and exit access travel distance for consideration when designing means of egress systems utilizing these elements. Similarly, we have revised Section 1009.2.1 to add that additional design component for exit capacity for the same reasons. In this case, it is even more important to include it since this is the charging section for requiring interior exit stairways. If we are going to provide a laundry list, then we believe the laundry list should contain the most important elements of the design requirements for means of egress so as not to mislead the user.

In Section 1021.1 we made an editorial revision which we believe greatly clarifies to what extent the required number of exits and exit access stairways and ramps providing access to exits from any story shall be maintained. We deleted the phrase "until arrival at grade" since it seems to be somewhat general and subjective and does not clearly state where the egress system is to terminate. We believe the phrase we have substituted "to the exit discharge" is much more descriptive and concise. Furthermore, the term "exit discharge" is currently defined in Section 1002 as: "That portion of a means of egress system between the termination of an exit and a public way."

In summary, we believe the modifications we have proposed in this Public Comment will help to improve the use, application, interpretation, and enforcement of the means of egress requirements contained in Chapter 10 of the IBC and should be approved by the Class A voting members.

Public Comment 5:

Gerald Anderson, Overland Park, KS, representing self, requests Disapproval.

Commenter's Reason: I have read this code change a number of times and find it very difficult to follow. It would appear that the majority of the code change is simply an introduction of new terms and some reorganization. My principal concern with this code change is that I don't believe it does anything to add clarity to the code. It is almost as if change is being proposes for the sake of change.

My other concern is about Section 1021.2 Number of exits. This section essentially states that two exits, or exit access stairways from any story or occupied roof are required when any of the following conditions exists.

1. The occupant load exceeds one of the values in Table 1021.2.
2. The exit access travel distance exceeds that specified in Table 1021.2 as determined in accordance with the provisions of Section 1016.1.
3. Helistop landing areas located on buildings or structures shall be provided with tow exits, or exit access stairways or ramps providing access to exits.

My concern is with #2. I don't know why we would allow someone to use an exit access stairway once they have exceeded the allotted travel distance in Table 1021/2. I think that the 2009 IBC would require one to enter an Exit when one has reached the maximum travel distance.

#3 also doesn't fit. This language is probably more appropriately placed in the body of the first paragraph.

In the last paragraph, of the same section it states: Where one exit or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads form adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with one exit shall not be located more than one story below grad plane.

As written, I think that this paragraph, might allow mixed occupancies (several tenants) on the same floor to have one exit even though the cumulative occupant load would exceed that with is specified in Table 1021.2.

With regard to the reference back to Section 1004.1, I have no idea why the proponent is directing the code use back to this section.

Public Comment 6:

Toni Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council (IFC), requests Disapproval.

Commenter's Reason: Overall, the concept that all interior stairways and ramps that are not formal exits, whether they are required means of egress components or not, are exit access components is an important clarification to the Code. However, while the revisions in this proposal for stairways should clarify when exit access stairways are part or the means of egress, and may clarify travel distance and enclosure requirements, there are some areas where further review and clarification is necessary.

For example, with the changes proposed to the definition of "Exit", the corresponding revisions to Section 708 dealing with the Shaft provisions deletes the requirement in the general article to construct any shaft enclosures as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both, but not just for exits, for all applications,. While this may suit the objectives of this proposal, it is not appropriate for any other condition where shaft construction is required by the I-Codes. This aspect of the proposal has certainly not been coordinated with the IBC, IFC, IRC, IMC, etc... The new section 708.3 does contain the requirement, but it is not clear from its location if it applies to shaft enclosures in 708.2. At a minimum, the new 708.3 needs to be relocated to 708.2.

In the same vein, proposed section 1009.3 is the new section established to regulate enclosure of exit access stairs. The justification indicates that the base line is that all exit access stairs must be enclosed, with a list of exceptions that follow. All of the current exceptions in sections 708,1016, and 1022 have been located as exceptions to the baseline requirement for enclosure because all open stairs are exit access stairs per this proposal. If that is the case, then the revisions to the definition of "Exit" are not needed. In addition, some of the exceptions in 1009.3 differ slightly from the existing provisions. These need to be explored further to determine whether they are consistent with the intent of the changes.

Lastly, a performance approach to designing exits exists in the ICC process under the Performance Code. These new provisions need to be evaluated against what the Performance Code would currently have required. Certainly, the ICCPC would require far more evaluation of the specific conditions to ensure adequate safe egress from the building. By including these provisions for unenclosed stairs directly into the IBC, it applies to ALL buildings, regardless of size, use, or whether sprinklered or unsprinklered. Chapter 19 of the IPCC addresses means of egress. The general performance requirement is as follows:

> "**1901.3.1 General.** The construction, arrangement and number of means of egress, exits and safe places for buildings shall be appropriate to the travel distance, number of occupants, occupant characteristics, building height, and safety systems and features."

Consequently, the minimum requirements in the ICCPC appear to be more comprehensive than what this proposal would create in the IBC. The proposal needs to be re-evaluated against existing ICCPC requirements before these changes can be made to the IBC.

Public Comment 7:

William E. Koffel, P.E., Koffel Associates, Inc., requests Disapproval.

Commenter's Reason: Without a doubt, the means of egress provisions in the IBC could be cleaned up and reformatted. Unfortunately, E5-09/10 is not the answer and there are too many issues and unintended technical changes to correct by a series of Public Comments. Therefore, I am left with no option other than to request Disapproval for the following reasons. I suspect that some will argue that E5-09/10 should be approved despite the problems identified below because of the improvements contained in the proposal. However, the technical changes and concerns expressed below indicate that publishing the 2012 IBC as proposed in E5-09/10 will only result in a new set of problems and unintended technical changes.

The fact that exits are typically required to be separated from other spaces to provide a protected path of travel is a fundamental concept of the three part means of egress system as defined in the IBC. The fact that the current definition for "exit" says "as required" indicates that the separation is only necessary "as required" by other sections of the Code. In the Committee Reason for Disapproval of E3-09/10 the Committee stated that "The text about separation requirements should not be removed because it makes the user look for separation requirements." The action on E5-09/10 is contradictory to the Committee Action on E3-09/10. It should also be noted that the definitions for interior exit ramp and interior exit stairway include the concept of "protected path of travel" that is proposed to be deleted from the definition of "exit."

The definitions for exit access ramp and exit access stairway limit the phrases to "interior" ramps and stairways. What are the requirements for exterior exit access ramps and exterior exit access stairways? Although exterior ramps and stairs are often either exits or exit discharge components, it is possible that they might also be exit access components.

Why does Section 1009, which is intended to apply to all stairways, address interior exit stairways (with a reference to Section 1022 for interior exit stairways) and interior exit access stairways but there is no reference to exterior exit stairs? A similar question applies to Section 1010 for ramps which also contains no reference to exterior exit ramps (Section 1022).

Section 1021 relaxes the Code by allowing either exits or exit access stairways (or ramps) from each story. In many cases the current Code requires each story to be served by at least two or more exits (existing 1021.1). The proposed Section 1021.2 permits exits or exit access components to be provided. Even in larger occupant load areas, Section 1021.2.1 would permit three or four exit access stairways (or ramps) in lieu of the current Code requirement for three or four exits.

The proposed changes to Section 403 where "exit enclosure" is changed to "interior exit stairways" results in the requirements not being applicable to interior exit ramps and exit passageways. Was this technical change intended?

Although rather circuitous, the requirements for fire barriers separating exit enclosures also applied to exit passageways. The proposed revision to Section 707.3.2 no longer includes exit passageways since there is no direct or circuitous reference to Section 1023 for exit passageways.

It is not clear how Section 707.6 provisions for openings in enclosures for exit access stairways and ramps will truly apply. The intent, most likely, is to only apply to when an enclosure is required for an exit access stairway or ramp. However, the proposed text does not really say that.

The proposed revision to section 1015.2.1 does not include interior exit ramps whereas the current text applies to all exit enclosures.

May the refuge area for a horizontal exit lead to an exit passageway instead of an interior exit stairway or ramp? The proposed revisions to Section 1025.4 would not permit such an arrangement.

Deleting the word "exit" in Item 1.2 of Exception No. 1 to Section 1027.1 and Item 2.1 of Exception No. 2 of Section 1027.1 results in less clarity in the Code. Retaining the word "exit" would clarify what enclosure is being referenced.

Final Action: AS AM AMPC____ D

E5-09/10, Part II

[F]403.3.1.1, [F]414.7.2, [F]415.8.4.6.2, [F]909.5; (IFC 909.5, 914.3.1.1, 1803.12.1.2, 2705.4.4); (IMC [F]513.5)

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

PART II – IFC

Revise as follows:

SECTION 403
HIGH-RISE BUILDINGS

[F] 403.3.1.1 (IFC 914.3.1.1.1) Riser location. Sprinkler risers shall be placed in interior exit stairways and ramps ~~exit enclosures~~ that are remotely located in accordance with Section 1015.2.

SECTION 414
HAZARDOUS MATERIALS

[F] 414.7.2 (IFC 2705.4.4) Dispensing, use and handling. Where hazardous materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 are transported through corridors ~~or exit enclosures~~, interior exit stairways or ramps or exit passageways there shall be an emergency telephone system, a local manual alarm station or an approved alarm-initiating device at not more than 150-foot (45 720 mm) intervals and at each exit and exit access doorway throughout the transport route. The signal shall be relayed to an approved central, proprietary or remote station service or constantly attended on-site location and shall also initiate a local audible alarm.

SECTION 415
GROUPS H-1, H-2, H-3, H-4 AND H-5

[F] 415.8.4.6.2 (IFC 1803.12.1.2) ~~Exit access~~ Corridors and interior exit stairways and ~~exit~~ ramps ~~enclosures~~. Emergency alarms for ~~exit access~~ corridors ~~and exit enclosures~~ interior exit stairways and ramps and exit passageways shall comply with Section 414.7.2.

SECTION 909
SMOKE CONTROL SYSTEMS

[F] 909.5 (IFC 909.5, IMC [F] 513.5) Smoke barrier construction. Smoke barriers shall comply with Section 710, and shall be constructed and sealed to limit leakage areas exclusive of protected openings. The maximum allowable leakage area shall be the aggregate area calculated using the following leakage area ratios:

1. Walls: $A/A_w = 0.00100$
2. Interior exit ~~enclosures~~ stairways and ramps and exit passageways: $A/A_w = 0.00035$
3. Enclosed exit access stairways and ramps and all other shafts: $A/A_w = 0.00150$
4. Floors and roofs: $A/A_F = 0.00050$

where:

A = Total leakage area, square feet (m^2).
A_F = Unit floor or roof area of barrier, square feet (m^2).
A_w = Unit wall area of barrier, square feet (m^2).

The leakage area ratios shown do not include openings due to doors, operable windows or similar gaps. These shall be included in calculating the total leakage area.

Reason: See E5-09/10 Part I.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME:Heilsted-G8-410.5.3.1

Public Hearing Results

PART II- IFC
Committee Action: **Approved as Submitted**

Committee Reason: The changes to sections controlled by the International Fire Code should be revised to be consistent with the terminology and intent in Part I.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Submitted.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 2:

Mike Ashley C.B.O. representing the Alliance for Fire & Smoke Containment & Control, Inc., requests Approval as Submitted.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 3:

David Collins, FAIA, Cincinnati, Ohio representing the American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 4:

Jason Thompson, National Concrete Masonry Alliance, representing Masonry Alliances for Codes and Standards, requests Approval as Submitted.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 5:

Gerald Anderson, Overland Park, KS, representing self, requests Disapproval.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 6:

Toni Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council (IFC), requests Disapproval.

Commenter's Reason: See E5-09/10 Part I**.**

Public Comment 7:

William E. Koffel, P.E., Koffel Associates, Inc., requests Disapproval.

Commenter's Reason: See E5-09/10 Part I.

Final Action: AS AM AMPC____ D

E6-09/10

505.3, 505.4, 1002.1, 1006.3, 1011.1, 1015 (IFC [B] 1002.1, 1006.3, 1011.1, 1015)

Proposed Change as Submitted

Proponent: Anne VonWeller, Murray City, and Ron Clements, Chesterfield County Building Inspection Department, representing the Utah Chapter of the International Code Council

Revise as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

EXIT ACCESS ~~DOORWAY~~ POINT. A door or access point along the path of egress travel within the exit access from an occupied room, area or space where the path of egress enters an intervening room, corridor, unenclosed exit access stair or unenclosed exit access ramp.

SECTION 1015 (IFC [B] 1015.1)
EXITS AND EXIT ACCESS ~~DOORWAYS~~ POINTS FOR ROOMS AND SPACES

1015.1 (IFC [B] 1015.1) Number required ~~Exit or exit access doorways from spaces.~~ Two exits or exit access points ~~doorways~~ from any room or space shall be provided where one of the following conditions exists:

Exception: Group I-2 occupancies shall comply with Sections 1014.2.2 through 1014.2.7

1. The occupant load of the room or space exceeds one of the values in Table 1015.1.

   Exception: In Groups R-2 and R-3 occupancies, one exit or exit access point ~~means of egress~~ is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

2. The common path of egress travel exceeds one of the limitations of Section 1014.3.
3. Where required by Section 1015.3, 1015.4, 1015.5, 1015.6 or 1015.6.1.

Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.

TABLE 1015.1 (IFC [B] 1015.1)
ROOMS & SPACES WITH ONE EXIT OR EXIT ACCESS ~~DOORWAYS~~ POINT
(*Portions of table not shown remain unchanged)*

1015.1.1 (IFC [B] 1015.1.1) Additional ~~Three or more~~ exits or exit access ~~doorways~~ points. Three exits or exit access ~~doorways~~ points shall be provided from any room or space with an occupant load of 501 to 1,000. Four exits or exit access doorways shall be provided from any room or space with an occupant load greater than 1,000.

1015.2 (IFC [B] 1015.2) Availability ~~Exit or exit access doorways arrangement~~. Required exits and exit access points shall be located in a manner that makes their availability obvious. Exits and exit access points shall be unobstructed at all times. Exit and exit access ~~doorways~~ points shall be arranged in accordance with Section~~s~~ 1015.3.~~1015.2.1 and 1015.2.2.~~

~~1015.2.1~~ 1015.3 (IFC [B] ~~1015.2.1~~ 1015.3) Arrangement ~~Two exits or exit access doorways.~~ Where two or more exits or exit access ~~doorways~~ points are required from any portion of the exit access, at least two of the exit doors or exit access ~~doorways~~ points shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access ~~doorways~~ points. For doors and doorways such distance shall be measured from the center of doors and openings. For unenclosed interior stairways and ramps such distance shall be measured from the center of the first stair riser or beginning of ramp slope. Interlocking or scissor stairs shall be counted as one exit or exit access point ~~stairway~~.

Exceptions:

1.~~2.~~ Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance ~~of the exit doors or exit access doorways~~ shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

2.~~1.~~ Where exit enclosures are provided ~~as a portion of the required exit~~ and such exit enclosures are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required ~~exit~~ separation distance shall be measured along the shortest direct line of egress travel within the corridor.

~~**1015.2.2 (IFC [B] 1015.2.2) Three or more exits or exit access doorways.** Where access to three or more exits is required, at least two exit doors or exit access doorways shall be arranged in accordance with the provisions of Section 1015.2.1.~~

~~1015.3~~ 1015.4 (IFC [B] ~~1015.3~~ 1015.4) Boiler, incinerator and furnace rooms. Two exit access ~~doorways~~ points are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m^2) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422 000 KJ) input capacity. Where two exit access ~~doorways~~ points are required, one is permitted to be a fixed ladder or an alternating tread device. Exit access ~~doorways~~ points shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

~~1015.4~~ 1015.5 (IFC [B] ~~1015.4~~ 1015.5) Refrigeration machinery rooms. Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two exits or exit access ~~doorways~~ points. Where two exit access ~~doorways~~ points are required, one such ~~doorways~~ points is permitted to be served by a fixed ladder or an alternating tread device. Exit access ~~doorways~~ points shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of room.

All portions of machinery rooms shall be within 150 feet (45 720 mm) of an exit or exit access ~~doorways~~ point. An increase in travel distance is permitted in accordance with Section 1016.1.

Doors shall swing in the direction of egress travel, regardless of the occupant load served. Doors shall be tight fitting and self-closing.

~~1015.5~~ 1015.6 (IFC [B] ~~1015.5~~ 1015.6) Refrigerated rooms or spaces. Rooms or spaces having a floor area larger than 1,000 square feet (93m^2), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two exits or exit access ~~doorways~~ points.

Travel distance shall be determined as specified in Section 1016.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an exit or exit access ~~doorways~~ points where such rooms are not protected by an approved automatic sprinkler system in accordance with Section 903.3.1.1. Egress is allowed through adjoining refrigerated rooms or spaces.

Exception: Where using refrigerants in quantities limited to the amounts based on the volume set forth in the International Mechanical Code.

~~1015.6~~ 1015.7 (IFC [B] ~~1015.6~~ 1015.7) Stage means of egress. Where two ~~means of egress~~ exits or exit access points are required, based on the stage size or occupant load, one ~~means of egress~~ exit or exit access point shall be provided on each side of the stage.

~~1015.6.1~~ 1015.7.1 (IFC [B] ~~1015.6.1~~ 1015.7.1) Gallery, gridiron and catwalk means of egress. The means of egress from lighting and access catwalks, galleries and gridirons shall meet the requirements for occupancies in Group F-2.

Exceptions:

1. A minimum width of 22 inches (559 mm) is permitted for lighting and access catwalks.
2. Spiral stairs are permitted in the means of egress.
3. Stairways required by this subsection need not be enclosed.
4. Stairways with a minimum width of 22 inches (559 mm), ladders, or spiral stairs are permitted in the means of egress.
5. A second ~~means of egress~~ exit or exit access point is not required from these areas where a means of escape to a floor or to a roof is provided. Ladders, alternating tread devices or spiral stairs are permitted in the means of escape.
6. Ladders are permitted in the means of egress.

SECTION 505
MEZZANINES

505.3 Egress. Each occupant of a mezzanine shall have access to at least two independent exits ~~means of egress~~ where the common path of egress travel exceeds the limitations of Section 1014.3. Where an unenclosed stairway provides a means of exit access from a mezzanine, the maximum travel distance includes the distance traveled on the stairway measured in the plane of the tread nosing. Accessible means of egress shall be provided in accordance with Section 1007.

Exception: A single exit or exit access point ~~means of egress~~ shall be permitted in accordance with Section 1015.1.

505.4 Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. A mezzanine having two or more exits or exit access points ~~means of egress~~ is not required to be open to the room in which the mezzanine is located if at least one exit or exit access point ~~of the means of egress~~ provides direct access to an exit from the mezzanine level.
3. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the aggregate floor area of the enclosed space does not exceed 10 percent of the mezzanine area.
4. In industrial facilities, mezzanines used for control equipment are permitted to be glazed on all sides.
5. In occupancies other than Groups H and I, that are no more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a mezzanine having access to two or more exits ~~means of egress~~ shall not be required to be open to the room in which the mezzanine is located.

SECTION 1006
MEANS OF EGRESS ILLUMINATION

1006.3 (IFC [B] 1006.3) Illumination emergency power. The power supply for means of egress illumination shall normally be provided by the premises' electrical supply.

In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Aisles and unenclosed ~~egress~~ exit access stairways and ramps in rooms and spaces that require two or more exits or exit access points. ~~means of egress~~.
2. Corridors, exit enclosures and exit passageways in buildings required to have two or more exits.
3. Exterior egress components at other than their levels of exit discharge until exit discharge is accomplished for buildings required to have two or more exits.
4. Interior exit discharge elements, as permitted in Section 1027.1, in buildings required to have two or more exits.
5. Exterior landings as required by Section 1008.1.6 for exit discharge doorways in buildings required to have two or more exits.

The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Chapter 27.

SECTION 1011
EXIT SIGNS

1011.1 (IFC [B] 1011.1) Where required. Exits and exit access ~~doors~~ points shall be marked by an approved exit sign readily visible from any direction of egress travel. The path of egress travel to exits and within exits shall be marked by readily visible exit signs to clearly indicate the direction of egress travel in cases where the exit or the path of egress travel is not immediately visible to the occupants. Intervening means of egress doors within exits shall be marked by exit signs. Exit sign placement shall be such that no point in an exit access corridor or exit passageway is more than 100 feet (30 480mm) or the listed viewing distance for the sign, whichever is less, from the nearest visible exit sign.

Exception:

1. Exit signs are not required in rooms, spaces or areas which require only one exit or exit access point.
2. Main exterior exit doors or gates that are obviously and clearly identifiable as exits need not have exit signs where approved by the building official.
3. Exit signs are not required in occupancies in Group U and individual sleeping units or dwelling units in Group R-1, R-2 or R-3.
4. Exit signs are not required in dayrooms, sleeping rooms or dormitories in occupancies in Group I-3.
5. In occupancies in Groups A-4 and A-5, exit signs are not required on the seating side of vomitories or openings into seating areas where exit signs are provided in the concourse that are readily apparent from the vomitories. Egress lighting is provided to identify each vomitory or opening within the seating area in an emergency.

Reason:

Background

The 2009 edition added a definition for 'exit access doorway' to clarify that the provisions for exit access doorways applied to components where there is not always a doorway, such as the transition point along the path of egress to unenclosed interior stairways and ramps.

During the discussions of the CTC's Unenclosed Stairway Work Group it was recognized a more clear term was needed to describe the 'point' where requirements such as those for number, availability, and arrangement should be applied. 'Exit Access Point' was very clear and straight forward.

Most of the language in the above proposal was developed in the study group. However, it was determined 'exit access point' was beyond the scope of the specific study. There was a good deal of support for the concept and we were encouraged to bring it forward as a separate change.

The Changes

The one word change in the definition going from 'doorway' to 'point' is the focus of the change. The new term is carried throughout the change. Also, 'within the exit access' was added to make clear an 'exit access point' in only applicable in those portions of the means of egress.

The name of the section was expanded to assist users and avoid confusion with Section 1020.

'Means of egress' was changed to 'exit or exit access point' in several places because means of egress applies to all occupied portions of a building. The change occurs where a term refers to the number of required components which is more appropriate than the general term.

In 1015.3 we have made it clear exactly where to measure the required separation distance between egress components in the exit access. How many debates have been about "Do we measure to the center of the door? The closest edge? The furthest edge? We chose the center. This becomes more important to pin down when now using the concept of 'point'.

Changes to 505, 1006.3, and 1011.1 are for correlation with those in 1015.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Vonweller-E3-1023.6

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The term "transition point" would address travel distance measurements at open stairway; however, it would be confusing for situations where there is a door on a stairway enclosure.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Anne vonWeller, Murray City, Utah, representing Utah Chapter ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1015.1.1 (IFC 1015.1.1) Additional exits or exit access points. Three exits or exit access points shall be provided from any room or space with an occupant load of 501-1,000. Four exits or exit access <u>points</u> ~~doorways~~ shall be provided from any room or space with an occupant load greater than 1,000.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: The reason printed in the report of the hearing does not clearly identify the committee's specific reason for disapproving this item. The proponents maintain their original reasons for this change. This change is especially beneficial if E5-09/10 is approved with the more comprehensive understanding of exit access stairways and the relationship between them and other aspects of egress design.

The purpose for modification is to correct a simple oversight in the original submittal when one of the applicable occurrences was missed.

Final Action: AS AM AMPC____ D

E8-09/10, Part I
1002.1 (IFC [B] 1002.1)

Proposed Change as Submitted

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association, Inc.

PART I – IBC MEANS OF EGRESS

Add new text as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

<u>**PROJECTED TREAD DEPTH.** The full depth dimension of a tread with a nosing projection or the sum of the tread depth measured between adjacent nosings and the depth of the nosing projection.</u>

<u>**NOSING PROJECTION.** The additional depth of a tread in excess of the tread depth or the distance between the edges of adjacent treads overlapping horizontally.</u>

<u>**RISER.** The vertical component of a step or stair.</u>

Reason:
Part I -These definitions clarify the intent of the code.

Projected Tread Depth is currently incorrectly characterized as the tread depth in reference to measuring alternating tread devices. This definition will allow for the same terminology to apply to all vertical egress devices as it does to both stairs and ship ladders. Please see our related change to Alternating tread devices.

Nosing projection needs to be better understood by all that use the code. One of the most common misinterpretations akin to the measurement of tread depth is the concept of a nosing projection and how it is measured. This simple definition is long overdue.

Riser is currently listed in the IRC with a definition for a plumbing application. Please see our change to the IRC as well.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME:Cooper-G1-202

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed definition for projected tread depth is unclear. The proponent should provide figures so this definition can be fully understood. The definition for 'riser' by inclusion of the word "vertical" could be interpreted to not allow the 30 degree slope on risers currently permitted.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association, requests Approval as Modified.

Modify the proposal as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

PROJECTED TREAD DEPTH. ~~The full depth dimension of a tread with a *nosing projection* or the~~ <u>The </u>sum of the tread depth measured between adjacent *nosings* and the depth of the *nosing projection* <u>of the tread or floor above.</u>

NOSING PROJECTION. ~~The additional depth of a tread in excess~~ <u>The portion </u>of the tread depth <u>that extends beyond the tread below.</u>~~ or the distance between the edges of adjacent treads overlapping horizontally~~

RISER. The vertical <u>or sloped</u> component of a step or *stair* <u>connecting a *nosing* with a tread or floor below</u>.

Commenter's Reason: The diagrams below have been provided at the committee's request to provide an easy understanding of the proposed terminology. The language of the definitions has been modified to resolve the IBC committee's concerns for clarity and objections raised in testimony. Specifically:

1. The definition of riser has been clarified to address that risers may be sloped as well as vertical. The sloping has been qualified as connecting a nosing and the tread or floor below. This is sufficient for the definition as the sloping of risers is quantified in **R311.7.4.3 Profile and 1009.4.5 Profile**
2. The concern that the original text implied that the nosing projection was "additional tread depth" has been eliminated by more clearly stating it is a portion of the tread depth. This is clearly illustrated in **Figures 1 – 4 below**.
3. The term projected tread depth has also been simplified and is clearly illustrated by the figures below.
3. The Figures also clearly illustrate that the terminology is common to stairs with vertical and sloped risers, ship ladders, and alternating tread devices. 4. Because of the illustrated relevance and current use of the term *nosing projection* in **R311.7.4.3 Profile**, the proposed change to the IRC has been modified to include *nosing projection*.
5. The term *projected tread depth* is only used in **1009.10 Alternating tread devices** and **1009.11 Ship Ladders** and is only essential to the IBC

In addition to the above referenced sections of the current code dependent on a clear understanding of these terms, please also see the following related approved proposals that include these terms; **E73** – AS, E75 Part I – AS, **RB46** – AM, **E79** – AS, and also the following disapproved proposals; **E75 Part II** – D, **E78** – D.

Illustration of Proposed Defintions

E8-09/10 Part I and Part II by Stairway Manufacturers' Association

The four figures below show that the defined terms and their dimensional relationships are common to stairs, ship ladders and alternating tread devices.

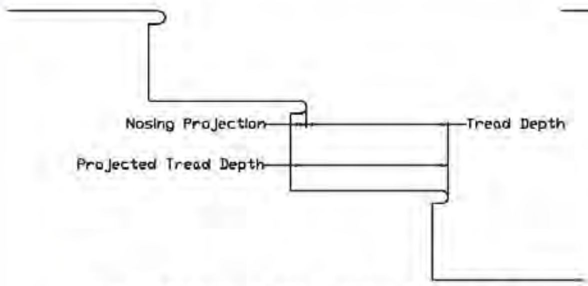


Figure 1: Stairway with traditional nosing projection

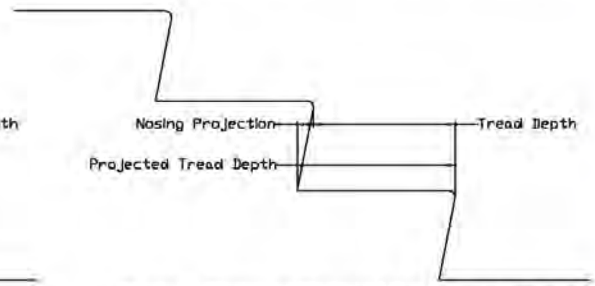


Figure 2: Stairway with sloped riser-nosing projection

Note: Both Stairways are drawn with same riser height and tread depth

Nosing Projection = The portion of the tread depth that extends beyond the tread below.
Projected Tread Depth = Tread Depth + Nosing Projection of tread or floor above .

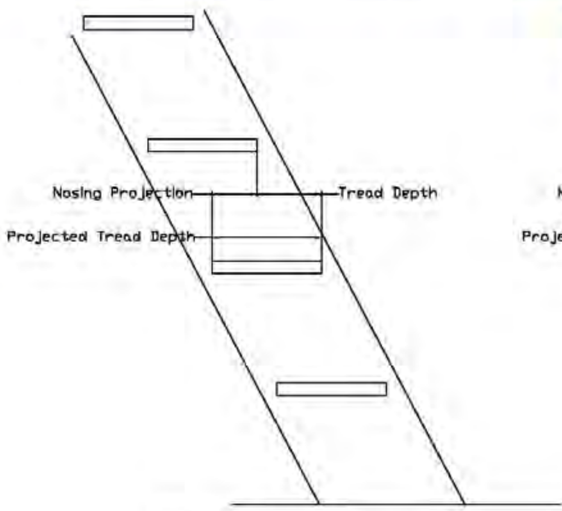


Figure 3: Ship Ladder

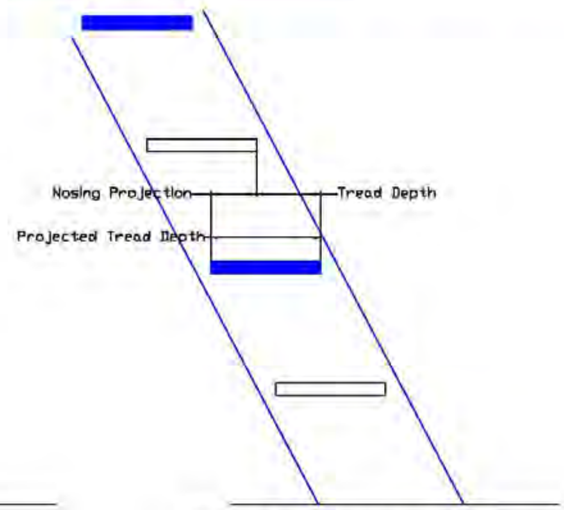


Figure 4: Alternating tread device

Central stringer and treads on opposite side shown in blue

Note: Both Ship ladder & ATD are drawn with same riser height and tread depth

Final Action: AS AM AMPC____ D

E8-09/10, Part II
IRC R202

Proposed Change as Submitted

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association, Inc.

PART II – IRC BUILDING/ENERGY

Revise as follows:

SECTION R202
DEFINITIONS

RISER.

1. The vertical component of a *step* or *stair*
2. A water pipe that extends vertically one full story or more to convey water to branches or to a group of fixtures.

Reason:
Part II-These definitions clarify the intent of the code.
Riser – I the 07/09 cycle the IRC committee pointed out that the term riser was confused with riser height and that further confusion was caused by the present definition of a plumbing application. The stair term is more commonly known and is therefore listed first. The existing definition remains unchanged.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME:Cooper-G1-202

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This is a good definition and it clarifies the meaning of "riser" as it relates to a step or stair. The definition does not require the riser to be 90° vertical. A slope is permitted in the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

RISER. 1.The vertical or sloped component of a step or *stai*r connecting a *nosing* with a tread or floor below. 2. A water pipe that extends vertically one full story or more to convey water to branches or to a group of fixtures.

NOSING PROJECTION. The portion of the tread depth that extends beyond the tread below.

Commenter's Reason: See E8-09/10 Part I.

Final Action: AS AM AMPC____ D

E13-09/10
Table 1004.1.1 (IFC [B] Table 1004.1.1)

Proposed Change as Submitted

Proponent: Jay Wallace, The Boeing Company

Revise as follows:

TABLE 1004.1.1 (IFC [B] TABLE 1004.1.1)
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	FLOOR AREA IN SQ. FT. PER OCCUPANT
~~Aircraft hangars~~	~~500 gross~~
Aircraft Related Uses	
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Manufacturing	
Final assembly	500 gross
Sub-assembly fabrication	300 gross
Hangars	
Maintenance and repair	500 gross
Storage or painting	1,000 gross

(Portions of the table not shown remain unchanged.)

Reason: This proposal intends to provide more representative occupant density factors for aircraft manufacturing and storage facilities. Presently, other than for aircraft hangars, there are no industry specific occupant load factors. The recommended values are typical of industry practices. It should be noted that automation has greatly reduced the number of persons necessary to manufacture aircraft. The typically large area necessary for the manufacturing or storage of aircraft is also a factor in the determination of appropriate values. Assigning one occupant for each 32' x 32' area (1000 sf) in an aircraft storage or paint hanger is actually a conservative approach. This figure was selected to account for common usage in smaller facilities. The proposed fabrication occupant load factors also represent typical production practices. These factors become significant in means of egress design. The Boeing Company has a 4,500,000 square foot manufacturing facility. Using the current industrial area occupant load factor of 100 square feet per occupant, the design occupant load of this building is 45,000. It should be noted that The Boeing Company has only 160,000 employees worldwide. In fact, approximately 20,000 employees divided into three shifts work in this factory. The current calculated occupant load would result in a minimum of four exits having 750 feet of egress width. The proposed occupant load factor of 500 would result in a design occupant load of 9,000. Four exits would still be required, however, total egress width would now be a more realistic 150 total feet (50 x 3'-0" doors). Since the facility also contains sub-assembly fabrication operations, the occupant load would be greater than 9,000 resulting in more total egress width. Approval of this proposal will provide code users with occupant load factors representative of industry practices. Such characteristic values will provide for the safe egress of building occupants while not requiring excessive numbers of means of egress components.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Wallace-E1-T1004.1.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Section 1004 already allows for code officials to approve the actual occupant load in large spaces with minimal occupants. There was no technical justification to support this occupant load across the industry: for example, is this consistent with small airplane manufacturers.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jay S. Wallace representing The Boeing Company; Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Submitted

Commenter's Reason: When a use is not included in Table 1004.1.1, Section 1004.1.1 directs the building official to "establish a use based on a listed use that most nearly resembles the intended use". In the case of aircraft manufacturing, the listed use that most nearly resembles our use is "Industrial areas" that assigns 100 square feet per occupant. As pointed out by the ICC Means of Egress Code Committee in its published reason substantiating disapproval of E13-09/10, the exception to Section 1004.1.1 states that the actual occupant load may be used when approved by the building official. This requires some good faith negotiations between the owner and the building official. It is relatively easy to do when the facility is operational, but during design it is harder for the building official to make such an assessment.

The Boeing Company is a global company with manufacturing interests throughout the United States and literally around the world. We participate in the ICC code development process to make the code more relevant and better for users. We are advocates for consistency and clarity so that the application of the code is as uniform as possible in every jurisdiction in which we have facilities. To require global users such as Boeing to negotiate something as fundamental as the occupant load in each and every jurisdiction is problematic.

Also, the committee stated that no technical justification was provided to demonstrate that the proposed occupant load factors are applicable to smaller aircraft manufactures. The Boeing Company manufactures fixed and rotary winged aircraft of all sizes from large commercial and military transport aircraft to single seat fighters. We collected data from the Cessna Aircraft Company and a variety of Boeing aircraft manufacturing environments that includes parts manufacturing and assembly of a full range of part sizes and product deliverables. The following data support our proposed occupant loads:

Modified Values to Table 1004.1.1				
Item No.	**Aircraft Industry Use**	**Floor Area in Sq. Ft. per Occupant Range**	**Floor Area Sq. Ft. per Occupant Average**	**Proposed New Table Value**
1	Manufacturing – Sub Assembly & Parts	140[a] – 976	589[b]	**300**
2	Manufacturing – Final Assembly & Associated Support Activities	373 – 1,053	740	**500**
3	Hangars – Maintenance & Repair	1,075 – 16,095	1,466	**500**
4	Hangars – Storage or Paint	2,508 – 13,086	7,797	**1000**

a) Number based on Cessna estimate in small parts use only, no sub-assembly; current actual figure is 421.
b) If actual number is used instead of Cessna estimate for current small parts use only, then average is 636.

As increased automation impacts industrial areas, the current Table 1004.1.1 occupant load factor of 100 square feet per occupant is due for an update. The Boeing Company conducted contemporary research and determined that the proposed values for aircraft manufacturing facilities are reasonable and on average, very conservative.

Final Action: AS AM AMPC____ D

E17-09/10
1004.3 (IFC [B] 1004.3)

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise as follows:

1004.3 (IFC [B] 1004.3) Posting of occupant load. Every room or space that is an assembly occupancy shall have the maximum occupant load of the room or space posted in a conspicuous place no more than 12 feet (3.66 m) above the floor, near the main exit or exit access doorway from the room or space. Posted signs shall be of ~~an approved legible~~ permanent design with letters and numbers not less than 1 inch (25 mm) high on a contrasting background and shall be maintained by the owner or authorized agent.

Reason: The term "approved legible design" for a maximum occupant load sign is ambiguous and creates unnecessary conflicts in the field, usually around the time when a certificate of occupancy is ready to be issued. The revised language creates a clear standard that will reduce disagreements and potential waste. The proposed language is similar to the text found in Section 1008.1.9.3.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME: KRANZ-E1-1004.3.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The requirement needs stroke width of visible requirements. The proposal does not indicate what should be posted for multi-purpose rooms. The occupant load indicated should be approved by the code official/fire official.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lee J. Kranz Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1004.3 Posting of occupant load. Every room or space that is an assembly occupancy shall have the ~~maximum~~ occupant load of the room or space posted in a conspicuous place no more than ~~12 feet (3.66 m)~~ <u>8 feet (2.44 m)</u> above the floor, near the main exit or exit access doorway from the room or space. Posted signs shall be of <u>an approved</u> permanent design with letters and numbers not less than 1 inch (25 mm) high on a contrasting background and shall be maintained by the owner or authorized agent. <u>The uppercase letter "I" shall be used to determine the allowable stroke width of all characters of a font. The stroke width shall be 10 percent minimum and 30 percent maximum of the height of the uppercase "I" of the font.</u>

Commenter's Reason: As advised by the Egress Committee in Baltimore, the language for this proposal has been modified to: 1) remove the term "maximum" as it relates to the occupant load of the room or space, 2) limit the placement of the sign to no more than 8' above the floor and 3) specify minimum and maximum stroke width. The language specifying the stroke width is consistent with Section 703.2.6 of ICC/ANSI A117.1-2003.

There were also comments made relating to posting of occupant load signs for multi-purpose rooms. The original proposal was not intended to address this issue nor do we intend to address it as part of this public comment. Because multi-purpose rooms can take on many different configurations we consider posting of occupant load signs to be a plan review issue that should be resolved prior to issuance of the permit.

Final Action: AS AM AMPC____ D

E22-09/10

1004.5, 1005.1 (IFC [B] 1004.5, 1005.1)

Proposed Change as Submitted

Proponent: Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International

Revise as follows:

~~**1005.1 (IFC [B] 1005.1) Minimum required egress width.** The means of egress width shall not be less than required by this section. The total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.3 inches (7.62 mm) per occupant for stairways and by 0.2 inches (5.08 mm) per occupant for other egress components. The width shall not be less than specified elsewhere in this code. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.~~

~~**Exception:** Means of egress complying with Section 1028.~~

1005.1 (IFC [B] 1005.1) General. The means of egress shall be sized in accordance with this section.

Exception: Means of egress complying with Section 1028.

1005.2 (IFC [B] 1005.2) Minimum width based on component. The width of egress components shall not be less than specified elsewhere in this code.

1005.3 (IFC [B] 1005.3) Capacity based on occupant load. The means of egress for any floor, room, or story shall be sized to accommodate the total occupant load, as determined by Section 1004, in accordance with the following:

1005.3.1 (IFC [B] 1005.3.1) Stairways. The capacity of means of egress stairways shall be calculated using a factor of 0.3 inches (7.62 mm) of width per person.

1005.3.2 (IFC [B] 1005.3.2) Other egress components. The capacity of means of egress components other than stairways shall be calculated using a factor of 0.2 inches (5.08 mm) of width per person.

1005.4 (IFC [B] 1005.4) Capacity based on egress path. The capacity of the means of egress required from any story of a building shall be maintained to the termination of the means of egress.

1005.5. (IFC [B] 1005.5) Distribution of egress capacity. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity.

1005.6 (IFC [B] 1005.6) Egress convergence. Where means of egress from floors above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the two floors.

(Renumber subsequent sections.)

Delete without substitution:

~~**1004.5 (IFC [B] 1004.5) Egress convergence.** Where means of egress from floors above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the two floors.~~

(Renumber subsequent sections.)

Reason: This proposal seeks to editorially reorganize and clarify the multiple requirements related to 'egress width' currently contained in a single paragraph in 10051, and to relocate a related provision from 1004.5 to a more logical location with other egress width/capacity provisions. No technical changes are intended by this change.

1005.1 creates a new charging paragraph.
1005.2 replaces the current second sentence of 1005.1, noting that minimum width requirements for means of egress components may be specified in other locations in the code.
1005.3 is consistent with the current egress width factors, but reorganizes the text to clarify that the total occupant load (which is determined in Section 1004) drives the capacity for which the egress width must be provided. The new text also clearly states that egress width/capacity is determined on a floor, room, and story basis.
1005.4 replaces the last sentence of current 1005.1, and notes that once a minimum capacity is required along a means of egress, it must be provided along the entire path of egress travel.
1005.5 is consistent with the current 4th sentence of 1005.1.
1005.6 relocates the provision for 'egress convergence' from 1004.5. This is really an issue of egress capacity/width, and should more appropriately be located here, instead of buried in a section on occupant load.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Perry-E1-1005.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The revisions bring the capacity concept forward in the width determination. Breaking this into parts will add clarity and readability in the code when dealing with means of egress width. This is consistent with the committee approval of E10-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International; Gregory R. Keith, Professional heuristic Development, representing The Boeing Company; Anne vonWeller, Murray City Corporation, Utah, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 1005
MEANS OF EGRESS SIZING ~~WIDTH~~

1005.1 (IFC [B] 1005.1) General. All portions of the means of egress system shall be sized in accordance with this section.

Exception: Means of egress complying with Section 1028.

1005.2 (IFC [B] 1005.2) Minimum width based on component. The minimum width, in inches, of any means of egress component~~s~~ shall not be less than that specified for such component, elsewhere in this code.

1005.3 (IFC [B] 1005.3) Required capacity based on occupant load. The required capacity, in inches, of the means of egress for any ~~floor,~~ room, area, space or story shall ~~be sized to accommodate the total occupant load, as~~ not be less than that determined ~~by Section 1004,~~ in accordance with the following:

1005.3.1 (IFC [B] 1005.3.1) Stairways. The capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity ~~using a~~ factor of 0.3 inches (7.62 mm) ~~of width~~ per occupant ~~person~~. Where stairways serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the stairways serving that story.

1005.3.2 (IFC [B] 1005.3.2) Other egress components. The capacity, in inches, of means of egress components other than stairways shall be calculated by multiplying the occupant load served by such component by a means of egress capacity ~~using a~~ factor of 0.2 inches (5.08 mm) ~~of width~~ per occupant ~~person~~.

1005.4 (IFC [B] 1005.4) Continuity ~~Capacity based on egress path~~. The capacity of the means of egress required from any story of a building shall not be reduced along the path of egress travel until arrival at the public way ~~be maintained to the termination of the means of egress~~.

1005.5. (IFC [B] 1005.5) Distribution of egress capacity. Where more than one exit, or access to more than one exit, is required, ~~multiple~~ the means of egress shall be configured ~~sized~~ such that the loss of any one exit, or access to one exit, ~~means of egress~~ shall not reduce the available capacity to less than 50 percent of the required capacity.

1005.6 (IFC [B] 1005.6) Egress convergence. Where the means of egress from stories ~~floors~~ above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the required capacities for the two adjacent stories ~~floors~~.

~~**1004.4 (IFC 1004.4) Exiting from multiple levels.** Where exits serve more than one floor, only the occupant load of each floor considered individually shall be used in computing the required capacity of the exits at that floor, provided that the exit capacity shall not decrease in the direction of egress travel.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: In its reason statement for approval of Item E22-09/10 as submitted, the ICC Means of Egress Code Committee stated, "The revisions bring the capacity concept forward in the width determination. Breaking this into parts will add clarity and readability in the code when dealing with means of egress width. This is consistent with the committee approval of E10-09/10." This public comment for approval as modified further clarifies and integrates the capacity concept into the IBC within the format established by Item E22-09/10. The deleted Section 1004.4 provisions correlate with Item E10-09/10 that separates occupant load and egress width/capacity provisions. Former Section 1004.4 provisions have been incorporated, in context, into E22-09/10 Section 1005.3.1. The exception on Section 1005.1 has been revised to be consistent with the language approved in E140-09/10 for assembly. The language and terminology are consistent with related means of egress provisions. Approval of this public comment will result in consistency in the determination of means of egress sizing requirements.

Final Action: AS AM AMPC____ D

E23-09/10
1005.1 (IFC [B] 1005.1)

Proposed Change as Submitted

Proponent: Maureen Traxler representing Washington Association of Building Officials Technical Code Development Committee

Revise as follows:

1005.1 (IFC [B] 1005.1) Minimum required egress width. The means of egress width shall not be less than required by this section. The total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.3 inches (7.62 mm) per occupant for stairways and by 0.2 inches (5.08 mm) per occupant for other egress components. The width shall not be less than specified elsewhere in this code. <u>The width of exit access doorways shall not be less than the width required for doors in Section 1008.</u> Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.

Exception: Means of egress complying with Section 1028.

Reason: The IBC lacks a reasonable provision for minimum width of exit access doorways. The factors in Section 1005.1 only make sense when they are applied to situations where another code section sets forth a minimum width for an egress element, but a high number of occupants would use that element. For example, Section 1018.2 sets forth minimum corridor widths, but also states that the width shall not be less than allowed by Section 1005.1. Section 1018.2 establishes 44 inches as the minimum for most corridors, but if the corridor serves an occupant load of 300, Section 1005.1 would require 60 inches. However, the only section that addresses minimum widths for exit access doorways is 1005.1 which can produce some unacceptable results. For example, if a doorway from a space serves 50 people, Section 1005.1 says the minimum width is 10 inches.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TRAXLER-E1-1005.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is not the correct location for this requirement. A better place for this might be Section 1008. Other provisions of the code already cover the width of doorways, so this item is not needed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

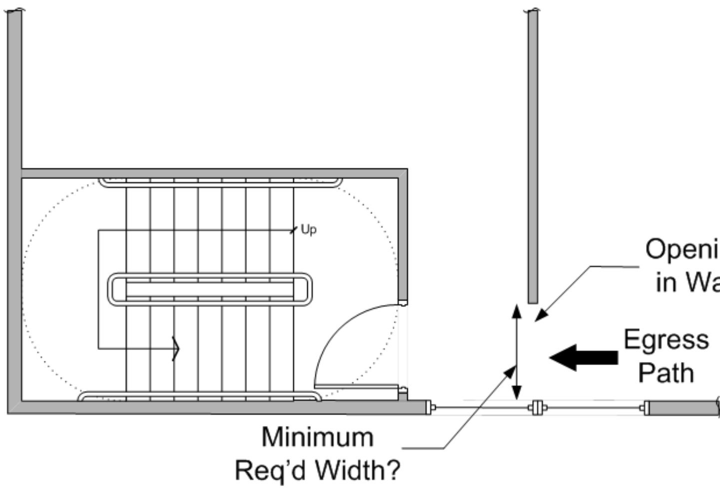
1005.1 (IFC [B] 1005.1) Minimum required egress width. The means of egress width shall not be less than required by this section. The total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.3 inches (7.62 mm) per occupant for stairways and by 0.2 inches (5.08 mm) per occupant for other egress components. The width shall not be less than specified elsewhere in this code. The width ~~of exit access doorways~~ <u>at any point in the path of egress travel</u> shall not be less than the width required for doors in Section 1008. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.

Exceptions: Means of egress width for the following elements shall be permitted to comply with the specified sections:

1. Means of egress for assembly areas in accordance ~~complying~~ with Section 1028.
2. Aisles in accordance with Section 1017.
3. Corridors in accordance with Section 1018.2.
4. Stage stairways and technical production areas in accordance with Section 410.

Commenter's Reason: There is no provision in the IBC that specifies a minimum width where there is no door or doorway. How narrow can an archway or the space between columns be? If the path of egress travel passes through an opening, there should be a required minimum width whether or not the opening is a doorway. The lack of a minimum required egress width can be especially problematic where the egress path is not an accessible path of travel. We believe Section 1005.1 is the appropriate place for this provision since it governs minimum width for means of egress. This proposed language modifies the 0.3 and 0.2 inch factors by imposing a minimum that applies where the factors would result in a width that is less than required for a doorway. For example, where there is an opening in the path of egress travel that serves 50 people, then the 0.2 factor requires a minimum width of only 10 inches. We are proposing to add 2 exceptions that correlate with the lower minimum width provisions for aisles and stage areas. The terminology in Exception 4 is coordinated with the new defined terms in G67-09/10.

The figure below illustrates a real-world example where this was an issue. An interior wall terminated near the exterior wall, creating an opening. The required egress path was not a required accessible path of travel, and passed through the opening. The occupant load was low, so the calculated required egress width was less than 20 inches. There is nothing in the current code text that says the width would have to be greater, but 20 inches is unreasonable.



Final Action: AS AM AMPC____ D

E32-09/10

1007.1.1 (New) [IFC [B] 1007.1.1(New)]

Proposed Change as Submitted

Proponent: Rick Lupton, City of Seattle, representing Seattle Dept of Planning & Development

Revise as follows:

1007.1 (IFC [B] 1007.1) Accessible means of egress required. Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress are required by Section 1015.1 or 1021.1 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. Accessible means of egress are not required in alterations to existing buildings.
2. One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1007.3, 1007.4 or 1007.5.
3. In assembly areas with sloped or stepped aisles, one accessible means of egress is permitted where the common path of travel is accessible and meets the requirements in Section 1028.8.

1007.1.1 (IFC [B] 1007.1.1) Separation of accessible means of egress. When two accessible means of egress are required, they shall be located as far apart as practical.

Reason: This proposal is intended to address a gap in the code. Currently, there is no specific code language that would prevent two accessible means of egress (AMOE) from being located immediately adjoining. Yet complying with Section 1015.2.1 would place an undue burden on the designer because there are times that an elevator is required as an AMOE and the measure between the elevator and a stair would likely control rather than the measure between stairs as intended for conventional design. According to ICC staff the intent is that two accessible means of egress be separated, but that flexibility is necessary to accommodate types and possible locations of AMOE. While this proposal does not detail exactly how far apart the two AMOE are required to be, it does state the intent yet allows the building official flexibility where necessary.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Lupton-E1F-1007 Exit slip AMOE

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The term 'practical' is not specific enough language for consistent interpretation. If this is an issue a measurement is needed – perhaps using the 30 feet minimum used in the stairway separation.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Modify the proposal as follows:

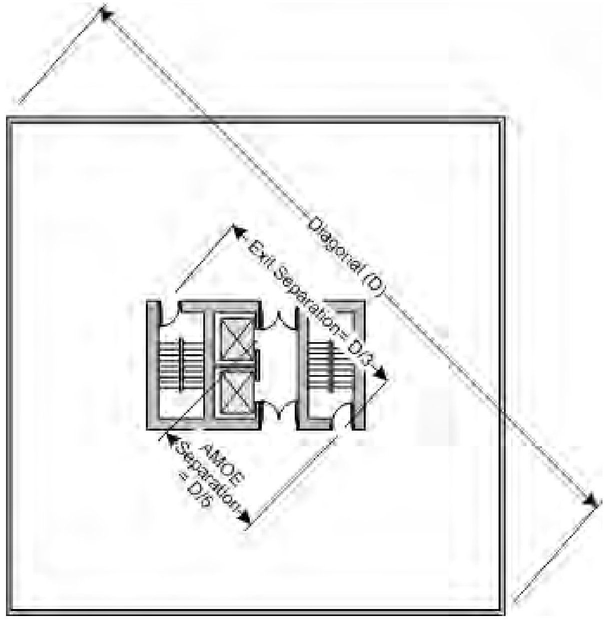
Public Comment:

Rick Lupton, Seattle, WA, representing City of Seattle, Department of Planning & Development, requests Approval as Modified by this Public Comment.

1007.1.1 (IFC [B] 1007.1.1) Separation of accessible means of egress. ~~When two accessible means of egress are required, they shall be located as far apart as practical.~~ Where more than one accessible means of egress is required, at least two accessible means of egress components complying with Section 1007.2, Items 2, 3, 4, 6, or 8 or an accessible exterior exit door shall be located a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between the access points of the accessible means of egress components.

> **Exception:** Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall not be less than one-fifth of the length of the maximum overall diagonal dimension of the area served.

Commenter's Reason: The committee disapproved the original proposal because the language was not specific enough, suggesting that the minimum 30 foot separation required between high-rise exit stair enclosures (Section 403.5.1) might be appropriate. However, because an elevator is a required accessible means of egress (AMOE) in tall buildings, using 30 feet as a minimum separation would drive an unreasonable expansion of the building core in a small footprint building whether the elevator is located between the stairs or outside the stairs. Instead, this modification proposes a dimension that is approximately 2/3 of the exit separation calculated in accordance with Section 1015.2.1. Such a separation distance provides for an elevator used as an AMOE within a building core without driving the core size larger, using up valuable leasable space. As in Section 1015.2.1, the required separation distance is less in a fully sprinkled building. The modification also clarifies that the separation must be measured to an AMOE component that either provides direct egress or a protected area and not pathway components like an accessible route or ramp or unprotected components like a platform lift. While the basis for the minimum separation proposed is empirical, the modification clearly addresses the committee's concern and accomplishes the original goal of codifying an implied requirement for a separation of AMOEs.



Staff note: Code changes E5-09/10 and E36-09/10 added exit access stairways (complying with current Section 1016.1 Exp. 3 and 4) to the list in Section 1007.1 as a new item 3. Code changes E37-09/10 and E38-09/10 added exterior areas for assisted rescue to the list in Section 1007.1 as a new item 9. If this proposal to E32-09/10 is successful, the new items will be added to the list of acceptable elements.

Final Action: AS AM AMPC____ D

E34-09/10

1007.2.1 (New), 1007.6 (IFC [B] 1007.2.1 (New), 1007.6)

Proposed Change as Submitted

Proponent: Ed Roether, Populous (Formerly HOK Sport Venue Event), representing self

Revise as follows:

1007.2 (IFC [B] 1007.2) Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with Section 1104.
2. Interior exit stairways complying with Sections 1007.3 and 1022.
3. Exterior exit stairways complying with Sections 1007.3 and 1026.
4. Elevators complying with Section 1007.4.
5. Platform lifts complying with Section 1007.5.
6. Horizontal exits complying with Section 1025.
7. Ramps complying with Section 1010.
8. Areas of refuge complying with Section 1007.6.

Exceptions:

1. Where the exit discharge is not accessible, an exterior area for assisted rescue shall be provided in accordance with Section 1007.7.
2. Where the exit stairway is open to the exterior, the accessible means of egress shall include either an area of refuge in accordance with Section 1007.6 or an exterior area for assisted rescue in accordance with Section 1007.7.

1007.2.1 (IFC [B] 1007.2.1) Travel distance limitations. Each required accessible means of egress component shall be so located on each story such that the maximum length of accessible exit access travel, measured from the most remote point of an accessible space to an accessible means of egress exit component, shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1.

(Renumber subsequent sections)

1007.6 (IFC [B] 1007.6) Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. ~~The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1.~~ Every required area of refuge shall have direct access to a stairway in an exit enclosure complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4. Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier.

Exceptions:

1. A stairway serving an area of refuge is not required to be enclosed where permitted in Sections 1016.1 and 1022.1.
2. A smokeproof enclosure is not required for an elevator lobby used as an area of refuge where the elevator is not required to be enclosed.

Reason: Currently, any building that provides accessible means of egress without the use of an area of refuge has no limit to the travel distance required by the accessible means of egress system. Travel distance limits are only found in Section 1007.6. The general means of egress requires a limit to travel distance as part of a holistic approach to the exit system to address the occupant flow rates through exit components and travel speeds along its path. There is limited information on how people with disabilities impact these flow rates and travel speeds, but persons with mobility impairments typically move at a slower rate than able bodied people. The exit system for persons with a disability should be within the same travel distance limits as that provided others within the building. Therefore, this proposal moves the travel distance limitation requirement from that pertaining to only an area of refuge and applies it to the continuity of the overall accessible means of egress where it belongs.

Cost Impact: This code change proposal will increase the cost of construction.

ICCFILENAME:Roether-E5-1007.2.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Travel distance should be met for all accessible means of egress, not just to those that contain areas of refuge.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rick Lupton, Seattle, WA, representing City of Seattle, Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1007.2.1 (IFC [B] 1007.2.1) Travel distance limitations. Each required accessible means of egress component shall be so located on each story such that the maximum length of accessible exit access travel shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1, measured from the most remote point of an accessible space to an accessible exterior exit door, or an accessible means of egress exit component complying with Section 1007.2, Items 2, 3, 4, 6, or 8 ~~shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1~~.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The maximum length of accessible exit travel distance should not be measured to an accessible route, platform lift, or ramp because these components do not necessarily provide direct egress from the building nor a protected location for delayed or assisted rescue. Because the list in Section 1007.2, referred to by the proponent, includes these components, a list of specific appropriate components must be provided. As written, there is no meaningful measure to some components, such as to an accessible route. The modification provides an appropriate list for purposes of travel distance, because it requires a measurement only to those components providing either direct egress or protection. It also clarifies that each must be served by an accessible route and complies with Section 1007.2 to qualify for this measurement. Because proposal E37 was passed in Baltimore and no comments were submitted, exterior areas for assisted rescue are included as item 9 of Section 1007.2, rather than listed independently.

Staff note: Code changes E5-09/10 and E36-09/10 added exit access stairways (complying with current Section 1016.1 Exp. 3 and 4) to the list in Section 1007.1 as a new item 3. Code changes E37-09/10 and E38-09/10 added exterior areas for assisted rescue to the list in Section 1007.1 as a new item 9. If this proposed modification to E34-09/10 is successful, the new items will be added to the list of acceptable elements.

Public Comment 2:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International requests Disapproval.

Commenter's Reason: This code change should be disapproved for the following reasons:

• While the proponent validly notes that the current code specifically regulates travel distance for accessible means of egress only where areas of refuge are provided, expanding this concept to all accessible means of egress creates far more questions and problems than it solves.

• The change establishes a new 'starting point' for measuring travel distance (the most remote accessible point vs. the most remote point). For facilities with large spaces that are not accessible (for example, stepped or tiered seating areas in assembly occupancies), there would be significant differences in the effective travel distances permitted.

• The 'end point' of the travel distance measurement is unclear.

• The change requires measuring travel distance to the nearest 'accessible means of egress component', which is not a defined term.

• If one assumes the intent is that the list of components in 1007.2 are the 'accessible means of egress components', the proposal is seriously broken, and there are no 'quick fix' modifications that would resolve the problems.

• As approved, the change allows measurement to an 'accessible route' to determine accessible means of egress travel distance. This makes no sense, and would allow up to a doubling of the code required travel distance for accessible means of egress (maximum travel distance to 'an accessible route', then maximum travel distance to an exit).

• Where elevators are used as an accessible means of egress component, it is unclear where the travel distance would be measured. Would it be to a hoistway door, all hoistway doors, any lobby door, or the nearest lobby door (where lobbies are provided)?

• The issue of using ramps as part of the accessible means of egress needs to be studied and better coordinated. As approved, one can apparently measure to the top of any ramp to determine the accessible means of egress travel distance. Is this appropriate where ramps are part of exit access? At the other extreme, where the code allows unseparated exterior exit ramps (Section 1026), shouldn't the accessible travel distance be measured to the same point as the general travel distance (the top of the ramp)?

• The limited allowance for use of platform lifts as an accessible means of egress needs to be studied and coordinated. As approved, one can measure to the platform lift in any case where a lift is permitted, which may not be appropriate in all cases. At the other extreme, if the change were modified to exclude considering platform lifts when determining accessible travel distance, what is the point in providing standby power to the lift?

• Where the code allows unenclosed stairs (as part of exit access) in lieu of enclosed exit stairs, it makes no sense to have a general rule that would measure maximum travel distance from the upper level, down the stairs to the exit door, and then require a separate calculation using the same maximum travel distance, to assess the accessible means of egress travel distance on the upper level.

• For a very large percentage of new buildings (those that are sprinklered and use stairs in exit enclosures for both general and accessible means of egress), the change adds a new requirement that has no practical effect. In a sprinklered building, the exit stair requirements are identical whether the enclosure is an accessible means of egress or not, and the general code requirements establish the maximum travel distances permitted. Even in buildings greater than 5 stories in height, where an elevator is required as an accessible means of egress, the general travel distance rules would already have ensured that an accessible means of egress (exit stair enclosure) is within travel distance.

• Because the current 'accessible travel distance' requirement is currently a provision within the technical requirements for areas of refuge, there is validly a question as to how the requirement gets applied where the selected accessible means of egress components include those with areas of refuge (e.g., an exit stair in a non-sprinklered building) with those that do not (a horizontal exit). If any simple fix to this 'inconsistency' is needed, it appears that modifying 1007.6 would be the appropriate approach, instead of attempting to take a fundamental code concept (travel distance) and trying to force it into an entirely different application.

Final Action: AS AM AMPC____ D

E38-09/10

1007.2, 1007.7, 1007.7.1 (New), 1007.7.2 (IFC [B] 1007.2, 1007.7, 1007.7.1 (New), 1007.7.2)

Proposed Change as Submitted

Proponent: Ed Roether, Populous (Formerly HOK Sport Venue Event), representing self

Revise as follows:

1007.2 (IFC [B] 1007.2) Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with Section 1104.
2. Interior exit stairways complying with Sections 1007.3 and 1022.
3. Exterior exit stairways complying with Sections 1007.3 and 1026.

4. Elevators complying with Section 1007.4.
5. Platform lifts complying with Section 1007.5.
6. Horizontal exits complying with Section 1025.
7. Ramps complying with Section 1010.
8. Areas of refuge complying with Section 1007.6.
9. Exterior area for assisted rescue complying with 1007.7

~~Exceptions:~~

~~1. Where the exit discharge is not accessible, an exterior area for assisted rescue shall be provided in accordance with Section 1007.7.~~
~~2. Where the exit stairway is open to the exterior, the accessible means of egress shall include either an area of refuge in accordance with Section 1007.6 or an exterior area for assisted rescue in accordance with Section 1007.7.~~

1007.7 (IFC [B] 1007.7) Exterior area for assisted rescue. Exterior areas for assisted rescue shall be accessed by an accessible route from the area served shall be permitted in accordance with Section 1007.7.1 or 1007.7.2.

1007.7.1 (IFC [B] 1007.7.1) Level of exit discharge. Where the exit discharge does not include an accessible route from an exit located on a level of exit discharge to a public way, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1007.7.3 through 1007.7.6.

1007.7.2 (IFC [B] 1007.7.2) Stories above level of exit discharge. Where exit access from the area served is outdoor open air, an exterior area of assisted rescue is permitted as an alternative to an area of refuge. Every required exterior area of assisted recue shall have direct access to an interior exit stairway, exterior stairway, or elevator serving as an accessible means of egress component. The exterior area of assisted rescue shall comply with Section 1007.7.3 through 1007.7.6 and shall be provided with a two-way communication system complying with Sections 1007.8.1 and 1007.8.2.

1007.7.3 (IFC [B] 1007.7.3) Size. Each exterior area for assisted rescue shall be sized to accommodate wheelchair spaces in accordance with Section 1007.6.1. ~~The exterior area for assisted rescue must be open to the outside air and meet the requirements of Section 1007.6.1.~~

1007.7.4 (IFC [B] 1007.7.4) Separation. Separation walls shall comply with the requirements of Section 705 for exterior walls. Where walls or openings are between the area for assisted rescue and the interior of the building, the building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the floor level of the area for assisted rescue or to the roof line, whichever is lower.

~~1007.7.1~~ 1007.7.5 (IFC [B] ~~1007.7.1~~ 1007.7.5) Openness. The exterior area for assisted rescue shall be open to the outside air. The sides other than the separation walls shall be at least 50 percent open, and the open area above ~~the~~ guards shall be ~~so~~ distributed so as to minimize the accumulation of smoke or toxic gases.

~~1007.7.2~~ 1007.7.6 (IFC [B] ~~1007.7.2~~ 1007.7.6) ~~Exterior exit~~ Stairway. ~~Exterior exit~~ Stairways that are part of the means of egress for the exterior area for assisted rescue shall provide a clear width of 48 inches (1219 mm) between handrails.

> **Exception:** The clear width of 48 inches (1219 mm) between handrails is not required at stairways serving buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: An exterior area of assisted rescue is a component of an accessible means of egress, like other components listed. It is not an exception to a component of an accessible means of egress – it is a viable alternative to an interior area of refuge. This proposal clarifies how an exterior area of assisted rescue can serve as a component and still maintain the provisions relating to other components. With proper separation, communication and signage an exterior area of assisted rescue should not be limited to an exit discharge or an exterior exit stair. A stair complying with Section 1022 allows for an exterior stair, but it also allows for an enclosed exit stair to serve an exterior area of assisted rescue and Section 1107.4 would allow an elevator to also serve it. This option needs clarification on it use and this proposal provides that clarification.

Cost Impact: This code change proposal will increase the cost of construction.

ICCFILENAME:Roether-E6-1007.2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Allowing for exterior areas of assisted rescue in smoke protected or open air assembly spaces is appropriate. There was a concern about coordination with E37-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ron Clements, representing Chesterfield County Building Inspection Dept., requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

1007.6.1 Separation. Each *area of refuge* shall be separated from the remainder of the story by a *smoke barrier* complying with section 710 or a *horizontal exit* complying with Section 1025. Each *area of refuge* shall be designed to minimize the intrusion of smoke.

Exceptions:

1. *Areas of refuge* located within *an exit enclosure*.
2. *Areas of refuge* located within group A occupancies where the *exit access* from the area served is outdoor, open air or *smoke protected seating.*

Commenter's Reason: The result of E38-09/10 is to allow what essentially is an area of refuge to be designed with the omission of the fire rated enclosure around the area of refuge when the area of refuge is located in a structure that is open to the outdoor air. This is primarily of use for stadiums and similar open structures. Parking garages are already covered with an exception to 1007.3. Unlike a complete exception to 1007.3 this change did retain the size of the wheel chair space and the two-way communication system that is required for an area of refuge and in the original proposal those two aspects of the change referred the code user back to the area of refuge provisions for design of those elements. Essentially the only two changes that the original E38-09/10 accomplishes is to allow omission of the separation and an exception to the 48" width between handrails in a sprinklered building. The exterior area for assisted rescue is a specialized accessible means of egress component that was created as an element of a grade level exit discharge and it is to awkward to attempt to use the exterior area for assisted rescue section as the method to accomplish the goal of E38-09/10. That is why it took so many modifications throughout section 1007.7 to accomplish. Since the net result of the change is to keep all of the aspects of an area of refuge accept the separation requirement it is cleaner and simpler to accomplish that goal with the single exception to 1007.6.1 Separation, which is proposed with this as-modified public comment. The second part of the original change to add an exception to 1007.7.2 (changed to 1007.7.6), which was adding the exception to the 48" width between handrails in a sprinklered building, is not necessary with this as-modified proposal because by keeping the area in question an area of refuge instead of an exterior area for assisted rescue then the existing exception #2 to 1007.3 will allow for the reduced space between handrails in a sprinklered building.

Final Action: AS AM AMPC____ D

E47-09/10
1007.6 (IFC [B] 1007.6)

Proposed Change as Submitted:

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise as follows:

1007.6 (IFC [B] 1007.6) Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1. Every required area of refuge shall have direct access to a stairway within an exit enclosure complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4. ~~Where an elevator lobby is used as an area of refuge, the shaft and lobby~~

~~shall comply with Section 1022.9 for smoke-proof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier~~.

Exceptions:

1. A stairway serving an area of refuge is not required to be enclosed where permitted in Sections 1016.1 and 1022.1.
2. A smoke-proof enclosure is not required for an elevator lobby used as an area of refuge where the elevator is not required to be enclosed.

Reason: Areas of refuge required to serve an elevator or stair enclosure must be separated from the remainder of the building by a smoke barrier or a horizontal exit per Section 1007.6.2. As written above, this sentence would never apply as all areas of refuge are formed by either a smoke barrier or horizontal exit.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME: KRANZ-E4-1007.6.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Deletion of the last sentence in Section 1007.8 would send the wrong message. Pressurizing the elevator lobby and shaft when the lobby is used as an area of refuge is needed as an option.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lee J. Kranz representing Washington Association of Building Officials Technical Code Development Committee, requesting Approval as Modified by this Public Comment.

Replace the proposal as follows:

1007.6 Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1. Every required area of refuge shall have direct access to a stairway within an exit enclosure complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4. ~~Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier~~.

1007.6.2 Separation. Each area of refuge shall be separated from the remainder of the story by a smoke barrier complying with Section 710 or a horizontal exit complying with Section 1025. Each area of refuge shall be designed to minimize the intrusion of smoke.

Exceptions:

1. Areas of refuge located within an exit enclosure.
2. An elevator lobby used as an area of refuge and complying with Section 1022.9 for smokeproof enclosures.

Commenter's Reason: The Egress Committee in Baltimore indicated that deleting the text from Section 1007.6 would eliminate pressurization of the elevator lobby as an option for elevator lobbies serving as an area of refuge. The reason for removing this text, as originally proposed, was that it did not make sense as all areas of refuge must be formed by a horizontal exit or smoke barrier so therefore would never be applicable. The smokeproof enclosure option for elevator lobbies used as an area of refuge has now been appropriately relocated to Section 1007.6.2. This exception, allows the area of refuge to comply with Section 1022.9 which refers to Section 909.20 for pressurization and separation of the area of refuge from the remainder of the building.

Final Action: AS AM AMPC____ D

E54-09/10
1008.1.4.3 (IFC [B] 1008.1.4.3)

Proposed Change as Submitted

Proponent: Gregory J. Cahanin, Cahanin Fire & Code Consulting Representing the Smoke Safety Council

Revise as follows:

1008.1.4.3 (IFC [B] 1008.1.4.3) Horizontal <u>or vertical</u> ~~sliding~~ doors. In other than Group H occupancies, horizontal <u>or vertical</u> ~~sliding~~ doors permitted to be a component of a *means of egress* in accordance with Exception 6 to Section 1008.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.
2. The doors shall be openable by a simple method from both sides without special knowledge or effort.
3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.
4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.
5. The door assembly shall comply with the applicable *fire protection rating* and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 715.4.8.3, shall be installed in accordance with NFPA 80 and shall comply with Section 715.
6. The door assembly shall have an integrated standby power supply.
7. The door assembly power supply shall be electrically supervised.
8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

Reason: Doors other than side-swinging doors have had special classifications for some time- turnstiles, revolving doors, and horizontal sliding doors suitable for egress are the most common. Horizontal sliding door classifications for egress were first developed more than 2 decades ago for Won Door's then unique bi-fold door and wall system. Since that time there have been multiple manufacturers whose opening protectives are not side swinging, but meet the same performance and safety requirements for horizontal sliding doors while have a different orientation. This change is recognition of any door system orientation that meets the specific operational requirements that have been successfully in place for horizontal doors is acceptable. Further, it does not matter if the door slides, folds, or rolls up- only that it perform successfully for safe egress. There is no change in the testing or operational requirements- only a clarification of orientation.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Cahanin-E1-1008.1.4.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The current text requires full width and assumes that the headroom height will be provided immediately. Since these doors move up, the proposal needs to address when the full height for the means of egress would be provided – this is critical for adequate headroom during egress. It is a concern that these doors, when not yet fully open, may be a hazard for a visually impaired person during egress. There are issues for the change in forces and lifting vs. pushing to open the door in manual operation – information is needed on if this operation is doable by all persons using the means of egress. This new technology should be in a separate section to deal with the specific provisions/concerns for this type of door rather than trying to fit this in with horizontal sliding doors. The section should address requirements to prevent vertical sliding doors from coming down without warning.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing Smoke Safety Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

<u>**1008.1.4.4 (IFC [B] 1008.1.4.4) Vertical doors.** In other than Group H occupancies, vertical doors permitted to be a component of a *means of egress* in accordance with Exception 10 to Section 1008.1.2 shall comply with all of the following criteria:</u>

1. <u>The doors shall be power operated and shall include standby emergency power capable of operating the doors in the event of power failure.</u>
2. <u>Power-assisted doors shall comply with BHMA A156.19.</u>
3. <u>The doors shall be openable by a simple method from both sides without special knowledge or effort.</u>
4. <u>The force required to operate the door manually shall not exceed 50 pounds (220 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required height. The door shall contain a handle or device at its base to assist in manual operation.</u>
5. <u>Vertical doors shall be readily distinguishable from the adjacent walls and finishes such that the doors are easily recognizable as doors. Contrasting marking framing the opening shall be construed as readily distinguishable.</u>
6. <u>Vertical doors shall have an Exit Sign per Section 1011.1. Doors shall contain a label on the egress side with the words, “Exit Do Not Block” meeting the graphics requirements of Section 1011.5.1.</u>
7. <u>The door assembly shall comply with the applicable *fire protection rating* and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 715.4.8.3, shall be installed in accordance with NFPA 80 and shall comply with Section 715.</u>
8. <u>The door assembly shall have an integrated standby power supply per Section 2702.1.</u>
9. <u>The door assembly power supply shall be electrically supervised.</u>
10. <u>The door shall open to the minimum required width and height within 10 seconds after activation of the operating device. An audible alarm while the door is in motion shall sound. The audible alarm shall meet the requirements of Section 907.5.2.1.1.</u>
11. <u>Vertical opening size shall comply with minimum width requirements of Section1008.1.1. The maximum width of vertical doors shall be limited to their listing width.</u>
12. <u>Vertical opening height shall be not less than 80 inches.</u>

(Renumber subsequent sections)

Revise text as follows:

1008.1.2 Door swing. Egress doors shall be of the pivoted or side-hinged swinging type.

Exceptions:

1. Private garages, office areas, factory and storage areas with an *occupant load* of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single dwelling unit in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1008.1.4.1.
6. In other than Group H occupancies, horizontal sliding doors complying with Section 1008.1.4.3 are permitted in a *means of egress*.
7. Power-operated doors in accordance with Section 1008.1.4.2.
8. Doors serving a bathroom within an individual sleeping unit in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 or less.
10. <u>In other than Group H occupancies, vertical doors complying with Section 1008.1.4.6 are permitted in a means of egress.</u>

Doors shall swing in the direction of egress travel where serving an *occupant load* of 50 or more persons or a Group H occupancy.

Commenter's Reason: Doors other than side-swinging doors have had special classifications for some time- turnstiles, revolving doors, and horizontal sliding doors suitable for egress are the most common. Horizontal sliding door classifications for egress were first developed more than 2 decades ago for Won Door's then unique bi-fold door and wall system. Since that time there have been multiple manufacturers whose opening protectives are not side swinging, but can meet the same performance and safety requirements for horizontal sliding doors while have a different orientation. This change is recognition of any door system orientation that meets the safety and egress provisions of the Code is acceptable.

The new Section takes the horizontal door requirements and incorporates them into this new section as recommended by the Committee when the original proposal was heard. This new section is also referencing other sections of the Code that has specific requirements to address committee comments during the last two cycles when these doors have been addressed. Those concerns include audibility for the sight impaired when the door is rising, emergency power to operate the door automatically with the same provisions of power operated doors, and visibility requirements that distinguish the door from adjacent walls.

This comment should not be treated as new material since it follows the dictates of the committee over the last two revisions cycles and only references current code sections. In 2 code cycles each of these provisions has been discussed on the floor. This comment has been reformatted into a new section based upon committee comments.

Cost Impact: The code change proposal will not increase the cost of construction.

Final Action: AS AM AMPC____ D

E61-09/10
1008.1.9.3

<u>Proposed Change as Submitted</u>

Proponent: Jim McClintic, Sandy City, representing the Utah Chapter

Revise as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship, the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   - 2.1. The locking device is readily distinguishable as locked;
   - 2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   - 2.3. The use of the key-operated locking device is revocable by the building official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool <u>and complying with the height requirements outlined in Section 1008.1.9.2.</u>
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.

Reason: This additional language will clarify hardware height requirements in these locations and help eliminate the confusion when this section of the code is being enforced.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Mcclintic-E1-1008.1.9.3

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The reference to Section 1008.1.9.2 for height provides direction for the code official for where the “night latch, dead bolt or security chain” in hotel rooms must be installed when these locks are used for purposes other than just security.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jim Budzinski, requests Disapproval.

Commenter’s Reason: The proposal intended modify Section 1008.1.9.3 to establish the minimum and maximum dimensions listed in 1008.9.2 and eliminate the provision permitting “..night latch, dead bolt or security chain…” in individual dwelling or sleeping units to be permitted at any height. The proposed reference to Section 1008.1.9.2 maintains the three conditions for the installation of locks and latches. The conditions include a minimum height, a maximum height, and if “…used only for security purposes and not used for normal operation…” any height; this provides no clarification to condition 4 of 1008.9.3 as intended by the proposal. The devices specified in 1008.9.3 are clearly used for ‘security purposes.’

Final Action: AS AM AMPC____ D

E62-09/10
1008.1.9.3 (IFC [B] 1008.1.9.3)

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship, the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   - 2.1. The locking device is readily distinguishable as locked;
   - 2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   - 2.3. The use of the key-operated locking device is revocable by the building official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.
6. <u>Doors serving outdoor areas specified in Section 1004.8 having an occupant load of 300 or less are permitted to be equipped with key-operated locking devices from the egress side provided:</u>
   - <u>6.1. The locking device is readily distinguishable as locked;</u>
   - <u>6.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THE BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background;</u>
   - <u>6.3. A two-way communication system complying with Sections 1007.8.1 and 1007.8.2 shall be provided on the egress side.</u>
   - <u>6.4 The use of the key-operated locking device is revocable by the building official.</u>

Reason: Egress from confined outdoor areas, as required by Section 1004.8, is necessary. Unfortunately, many building owners are reluctant to leave required egress doors from these areas unlocked for security reasons, which places the public at risk. Fire Code officials, who conduct maintenance inspections, and building owners are at odds on this issue. It makes sense to recognize that this conflict exists and place safeguards in the code to eliminate the conflict. The two-way communication system will allow an occupant to call for help if the egress is accidently locked while the outdoor area is occupied. This new text is similar to exception #2 of Section 1008.1.9.3 as it relates to an allowance to lock egress doors under certain conditions.

Cost Impact: This code change proposal will increase the cost of construction.

ICCFILENAME: KRANZ-E2-1008.1.9.3.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: It is not clear which side of the door (i.e., inside or outside) the signage should be located on. The reference to Section 1004.8 could include yards and courts where egress may be directly provided without going through the building. There were questions about the two-way communication system: Who would it go to? What is the purpose? This could be problematic with smaller facilities or with multiple balconies.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lee J. Kranz representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.3 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship , the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   - 2.1. The locking device is readily distinguishable as locked;
   - 2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   - 2.3. The use of the key-operated locking device is revocable by the building official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.
6. Required egress doors serving outdoor areas having an occupant load of 300 or less where a required path of egress travel from the outdoor area passes through the building ~~specified in Section 1004.8 having an occupant load of 300 or less~~ are permitted to be equipped with key-operated locking devices ~~from the egress side~~ provided:
   - 6.1 The locking device is readily distinguishable as locked;
   - 6.2 A readily visible durable sign is posted on the ~~egress~~ interior side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THE ~~BUILDING~~ OUTDOOR AREA IS OCCUPIED. The sign shall be in letter 1 inch high on a contrasting background;
   - 6.3 A two-way communication system complying with Sections 1007.8.1 and 1007.8.2 shall be provided on the egress side.
   - 6.4 The use of the key-operated locking device is revocable by the building official for due cause.

Commenter's Reason: When occupants from an outdoor area must re-enter the building for egress purposes, Section 1004.8 requires the means of egress serving the outdoor area to comply as though it were any other occupied room in the building. Currently egress doors serving these outdoor areas must remain unlocked to maintain safe egress. Building owners and tenants typically install locks on these egress doors for security purposes, which potentially creates an obstruction for safe egress and places the public at risk.

The language for this proposal has been modified to address comments made by the Means of Egress Committee in Baltimore. Specifically, the committee suggested 1) the signage should be on the interior side of required egress doors, and 2) limit the use of the exception to outdoor areas where occupants must pass through the building. They also asked about the need to install a two-way communication system accessible from the outdoor areas where occupants must pass through the building. A two-way communication system would allow occupants to call for help if the egress door is accidently locked. Two-way communication system requirements are currently found in IBC Section 1007.8.1 & 1007.8.2. Section 1007.8.1 specifies connection to a fire command center or central control point approved by the fire department. If the fire command center is not provided or the central control point is not constantly attended then connections to an approved monitoring location or 911 dispatch are required.

This exception allows locking the required egress doors serving outdoor areas where the egress path is through the building as long as:

1) the locking device is distinguishable as locked,
2) a sign is provided on the interior side of the door requiring the doors to remain unlocked while the outdoor area is occupied,
3) a two-way communication system is provided,
4) the exception is revocable by the building official if all the above conditions are not met.

Final Action: AS AM AMPC____ D

E63-09/10

1008.1.9.3 (IFC [B] 1008.1.9.3)

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, representing Joint Fire Service Review Committee

Revise as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Approved locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship, the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   - 2.1 The locking device is readily distinguishable as locked;
   - 2.2 A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   - 2.3 The use of the key-operated locking device is revocable by the building official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.
6. <u>In Group I-2 occupancies housing clients where the means of egress needs to be secured for the safety of the clients provided all the following requirements are met:</u>
   - <u>6.1 The facility is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1,</u>
   - <u>6.2 The doors unlock upon actuation of the automatic sprinkler system,</u>
   - <u>6.3 The doors unlock upon activation of the automatic smoke detection system,</u>
   - <u>6.4 The doors unlock upon loss of power controlling the lock or lock mechanism,</u>
   - <u>6.5 The door locks shall have the capability of being unlocked by a signal from an approved location,</u>
   - <u>6.6 Emergency lighting is provided at the door, and</u>
   - <u>6.7 The facility is constantly staffed.</u>

Reason: The new language addresses the problem faced by providers of patients suffering from Alzheimer's or Dementia wandering out of facilities and endangering their persons. Cognitive impairments caused by these diseases and other forms of dementia, render the residents of this type of facility unable to make the most appropriate decisions for their safety and welfare. This proposal would allow for door locking arrangements without delayed egress locks that are currently approved in health care type occupancies.

These patients can be very quick and mobile. The delayed egress lock poses a very challenging situation for staff when providing care for these patients who seek wandering or "exit seeking" associated with their disease.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A concern would be how this proposal will coordinate with Section 1008.1.9.6 Special locking arrangements in Group I-2.

ICCFILENAME:Lariviere-E1-1008.1.9.3

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposals addresses the unique locking arrangements in Group I-2 where the need is also to protect the clients, however, some of the facilities where this is needed are not necessarily medical facilities.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Joe Pierce, Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3] Locks and latches. *Approved* locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. through 5. *(No change to current text)*

~~6. In Group I-2 occupancies housing clients where the *means of egress* needs to be secured for the safety of the clients provided all the following requirements are met:~~

- ~~6.1. The facility is protected by an *automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3,~~
- ~~6.2. The doors unlock upon actuation of the *automatic sprinkler system*,~~
- ~~6.3. The doors unlock upon actuation of the *automatic fire detection system*,~~
- ~~6.4. The doors unlock upon loss of power controlling the lock or lock mechanism,~~
- ~~6.5. The door locks shall have the capability of being unlocked by a signal from an approved location,~~
- ~~6.6. Emergency lighting is provided at the door, and~~
- ~~6.7. The facility is constantly staffed.~~

1008.1.9.6 (IFC [B] 1008.1.9.6) Special locking arrangements in Group I-2. Approved ~~delayed~~ special egress locks shall be permitted in a Group I-2 occupancy where the clinical needs of persons receiving care require such locking. ~~Delayed~~ Special egress locks shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 ~~or~~ and an approved automatic ~~smoke or heat~~ fire detection system installed in accordance with Section 907, provided that the doors ~~unlock~~ are installed and operated in accordance with Items 1 through ~~6~~ 7 below. ~~A building occupant shall not be required to pass through more than one door equipped with a delayed egress lock before entering an exit.~~

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center, a nursing station or other approved location.
4. A building occupant shall not be required to pass through more than one door equipped with a special egress lock before entering an exit.
5. ~~4.~~ The procedures for the operation(s) of the unlocking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the *International Fire Code*.
6. ~~5.~~ The facility shall be constantly staffed and all clinical staff shall have the keys, codes or other means necessary to operate the locking devices.
7. ~~6.~~ Emergency lighting shall be provided at the door.

Exception: Items 1 through ~~3~~ 4 shall not apply to doors to areas where persons which because of clinical needs require restraint or containment as part of the function of ~~a mental hospital~~ psychiatric treatment areas.

Commenter's Reason: Code Change E63 was Approved as Submitted. However, the language approved in Item 6 of Section 1008.1.9.3 creates an overlap when compared to the language in Section 1008.1.9.6 which was Approved as Modified by G65-09/10. Therefore, the intent of this Public Comment is:

1. Combine the approved language in E36-09/10 with the approved language in IBC 1008.1.9.6 in G65-09/10. Accordingly, these revisions are: modification of the term "unlock" with the phrase "installed and operated"; relocation of the last sentence in the main paragraph to Item 4; and inclusion of Item 4 in the Exception; and revision of the phrase "a mental hospital" to "psychiatric treatment areas" in the Exception.
2. Maintain the requirement for "approved" locks that is specified in 1008.1.9.3.
3. Delete Item 6 from 1008.1.9.3, because it will now be covered in 1008.1.9.6.
4. Add the requirement for constant staffing from 1008.1.9.3 Item 6.6 into 1008.1.9.6 Item 6.
5. The allowance of either fire sprinkler system OR a fire detection system is deleted. Section 4603.4.2 requires fire sprinklers in all existing Group I-2 occupancies and Section 4603.6.3 requires a fire alarm system in all existing Group I-2 occupancies. Therefore, both systems should be present whether the building is new or existing, and requiring both systems to be present is consistent with the requirements in the IBC and IFC.

The revised sections address the problem faced by care providers of patients suffering from Alzheimer's or Dementia wandering out of facilities and endangering their persons. Cognitive impairments caused by these diseases and other forms of dementia, render the residents of this type of facility unable to make the most appropriate decisions for their safety and welfare. This proposal would allow for door locking arrangements which may be delayed egress locks, but more frequently are other types of approved locking arrangements.

Public Comment 2:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Disapproval.

Commenter's Reason: The proponent correctly notes the need to address special locking arrangements for patients with Alzheimer's or Dementia. However, these provisions are not coordinated and conflict with the provisions in Section 1008.9.16 which were added last cycle via a public comment to E51-07/08 by the CTC to specifically address these conditions. Language of Section 1008.1.9.6 is unique to Group I-2 and the minor issues raised in portions of the proposed new language, such as "constantly staffed", were debated and rejected during the last cycle. We urge the membership to simply deny this change and don't create conflicts in language or loop holes for poor locking arrangements in Group I-2 uses. Approval of E63 will cause an unintended conflict within the code. The CTC supports the modifications to Section 1008.1.9.6 as modified in Code Change G65-09/10.

Final Action: AS AM AMPC____ D

E64-09/10
1008.1.9.4 (IFC [B] 1008.1.9.4)

<u>Proposed Change as Submitted</u>

Proponent: Gene Boecker, AIA, Code Consultants, Inc., representing Code Consultants, Inc.

Revise as follows:

1008.1.9.4 (IFC [B] 1008.1.9.4) Bolt locks. Manually operated flush bolts or surface bolts are not permitted.

Exceptions:

1. On doors not required for egress in individual dwelling units or sleeping units.
2. Where a pair of doors serves a storage or equipment room, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf.
3. Where a pair of doors serves an *occupant load* of less than 50 persons in a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf. The inactive leaf shall contain no doorknobs, panic bars or similar operating hardware.
4. Where a pair of doors serves a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf provided such inactive leaf is not needed to meet egress width requirements and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The inactive leaf shall contain no doorknobs, panic bars or similar operating hardware.
5. Where a pair of doors serves patient care rooms in Group I-2 occupancies, self-latching edge or surface-mounted bolts are permitted on the inactive leaf provided that the inactive leaf is not needed to meet egress width requirements and the inactive leaf contains no doorknobs, panic bars or similar operating hardware.
6. <u>Where pairs of doors are installed in accordance with Section 1008.1.9.3, item 2, the inactive leaf shall be permitted to be equipped with manually operated surface or flush bolts provided the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and the inactive leaf is not required for means of egress width.</u>

Reason: This recognizes one of the current practices in the construction industry. Whether we choose to admit it or not, the standard manner in which the doors are installed in compliance with item #2 for Section 1008.1.9.3 is that the active leaf has the readily distinguishable lock and sign while the inactive leaf is simply held in place by flush (edge) bolts. It is the flush bolt that keeps the inactive leaf secure so that the active leaf can be locked when the building is not occupied.

Although it could be easy to simply recognize this condition and include it alone, the exception adds the requirement for sprinkler protection as an added measure of safety. It also differentiates this exception from exception #3 which limits the occupant load to less than 50 and does not address sprinkler protection.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Boecker-E2-1008.1.9.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Any door that looks like a means of egress must meet means of egress door requirements. The correct enforcement at doors where they are intended for the movement of equipment and not for a means of egress would be to prohibit hardware on the door so it was obvious that it is not normally operational – the proposal would allow hardware on the inactive leaf.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gene Boecker, Coe Consultants Inc., requests Approval as Submitted.

Commenter's Reason: The original proposal seeks to address a condition that is present in current construction. It broadens the existing exception #4 in that it would apply to more occupancies – M, Assembly with an occupancy of 300 or less and places of worship. However, consistent with the provisions of 1008.1.9.3(2) it also requires the door to be readily distinguishable as locked; labeling of the door with the "THIS DOOR TO REMAIN OPEN. . . " sign and that the key operated locking device provision is revocable by the building official for due cause. Additionally the new exception would allow this only in sprinklered buildings.

The committee stated that any door that looks like a means of egress must meet the means of egress requirements. That is clearly not the case since doors to storage areas are allowed to be locked and the current exceptions allow for doors that are not required for egress capacity to be locked. Also, the application to assembly is limited at best since all assembly occupancies must now have panic devices the ability to use flush or surface bolts would only be where there is a large excess of doors provided such as is provided.

The truth is that the condition exists in many, many buildings today. A storefront system is constructed with a pair of doors and only a single leaf is needed for capacity. The second leaf will be provided with flush bolts as well as door hardware to be used when the door is unlocked. In these situations (and even when exceptions #3 and #4 are used) the inactive leaf will be provided with hardware so the doors have a symmetry.

The fact that these conditions exist is testimony to the fact that there are no major problems with the concept. The opponents did not identify where a single installation exists with the proposed conditions that proved to be problematic to life safety. It is time we recognized this condition and addressed it directly in the code.

Final Action: AS AM AMPC____ D

E65-09/10
1008.1.9.8 (IFC [B] 1008.1.9.8)

Proposed Change as Submitted

Proponent: Edward A. Hite, CML, representing self

Revise as follows:

1008.1.9.8 (IFC [B] 1008.1.9.8) Electromagnetically locked egress doors. Doors in the means of egress ~~that are not otherwise required to have panic hardware~~ in buildings with an occupancy in Group A, B, E, M, R-1 or R-2 and doors to tenant spaces in Group A, B, E, M, R-1 or R-2 shall be permitted to be electromagnetically locked if equipped with listed hardware that incorporates a built-in switch and meet the requirements below:

1. The listed hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.
2. The listed hardware is capable of being operated with one hand.
3. Operation of the listed hardware releases ~~to~~ the electromagnetic lock and unlocks the door immediately.
4. Loss of power to the listed hardware automatically unlocks the door.

Reason: Bars tested and listed to release electromagnetic locks include both panic bars and fire exit hardware. When power is removed from a listed electromagnetic lock, it will release in less than ½ second. Bars with switches directly release that power. The number of people going through the door has no bearing on this.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HITE-E2-1008.1.9.8

Public Hearing Results

Committee Action: **Approved as Modified**

Replace the proposal with the following:

1008.1.9.8 (IFC [B] 1008.1.9.8) Electromagnetically locked egress doors. Doors in the means of egress ~~that are not otherwise required to have panic hardware~~ in buildings with an occupancy in Group A, B, E, M, R-1 or R-2 and doors to tenant spaces in Group A, B, E, M, R-1 or R-2 shall be permitted to be electromagnetically locked if equipped with listed hardware that incorporates a built-in switch and meet the requirements below:

1. The listed hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.
2. The listed hardware is capable of being operated with one hand.
3. Operation of the listed hardware <u>directly</u> releases ~~to~~ the electromagnetic lock and unlocks the door immediately.
4. Loss of power to the listed hardware automatically unlocks the door.
5. <u>Where panic or fire exit hardware is required by Section 1008.1.10, operation of the listed panic or fire exit hardware also releases the electromagnetic lock.</u>

Committee Reason: Panic hardware should be permitted where electromagnetic locks are utilized. The modification to Items 3 and 5 clarifies that the release of the lock must be automatic with the operation of the panic bar.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Edward A. Hite, CML, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.8 (IFC [B] 1008.1.9.8) Electromagnetically locked egress doors. Doors in the means of egress in buildings with an occupancy in Group A, B, E, M, R-1 or R-2 and doors to tenant spaces in Group A, B, E, M, R-1 or R-2 shall be permitted to be electromagnetically locked if equipped with listed hardware that incorporates a built-in switch and meet the requirements below:

1. The listed hardware that is affixed to the door has an obvious method of operation that is readily operated under all lighting conditions.
2. The listed hardware is capable of being operated with one hand.
3. Operation of the listed hardware directly ~~releases~~ <u>interrupts</u> <u>the power to</u> the electromagnetic lock and unlocks the door immediately.
4. Loss of power to the listed hardware automatically unlocks the door.
5. Where panic or fire exit hardware is required by Section 1008.1.10, operation of the listed panic or fire exit hardware also releases the electromagnetic lock.

Commenter's Reason: Proponent believes that the wording "interrupts the power to" is clearer than "releases."

Public Comment 2:

Kurt Roeper, Cincinnati, OH, representing Ingersoll Rand, requests Disapproval.

Commenter's Reason: The existing language of Section 1008.1.9.8, as it appears in the 2009 IBC, limits electromagnetic locking of egress doors to those *"that are not otherwise required to have panic hardware…"* The existing language is a clear recognition of the scope of panic and fire exit devices, in that they are <u>not</u> listed to act as switching devices for secondary electromagnetic locks on doors in the means of egress.

In support of this position, please consider the following from Underwriters Laboratories;

"From the proposal, when you push the pad the latches would unlock and a switch would turn off power to the magnet to release the door. Therefore this arrangement could not be covered as panic, FVSR, or fire exit hardware, GXHX. UL 305 would need to be revised to allow a magnet before it could be covered as panic, FVSR, or fire exit hardware, GXHX. "

Edgar Wolff-Klammer Principal Engineer - Exit Devices
Underwriters Laboratories

I respectfully request disapproval of E65 until such time as UL 305 has been revised to permit such applications.

Final Action: AS AM AMPC____ D

E66-09/10
1008.1.9.10 (IFC [B] 1008.1.9.10)

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, representing Joint Fire Service Review Committee

Revise as follows:

1008.1.9.10 (IFC [B] 1008.1.9.10) Stairway doors. Interior stairway means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. Stairway discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. ~~In stairways serving not more than four stories,~~ Stairway doors are permitted to be locked from the stairway side ~~opposite the egress side, provided they are openable from the egress side and~~ when the stairway serves no more than four stories and the doors are capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.
4. Stairway doors are permitted to be locked from the stairway side when the stairways serves no more than two stories and the stairway discharge door leads directly to the exit discharge and a key box is provided in accordance with Section 506 of the International Fire Code.

Reason: Many buildings are concerned with security and reentry into the building from the stairways. As a result, building owners and managers desire to lock the stairwell doors to prohibit entry onto the floor from the stairwell. This practice of locking the stairwell doors increases the building security.

This proposal will provide an additional exception for buildings not more than two stories in height. This new exception will allow for the prohibition of reentry from the stairwell as long as a key box is provided for fire department use. The fire department could access the key box and unlock the stairwell doors for fire use.

The current requirements are allow for the locking of these doors, but only is an electric override is provided within the building for fire department use. The current requirement is overly restrictive for stairways serving only two stories, and this exception will provide another option for building owners and managers.

Item 4 is added to provide the allowance for doors to be locked when the building serves no more than 2 stories. Item 3 is revised without changing the intent. This revision is to simplify the wording and clarify the section. This wording is similar to the current wording in Section 403.5.3.

Cost Impact: This code change proposal will decrease the cost of construction.

ICCFILENAME:Lariviere-E3-1008.1.9.10

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: While there are security issues in low rise buildings, the proposed language would allow the locking of the exit discharge door at the level of exit discharge.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce (Chairman), representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1008.1.9.10 (IFC [B] 1008.1.9.10) Stairway doors. *Interior stairway means of egress* doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. In stairways serving not more than four stories, *stairway* doors are permitted to be locked from the *stairway* side ~~opposite the egress side,~~ provided: ~~they~~
   3.1. The doors are openable from the egress side; ~~and~~
   3.2. The *stairway* discharge door is always openable from the stairway side; and
   3.3. The doors are capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.
4. In stairways serving not more than two stories, *stairway* doors are permitted to be locked from the stairway side provided:
   4.1. The doors are openable from the egress side;
   4.2. The *stairway* discharge door leads directly to the exterior;
   4.3. The *stairway* discharge door is always openable from the stairway side; and
   4.4. A key box is provided in accordance with Section 506 of the *International Fire Code* which contains keys to unlock the *stairway* doors.

Commenter's Reason: This proposal was Disapproved at the Code Development Hearing because the Code Development Committee felt that the revisions would allow for the stairway discharge door to also be locked. This was not the intent of the code change, so the revisions have been reformatted to clarify that the discharge door from the stairway is always to remain unlocked from the stairway side.

This Public Comment reformats Items 3 and 4 to provide a clearer understanding of the conditions for allowing the stairway doors to be locked. Item 3 addresses stairways up to 4 stories in height, and Item 4 is limited to stairways up to 2 stories in height.

Final Action: AS AM AMPC____ D

E74-09/10, Part I
1009.4.2 (IFC [B] 1009.4.2)

Proposed Change as Submitted

Proponent: Jake Pauls, representing self

PART I – IBC MEANS OF EGRESS

Revise as follows:

1009.4.2 (IFC [B] 1009.4.2) Riser height and tread depth. Stair riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the leading edges of adjacent treads. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. Winder treads shall have a minimum tread depth of 11 inches (279 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. Alternating tread devices in accordance with Section 1009.10.
2. Ship ladders in accordance with Section 1009.11.
3. Spiral stairways in accordance with Section 1009.9.
4. Aisle stairs in assembly seating areas where the stair pitch or slope is set, for sightline reasons, by the slope of the adjacent seating area in accordance with Section 1028.11.2.
5. In ~~Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in~~ Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; the maximum riser height shall be 7 ¾ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum winder tread depth at the walkline shall be 10 inches (254 mm); and the minimum winder tread depth shall be 6 inches (152 mm).A nosing not less than ¾ inch (19.1 mm) but not more than 1 ¼ inches (32 mm) shall be provided on stairways with solid risers where the tread depth is less than 11 inches (279 mm).
6. See Section 3404.1 for the replacement of existing stairways.
7. In Group I-3 facilities, stairways providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8

inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

Reason: This is purely a technical change affecting maximum and minimum rise and tread depth dimensions respectively. This is the long overdue mainstreaming of the so-called "7-11" step geometry in terms of maximum rise and minimum tread depth. (The proponent has submitted a separate change proposal which simply formats and restates the current requirements; that proposal and this one should be dealt with separately or independently as their purposes and effects are different.)

Much has been written about this topic, especially around 2003 in relation to the IRC and the NFPA codes (NFPA 101 and NFPA 5000 which adopted this change to the mainstreamed "7-11" step geometry at that time. Since that day nobody has attempted to revert to pre-"7-11" criteria for dwelling unit stairs within NFPA and for non-dwelling unit stairs within ICC. The "7-11" minimum standard is the most widely used step geometry standard internationally and reasons for keeping it at least the minimum standard have grown. This is because all the recent research on use of stairs—*including the matter of falls on stairs, including injurious ones*—confirms that it is a very reasonable minimum standard and that it is a long way—about three inches or more—from an "optimum" standard.

The very extensive 2003 proposal I submitted to both ICC and NFPA is not reproduced within this proposal for reasons of length and, more importantly, its free availability on the Internet, specifically the Downloads area of my website, http://web.me.com/bldguse. Once within the Downloads area (where over a hundred PDF files can be freely downloaded on stairway usability and safety plus means of egress performance), simply open the folder titled, "Home Stairway Safety and Codes," and download the 3.4 MB, 40-page file, "Pauls-R311-2003.pdf." Here follows an outline of what was covered in that proposal which I submitted to ICC with NFPA getting a comparable, earlier one that was approved by NFPA members and withstood technical and procedural challenges from the NAHB.

Benefit-Cost Analysis for Improved Stairs in the USA
Injury Epidemiology
History of Debate on Improved Step Geometry Requirements in Codes & Standards
Benefits and Costs
Industry's and Regulators' Reviews of Research
Latest Research on Step Geometry from Britain
Politically-driven Local and State Adoption Process
Building and Marketing Improved Stairs
The Problem of the Double Standard
Intimidation of Building Officials
Roles of NFPA and APHA
Summary.

What Has Changed Since 2003?

The changes for the worse appear to be directly attributable to even worse home stair construction and regulation than existed before 2003. This is seen in Figure 1 which shows the growth of home stair-related injuries that are NOT due to the aging of the population—as this was checked out to learn that people under 65 and those 65 or more in age both contributed in more or less the same proportion to the substantial growth in home stair, related injuries. A recent, widely-circulated document described the statistical insights as follows: "For both 1997 and 2007, the percentage of NEISS-reported injuries for the 65-and-older group was 15.3 percent plus/minus 0.4 percent for both home settings and all settings." Thus, both before and after 1997, elderly persons were only slightly—but consistently—over-represented in hospital emergency department-treated injuries associated with stairs as reported in national estimates by the US Consumer Product Safety Commission. (The note, titled "The Home Stairway Safety Problem and Related Code Development, Adoption and Enforcement Problems in the USA," is also posted for free downloading from the website "http://web.me.com/bldguse" Downloads area as file "Pauls2009Letter&InjuryNote" within the folder titled, "Home Stairway Safety and Codes.") A list of the topics addressed therein is provided below Figure 1.

Figure 1 shows an extraordinary growth in the US national estimates from the US CPSC/NEISS for stair-related injuries, particularly in homes. The average annual rate of increase in the last several years exceeds the average annual rate of US population growth by a factor of about five while stair-related injuries in non-home settings decrease slightly, resulting in about a 2 percent reduction annually for non-home stairs over the last several years—since about 1998. During these several years there has been increasing use of the "7-11" minimum step geometry standard for non-home stairs, thanks to the adoption—beginning in the 1980s—of this standard in model building codes. This is further evidence of a partial success story on the stairway safety front and ICC members might rightly claim some of the credit for this partial success. Now building officials who control the adoption of the requirements in model codes need to finish the job where it will count most, in homes.

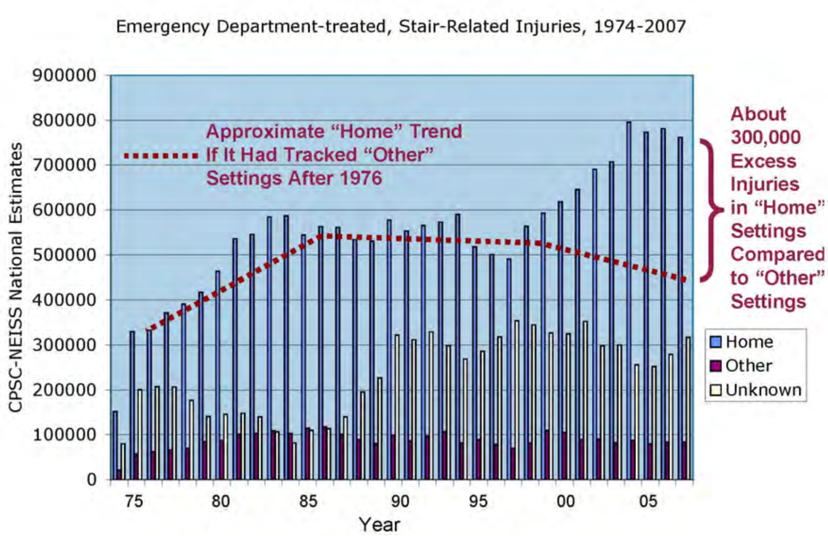


Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years.

Updating the 2003 ICC proposal on mainstreaming the "7-11" minimum standard was the note which began circulating in February of 2009. Here are the topics it addressed in its 26 pages (including over two pages of references and additional resources).

Preface

Injury Epidemiology
- CPSC-NEISS Data
- Injury Increase Comparisons
- Excess Injuries for Home Stairs
- Are Recent Increases Due to the Aging Population?

Statistical Issues
- Uncertainty in the NEISS Data
- Societal Cost of Stair-related Injuries
- Estimated Cost of Two Million Excess Home Stair-related Injuries, 1998 to 2007

Are We Finally Paying the Price for Code-triggered Defects in Home Stairways, Compared to Other Stairways?
- In the Mostly Bleak, Stair Safety Field, A Possible Success Story in Non-home Settings
- Why Are Home Stairways Relatively Dangerous?
- The Role of Code Development, Adoption and Enforcement

History of Some Relatively Important Influences on Stairway Safety and Its Regulation
- Step Geometry
- Step Geometry Uniformity
- Systemic Tread Run Non-uniformities Common in Many Recently Constructed Homes
- Resulting Misstep and Fall Scenarios
- Systemic Uniformity Defect Superimposed Upon Another Systemic Step Geometry Defect
- An Abbreviated History of Step Geometry Rules and Related Issues
- Homebuilders
- Business Arrangement Between ICC and NAHB, Among Other Strategic Partners
- NAHB Bias on ICC Committees Responsible for IRC
- Hypocrisy in ICC's Business Deal with NAHB
- Consumer-supplied Evidence of Step Geometry Efficacy
- Combination of the NAHB-favored Short Stair Treads with Top-of-Flight

Non-uniformities and with Dysfunctional Handrail Systems
- Recent Critique of Type II Handrails and Study Used to Justify Them
- ICC Codes and Stairway Defects
- What Homeowners Must Now See (beyond the failings of ICC and the code-based regulatory process generally).
- With Flawed Code Inspection, Consumers Need to Do Their Own Stair Inspection
- Recommendations: What ICC and Other Organizations Urgently Need to Do

Appendix A: Abbreviated History of Step Geometry Rules and Related Issues
Appendix B: Code of Ethics of International Code Council (ICC) and predecessor organization, Council of American Building Officials (CABO)\
References and Guide to Resources.

The 2003 proposal to ICC, "Pauls-R311-2003," included substantial benefit-cost information about stair step geometry in homes which must be updated to take account of recent, dramatic growth in home stair-related injuries (in terms of CPSC-NEISS national estimates) as well as higher-than-general inflation rates for medical treatment costs. The latter are currently running at about $1 million per hour in the USA with total, societal costs running at about $10 million per hour in the USA.

Societal Cost of Stair-related Injuries. Currently, for the USA, the annual societal costs of home stair-related injuries—currently comprising about 89 percent of all stair-related injuries where the location or setting is known—are on the order of $100 billion annually for comprehensive, societal costs. (The basis for the 89-percent figure is the NEISS data described above.) The basis for the societal cost (the sum of medical care costs, direct productivity losses and pain-and-suffering or quality of life costs) is a paper by Lawrence, *et al.* (1999). (Among coauthors for this paper are internationally recognized experts in burden of injury, like Ted Miller.) They estimated a societal cost (in 1997 dollars) of $46.7 billion for stair-related injuries occurring in 1995. For that year the NEISS national estimate for US emergency department-treated, stair-related injuries was 892,610 for all settings and 517,641 for homes. Between 1995 and 2007 these increased, respectively, to 1,161,915 (a 30-percent increase) and 761,881 (a 47-percent increase). (These national estimates for 1995 are the "adjusted" ones obtained via the NEISS website; they correct for a change in NEISS sampling that took effect in January 1, 1997.)

Accounting also for inflation (of about 3 to 4 percent annually—although medical care increases were higher), we can assume that, for 2007, the societal costs for stair-related injuries in the USA were on the order of $100 billion in 2007 dollars (including on the order of $10 billion for medical care, $20 billion for direct productivity losses, and $70 billion for pain and suffering or quality of life costs—with this estimated distribution based on a personal communication with Bruce Lawrence and Ted Miller, among the authors of the above noted paper). This cost was about an order of magnitude greater than the annual construction cost of new stairs (just prior to the recent economic downturn) in the USA. For an analysis of home and stair construction costs see Pauls (2003). The smallest cost component, medical care, is about one million dollars per hour in the US."

Quoting also from the paper by Pauls, 2009 on "Injury Increase Comparisons: The apparent, relatively rapid increase recently in home stair-related injuries has an average annual growth rate of about 4.5%, a few times greater than annual population growth (1%). The overall increase, over a three-decade period, was about 130 percent with the most recent ten-year period showing a 55-percent increase. By contrast, fire-related injuries (the majority of which occur in homes), a major concern traditionally in safety standards and codes, have shown a three-decade pattern of average annual *decrease* of about 2 percent. (If fire-related injuries were plotted on Figure 1A, that plot would be appear very close to the base of the graph, declining from about 50,000 to about 25,000 annual injuries over a three-decade period.) Moreover, the trend for all NEISS injury national estimates for home settings—other than stairs, during the period 1997-2007 has a 39-percent increase over the same last ten-year period when home stair-related injuries increased by 55 percent. For *all* products and settings, the increase in NEISS national estimates over the same 1997-2007 period was only 19 percent, about the same as the 18-percent increase for stairs in other settings (i.e., not homes). From this, and other analyses the author has performed with the CPSC-NEISS data, we can see generally, that homes generally are the major site for injuries, relative to other settings; homes account for about 49 percent of the NEISS national estimates of injuries during the 1997-2007 period.

Aside from fire-related injuries—these NEISS-reported national estimates of all injuries in home settings are increasing faster than in other settings (39 percent versus 19 percent for all NEISS national estimates during the 1997-2007 period).

NEISS national estimates of stair-related injuries in home settings have been increasing over the last ten years at a fast rate relative to NEISS national estimates for all NEISS-coded products (55 percent versus 19 percent) and relative to population growth (55 percent versus 10 percent). Over the 1997-2007 period, NEISS national estimates of home stair-related injuries comprised 89 percent of NEISS national estimates for stair-related injuries in all known settings. For early years of NEISS national estimates, specifically 1975-1977, this was 85 percent. Most of the increase in this proportion occurred since 1990.

Generally, in recent years stairs have accounted for about 9 percent of the NEISS national estimates for all products; home stairs accounted for about 6 percent; other settings' stairs accounted for less than 1 percent; unknown settings' stairs accounted for over 2 percent.
Stairs maintain their position, since the earliest days of CPSC-NEISS, as the leading product, associated with injuries coded by NEISS. Floors are the second leading category. See Lawrence, *et al.* (1999), Table 5, using data for 1995-1996, for an analysis for the top ten NEISS-coded products, ranked by injury cost, for various age groups. As well as ranking first for all ages, stairs rank first for 5 of 12 age groups (preschool children and middle-age adults) and second for another three. Only for the two highest age categories, 70-79 and 80 or more (for which stair use is relatively rare), do floors rank first, reflecting the contribution of gait and balance deterioration. However, stairs are still the second leading product for the 70-79 age group and third (after beds) for the 80-plus age group."

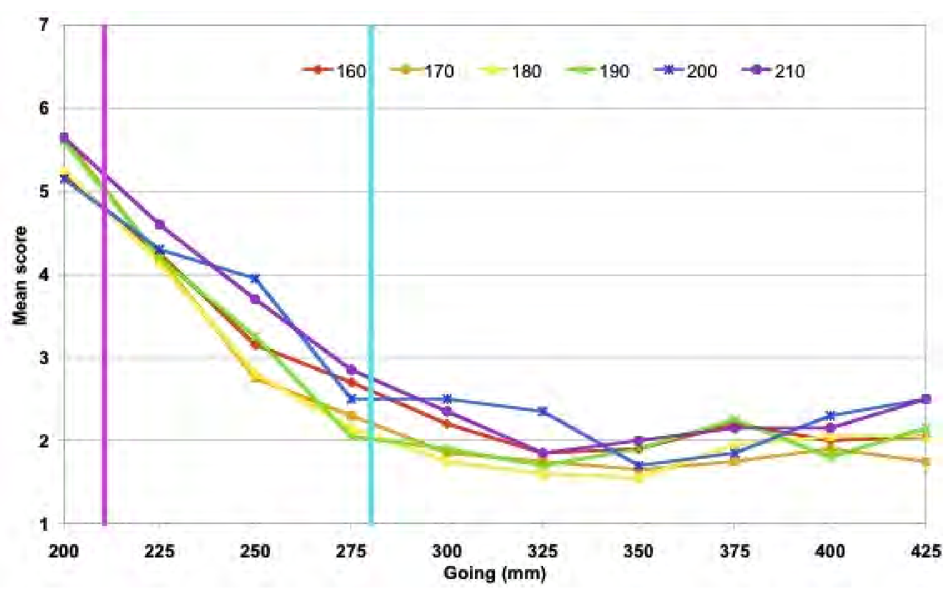
Laboratory and Field Research and Investigations of the Role of Step Geometry on Stairway Safety

The last several years have seen some important work on questions that have long troubled ICC members when addressing this issue of appropriate minimum standards for home step geometry. This work brings no comfort to those arguing that the minimum standards should stay as they are in the IRC and IBC or, even worse, that the NAHB's even lower standard should be the norm. The latter is based on NAHB's long-held national policy position which can be read directly on its website at "www.nahb.org/generic.aspx?sectionID=224&genericContentID=3093" (accessed June 1, 2009): "Support efforts by state and local affiliated Home Builder Associations to oppose the adoption of any new stair geometry that is not consistent with the requirements originally contained in the 1993 BOCA and 1992 CABO Codes by amending those provisions when adopting new editions of model building codes." This is the 8 1/4-inch maximum rise by 9-inch minimum tread depth that, especially with carpeting further degrading the usability and safety of the home stairs, makes them so dangerous and difficult to use. It is indeed beyond belief that, as the stair safety epidemic grows, the homebuilders insist on using a code that was out of date decades ago.

UK Research. Mike Roys and Mike Wright, UK Building Research Establishment have conducted some extraordinarily useful research in recent years, with the last of their papers published in May 2008. Working with a test stairway that offered 10 combinations of tread depth ("going" as it is called in the UK and "run" in some other places), in the range of 200 to 425 mm or 7.9 to 16.7 inches, with 6 combinations of rise height, in the range of 160 to 210 mm or 6.3 to 8.3 inches, they clearly showed the benefits of larger tread depths. Altogether, 60 adult subjects walked up and down each of 20 stair arrangements. Their work, while not completely published yet, is represented centrally in my recent one-day workshops on stairway usability and safety, the PowerPoint slides of which (including a fair selection of the BRE study slides) are available for downloading from my website in the folder titled, "Presentations at MUTN Conference in BC, Canada, April 2009." Papers on this work include Roys, 2001; Wright and Roys, 2005; and Wright and Roys, 2008. (Dr Wright moved to the USA in late 2008 so that now we are fortunate to have, in the USA, one of the top world talents in designing and conducting studies of step geometry and stair use performance.)

Answering a very old question in the code field, they showed that optimum tread depth in terms of many objective and subjective measures was much larger than 11 inches; 14 inches is about where this becomes optimum. The much-used 11-inch criterion is approximately where the graph of some of their findings, reproduced below as Figure 2, shows a change of direction from steep to more gradual slope and finally leveling off at the "optimum" tread depth of about 14 inches or 350 mm. This supports treating 11 inches as the minimum and clearly not the "optimum."

Figure 2. Graph of Findings from the UK Research by Wright and Roys, as Presented (in a PowerPoint) in 2005 at an International Conference on Falls in the UK.

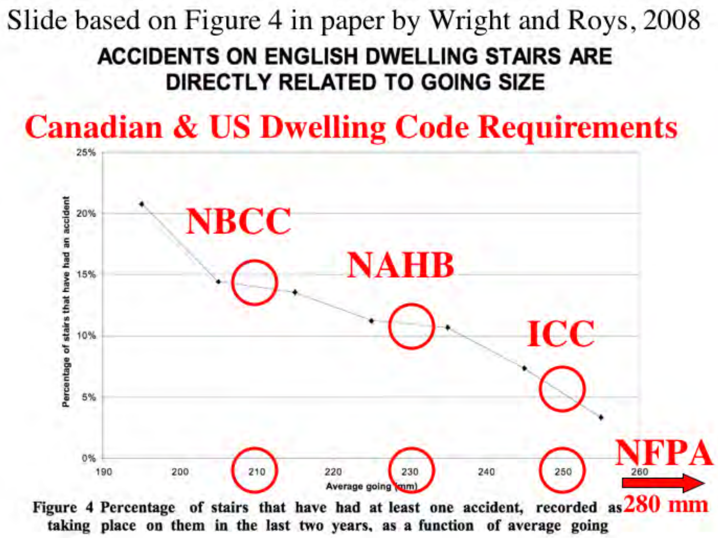


The responses plotted here are to the scaled remark, "I felt safe walking down the stair," with the "most-safe" responses at the bottom of the curves.

The most recent of their papers, Wright and Roys (2008), contains some of the most interesting and valuable work—*in this case conducted in the field and inquiring into actual fall incidents as a function of home stairway rise and tread depth ("going" in the graph).* This is shown in Figure 3, onto which I have superimposed some of the criteria for US and Canadian home stair minimum tread depth, the same range shown in Figure 2 with the vertical bars at the left half of the Figure, specifically at the 210 and 280 mm, 8 1/4 and 11-inch minimum tread depth criteria. Note that any rounding or beveling of the nosing and presence of carpet and pad (in some cases, especially on typical home stairs), the effective tread depth is significantly reduced from these values so that the effective tread depth of some home stairs, built to code, is as small as 180 mm or 7 inches. Incidentally, the testing that led to the results in Figure 2, were with uncarpeted treads with no more than 13 mm or 1/2 inch loss of effective tread depth due to rounding of the nosing. The safety differences among the various tread depths are large and cannot be ignored.

Figure 3. Role of Stair Tread Depth ("Going" in UK) in Stair-related "Accidents" in Homes

(PowerPoint slide based on Wright and Roys, 2008)



Recent US Research on Step Geometry. While there are other studies that could be referenced and described here in relation to the step geometry issue, in the interests of time and space, I will note only one more. This was a paper based on 80 relatively intensively investigated stair-related fall injuries that led to litigation and subsequent investigation by one of the top three or so research and investigation experts in North America with excellent ergonomics credentials. The paper was published in January of 2009 *Professional Safety,* the peer-reviewed journal of the American Society of Safety Engineers and was titled, "Stairway Falls: an ergonomic analysis of 80 cases," by Cohen, LaRue and Cohen (2009). Among their conclusions they note: "In this analysis, excessive dimensional variation appeared to be the most pervasive factor in stairway fall causation, followed by noncompliance with the 7-11 design rule for risers and treads, respectively. As with dimensional variation, this investigation showed a tendency for staircase geometry to fall outside the recommended limits of established building codes. Therefore, stairs that do not follow these requirements are more likely to be involved in falls. It stands to reason that greater adherence to the criteria specified in existing codes (i.e., risers in the range of 7 in. and treads in the range of 11 in.) would decrease the number of actual stairway falls that occur. Therefore, it is essential for both architects and builders to adhere to existing codes regarding stairway dimensions. Furthermore, prevailing codes must be enforced by building code officials, plan checkers and field inspectors, since stair dimensions can often be overlooked in the haste to issue building occupancy permits."

Any ICC chapter wishing to have their members participate in a one-day workshop (also slated for presentation in Eastern Canada on September 14, 2009) should contact Jake Pauls. It is available in a not-for-profit mode. Code authorities should be prepared to deal knowledgeably with consumers who, upon discovering the defects in their home stairs, contact their local building department and ask for a re-inspection of their home stairways. If there has been an injurious fall on such a stairway they should also be prepared to deal with resulting legal actions that might name the local building department as a third party defendant. (ICC itself is also a potential third-party defendant—as are homebuilders and their trade associations—a matter taken up in the so-called "New Orleans Declaration" I issued in the spring of 2009 and posted on my website Downloads area.) Inspectors should at least know about how measurements of the stair step geometry are performed that are of a quality expected in such litigation actions. These measurement techniques, usually requiring use of a spirit level or electronic level, are all described in the workshop materials posted on the above-mentioned website Downloads area and on the DVD of the Spring 2009 workshop noted above. These measurement techniques are consistent with the ICC requirements both as currently stated and as further clarified if the package of proposals I put forward is accepted.

As indicated with all of the epidemiological and etiological work outlined in this proposal, the home stair-related injury issue is many times larger than is the home fire-related injury problem. It should thus be nearly a no-brainer, after adopting home sprinkler requirements, for responsible ICC members to vote for the mainstreaming of the "7-11" step geometry standard. I will be counting on such ICC members and others who can sway opinion to speak out with conviction based on the primacy of their duties to the public, the first item in the code of ethics for certified officials, a code which is available on my website if it cannot be located on ICC's.

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Lawrence, B.A. et al. (1999). Estimating the costs of nonfatal consumer product injuries in the United States. *Proceedings of 7th International Conference on Product Safety Research*, September 30 - October 1, 1999, Washington, DC, pp. 97-113. Also, *Injury Control & Safety Promotion*, Vol. 7, No. 2, pp. 97-113.

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Pauls, J. and Harbuck, S. (2008). Ergonomics-based Methods of Inspecting, Assessing and Documenting Environmental Sites of Injurious Falls Resulting from Missteps on Small Elevation Differences, Slopes and Steps. *Proceedings of the American Society of Safety Engineers Professional Development Conference & Exposition*, Las Vegas, NV, 2008. (Downloadable as file, "Pauls-Harbuck-ASSE-paper.pdf," from folder, "Home Stairway Safety and Codes," accessible from the Downloads area of http://web.me.com/bldguse/Site/Downloads.html.)

Roys, M.S. (2001). Serious stair injuries can be prevented by improved stair design. *Applied Ergonomics*, Vol. 32, pp. 135-139.

Wright, M. and Roys, M. (2005). Effect of changing stair dimensions on safety. In Bust, P.D. and McCabe (eds.) *Contemporary Ergonomics 2005*, Taylor and Francis Books, pp. 469-474.

Wright, M. and Roys, M. (2008). Accidents on English dwelling stairs are directly related to going size. In Bust, P.D. (ed.) *Contemporary Ergonomics 2008*. Taylor and Francis, 632-637.

Cost Impact: The code change proposal will increase the cost of construction. However, more importantly, the change will lead to much larger benefits in injury reduction and usability, especially for older users.

ICCFILENAME: Pauls-E4-1012.3

Public Hearing Results

Part I-IBC
Committee Action: **Disapproved**

Committee Reason: The injury data is not correlated with the type of stairways in the International Building Code. The data is subjective (i.e., "I felt comfortable on the stairs.").

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jake Pauls, Silver Springs, MD, representing self, requests Approval as Submitted.

Commenter's Reason: This comment adopts, by reference, all of the information in my accompanying comment on E74-09/10 Part 2 on the "7-11" rule for dwellings in the IBC. To that information is added the following pertaining specifically to E74-09/10 Part 1.

The IBC Means of Egress Committee gave the following reason for disapproval of E74-09/10 Part 1. "The injury data is not correlated with the type of stairways in the International Building Code. The data is subjective (i.e., "I felt comfortable on the stairs.")."

The paucity of content in this reason statement is astonishing in view of the wealth of information provided to Committee members and the magnitude of the home stair safety problem, currently running at an hourly societal cost of injury of about 10 million dollars.

Secondly, the injury data were correlated with the type of stairways in the IBC, both in dwellings and elsewhere. Third, it is astonishing that the Committee seized on one finding—out of many more from the UK Building Research Establishment (BRE) studies, indeed only one of 15 questions put to test subjects to buttress the claim that "the data is subjective." There were objective measures as well which correlated well with the subjective measures, all underlining the importance of adequate tread depth for comfort and safety of users as a prime criterion, with riser height being secondary in importance.

Thus, in its reason statement, the Committee was being unreasonable as well as petty.

Even worse, the most astute member on the Committee—at least in terms of formal research responsibilities at the US National Institute of Standards and Technology (NIST)—after voting against the proposal, was asked why by the proponent. He said that he recalled something in Dr. John Templer's book, The Staircase, Vol. 2 (MIT Press, 1992) recommending step geometries considerably different (and less demanding than) the "7-11" rule would dictate. Here he made procedural and technical errors. This belief or recollection on his part should have been put in the form of a question to the proponent who would have disillusioned him on the spot. Rather, in a most unscientific manner, he set aside all of the evidence in favor of a flawed recollection. Templer, in his 1974 dissertation first provided evidence supporting the "7-11" rule although his data were based on 7.2 inches for maximum riser height. (Rounding this to the conventional "7-11" is warranted as there are typically small increases in effective riser height with typically carpeted dwelling unit stairs as well as effective reduction of tread depth when carpeted. Below as Table 1 for this Comment is summary table (2.2) from Dr. Templer's book (again based largely on work he did in 1974 and published in 1992, at least a decade before the more detailed work done by researchers Wright and Roys at the UK Building Research Establishment (BRE).

Table 1. Templer's Recommendations for Maximum Riser Height and Minimum Tread Depth Based on His 1974 Work

TABLE 2.2
Range of Rise and Going Relationships for Comfort and Safety

Rise	*Goings*						
INCHES							
7.2	11						
7	11						
6.5	11	11.5	12	12.5			
6	11	11.5	12	12.5	13	13.5	14
5.5	11	11.5	12	12.5	13		
5	11	11.5	12				
4.6	11						
CENTIMETERS							
18.3	27.9						
17.8	27.9						
16.5	27.9	29.2	30.5	31.8			
15.2	27.9	29.2	30.5	31.8	33.0	34.3	35.6
14.0	27.9	29.2	30.5	31.8	33.0		
12.7	27.9	29.2	30.5				
11.7	27.9						

Note that the 14-inch maximum, as Templer explained in this book, was merely the upper limit of his test apparatus for his 1974 dissertation; he indicated that more research was needed on larger tread depths (and such work was done in the BRE study coming some three decades later). Thus, contrary to the recollection admitted by the one researcher on the IBC Means of Egress Committee, Templer was in favor of the “7-11” rule and he explicitly put this in a written statement when BOCA, one of the three legacy model code groups was considering adopting the “7-11” rule for dwellings.

Thus, not only does the overall committee—with a few exceptions—get a failing grade on their sloppy evaluation of the evidence for the “7-1” rule, the one person who should have championed such research got it wrong. As the old saying goes, “What can you expect of iron when gold rusts?”

Finally, how can the Means of Egress Committee turn its back on the longstanding “7-11” rule that is applied to building contexts where occupants are significantly less vulnerable to unsafe stairs? Their reasoning for disapproval fails the logic test. E74-09/10 should be approved by the ICC membership which, on the comparable proposal (E74-09/10 Part 2) voted 63 percent in favor of approval in Baltimore.

Final Action: AS AM AMPC____ D

E74-09/10, Part II
IRC R311.7.4.1, R311.7.4.2

Proposed Change as Submitted

Proponent: Jake Pauls, representing self

PART II – IRC BUILDING/ENERGY

Revise as follows:

R311.7.4.1 Riser height. The maximum riser height shall be 7 inches (178 mm) ~~7 ¾ inches (196 mm)~~. The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm).

R311.7.4.2 Tread depth. The minimum tread depth shall be 11 inches (279 mm) ~~10 inches (254 mm)~~. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within $^3/_8$ inch (9.5 mm) of the rectangular tread depth.

Winder treads shall have a minimum tread depth of 11 inches (279 mm) ~~10 inches (254 mm)~~. measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than $^3/_8$ inch (9.5 mm).

Reason: This is purely a technical change affecting maximum and minimum rise and tread depth dimensions respectively. This is the long overdue mainstreaming of the so-called "7-11" step geometry in terms of maximum rise and minimum tread depth. (The proponent has submitted a separate change proposal which simply formats and restates the current requirements; that proposal and this one should be dealt with separately or independently as their purposes and effects are different.)

Much has been written about this topic, especially around 2003 in relation to the IRC and the NFPA codes (NFPA 101 and NFPA 5000 which adopted this change to the mainstreamed "7-11" step geometry at that time. Since that day nobody has attempted to revert to pre-"7-11" criteria for dwelling unit stairs within NFPA and for non-dwelling unit stairs within ICC. The "7-11" minimum standard is the most widely used step geometry standard internationally and reasons for keeping it at least the minimum standard have grown. This is because all the recent research on use of stairs—*including the matter of falls on stairs, including injurious ones*—confirms that it is a very reasonable minimum standard and that it is a long way—about three inches or more—from an "optimum" standard.

The very extensive 2003 proposal I submitted to both ICC and NFPA is not reproduced within this proposal for reasons of length and, more importantly, its free availability on the Internet, specifically the Downloads area of my website, http://web.me.com/bldguse. Once within the Downloads area (where over a hundred PDF files can be freely downloaded on stairway usability and safety plus means of egress performance), simply open the folder titled, "Home Stairway Safety and Codes," and download the 3.4 MB, 40-page file, "Pauls-R311-2003.pdf." Here follows an outline of what was covered in that proposal which I submitted to ICC with NFPA getting a comparable, earlier one that was approved by NFPA members and withstood technical and procedural challenges from the NAHB.

Benefit-Cost Analysis for Improved Stairs in the USA
Injury Epidemiology
History of Debate on Improved Step Geometry Requirements in Codes & Standards
Benefits and Costs
Industry's and Regulators' Reviews of Research
Latest Research on Step Geometry from Britain
Politically-driven Local and State Adoption Process
Building and Marketing Improved Stairs
The Problem of the Double Standard
Intimidation of Building Officials
Roles of NFPA and APHA
Summary.

What Has Changed Since 2003?

The changes for the worse appear to be directly attributable to even worse home stair construction and regulation than existed before 2003. This is seen in Figure 1 which shows the growth of home stair-related injuries that are NOT due to the aging of the population—as this was checked out to learn that people under 65 and those 65 or more in age both contributed in more or less the same proportion to the substantial growth in home stair, related injuries. A recent, widely-circulated document described the statistical insights as follows: "For both 1997 and 2007, the percentage of NEISS-reported injuries for the 65-and-older group was 15.3 percent plus/minus 0.4 percent for both home settings and all settings." Thus, both before and after 1997, elderly persons were only slightly—but consistently—over-represented in hospital emergency department-treated injuries associated with stairs as reported in national estimates by the US Consumer Product Safety Commission. (The note, titled "The Home Stairway Safety Problem and Related Code Development, Adoption and Enforcement Problems in the USA," is also posted for free downloading from the website "http://web.me.com/bldguse" Downloads area as file "Pauls2009Letter&InjuryNote" within the folder titled, "Home Stairway Safety and Codes.") A list of the topics addressed therein is provided below Figure 1.

Figure 1 shows an extraordinary growth in the US national estimates from the US CPSC/NEISS for stair-related injuries, particularly in homes. The average annual rate of increase in the last several years exceeds the average annual rate of US population growth by a factor of about five while stair-related injuries in non-home settings decrease slightly, resulting in about a 2 percent reduction annually for non-home stairs over the last several years—since about 1998. During these several years there has been increasing use of the "7-11" minimum step geometry standard for non-home stairs, thanks to the adoption—beginning in the 1980s—of this standard in model building codes. This is further evidence of a partial success story on the stairway safety front and ICC members might rightly claim some of the credit for this partial success. Now building officials who control the adoption of the requirements in model codes need to finish the job where it will count most, in homes.

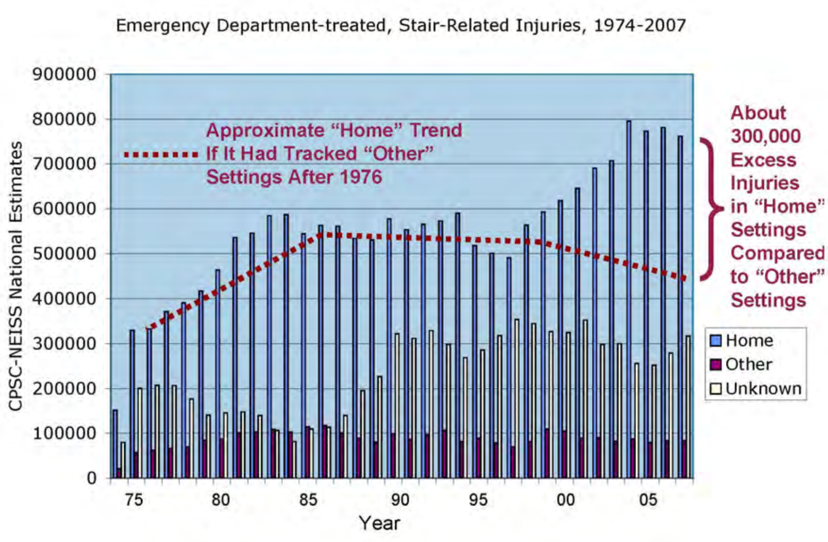

Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years.

Updating the 2003 ICC proposal on mainstreaming the "7-11" minimum standard was the note which began circulating in February of 2009. Here are the topics it addressed in its 26 pages (including over two pages of references and additional resources).

Preface
Injury Epidemiology
- CPSC-NEISS Data
- Injury Increase Comparisons
- Excess Injuries for Home Stairs
- Are Recent Increases Due to the Aging Population?

Statistical Issues
- Uncertainty in the NEISS Data
- Societal Cost of Stair-related Injuries
- Estimated Cost of Two Million Excess Home Stair-related Injuries, 1998 to 2007

Are We Finally Paying the Price for Code-triggered Defects in Home Stairways, Compared to Other Stairways?
- In the Mostly Bleak, Stair Safety Field, A Possible Success Story in Non-home Settings
- Why Are Home Stairways Relatively Dangerous?
- The Role of Code Development, Adoption and Enforcement

History of Some Relatively Important Influences on Stairway Safety and Its Regulation
- Step Geometry
- Step Geometry Uniformity
- Systemic Tread Run Non-uniformities Common in Many Recently Constructed Homes
- Resulting Misstep and Fall Scenarios
- Systemic Uniformity Defect Superimposed Upon Another Systemic Step Geometry Defect
- An Abbreviated History of Step Geometry Rules and Related Issues
- Homebuilders
- Business Arrangement Between ICC and NAHB, Among Other Strategic Partners
- NAHB Bias on ICC Committees Responsible for IRC
- Hypocrisy in ICC's Business Deal with NAHB
- Consumer-supplied Evidence of Step Geometry Efficacy
- Combination of the NAHB-favored Short Stair Treads with Top-of-Flight

Non-uniformities and with Dysfunctional Handrail Systems
- Recent Critique of Type II Handrails and Study Used to Justify Them
- ICC Codes and Stairway Defects
- What Homeowners Must Now See (beyond the failings of ICC and the code-based regulatory process generally).
- With Flawed Code Inspection, Consumers Need to Do Their Own Stair Inspection
- Recommendations: What ICC and Other Organizations Urgently Need to Do

Appendix A: Abbreviated History of Step Geometry Rules and Related Issues
Appendix B: Code of Ethics of International Code Council (ICC) and predecessor organization, Council of American Building Officials (CABO)\
References and Guide to Resources.

The 2003 proposal to ICC, "Pauls-R311-2003," included substantial benefit-cost information about stair step geometry in homes which must be updated to take account of recent, dramatic growth in home stair-related injuries (in terms of CPSC-NEISS national estimates) as well as higher-than-general inflation rates for medical treatment costs. The latter are currently running at about $1 million per hour in the USA with total, societal costs running at about $10 million per hour in the USA.

Societal Cost of Stair-related Injuries. Currently, for the USA, the annual societal costs of home stair-related injuries—currently comprising about 89 percent of all stair-related injuries where the location or setting is known—are on the order of $100 billion annually for comprehensive, societal costs. (The basis for the 89-percent figure is the NEISS data described above.) The basis for the societal cost (the sum of medical care costs, direct productivity losses and pain-and-suffering or quality of life costs) is a paper by Lawrence, *et al.* (1999). (Among coauthors for this paper are internationally recognized experts in burden of injury, like Ted Miller.) They estimated a societal cost (in 1997 dollars) of $46.7 billion for stair-related injuries occurring in 1995. For that year the NEISS national estimate for US emergency department-treated, stair-related injuries was 892,610 for all settings and 517,641 for homes. Between 1995 and 2007 these increased, respectively, to 1,161,915 (a 30-percent increase) and 761,881 (a 47-percent increase). (These national estimates for 1995 are the "adjusted" ones obtained via the NEISS website; they correct for a change in NEISS sampling that took effect in January 1, 1997.)

Accounting also for inflation (of about 3 to 4 percent annually—although medical care increases were higher), we can assume that, for 2007, the societal costs for stair-related injuries in the USA were on the order of $100 billion in 2007 dollars (including on the order of $10 billion for medical care, $20 billion for direct productivity losses, and $70 billion for pain and suffering or quality of life costs—with this estimated distribution based on a personal communication with Bruce Lawrence and Ted Miller, among the authors of the above noted paper). This cost was about an order of magnitude greater than the annual construction cost of new stairs (just prior to the recent economic downturn) in the USA. For an analysis of home and stair construction costs see Pauls (2003). The smallest cost component, medical care, is about one million dollars per hour in the US."

Quoting also from the paper by Pauls, 2009 on "Injury Increase Comparisons: The apparent, relatively rapid increase recently in home stair-related injuries has an average annual growth rate of about 4.5%, a few times greater than annual population growth (1%). The overall increase, over a three-decade period, was about 130 percent with the most recent ten-year period showing a 55-percent increase. By contrast, fire-related injuries (the majority of which occur in homes), a major concern traditionally in safety standards and codes, have shown a three-decade pattern of average annual *decrease* of about 2 percent. (If fire-related injuries were plotted on Figure 1A, that plot would be appear very close to the base of the graph, declining from about 50,000 to about 25,000 annual injuries over a three-decade period.) Moreover, the trend for all NEISS injury national estimates for home settings—other than stairs, during the period 1997-2007 has a 39-percent increase over the same last ten-year period when home stair-related injuries increased by 55 percent. For *all* products and settings, the increase in NEISS national estimates over the same 1997-2007 period was only 19 percent, about the same as the 18-percent increase for stairs in other settings (i.e., not homes). From this, and other analyses the author has performed with the CPSC-NEISS data, we can see generally, that homes generally are the major site for injuries, relative to other settings; homes account for about 49 percent of the NEISS national estimates of injuries during the 1997-2007 period.

Aside from fire-related injuries—these NEISS-reported national estimates of all injuries in home settings are increasing faster than in other settings (39 percent versus 19 percent for all NEISS national estimates during the 1997-2007 period).

NEISS national estimates of stair-related injuries in home settings have been increasing over the last ten years at a fast rate relative to NEISS national estimates for all NEISS-coded products (55 percent versus 19 percent) and relative to population growth (55 percent versus 10 percent). Over the 1997-2007 period, NEISS national estimates of home stair-related injuries comprised 89 percent of NEISS national estimates for stair-related injuries in all known settings. For early years of NEISS national estimates, specifically 1975-1977, this was 85 percent. Most of the increase in this proportion occurred since 1990.

Generally, in recent years stairs have accounted for about 9 percent of the NEISS national estimates for all products; home stairs accounted for about 6 percent; other settings' stairs accounted for less than 1 percent; unknown settings' stairs accounted for over 2 percent.

Stairs maintain their position, since the earliest days of CPSC-NEISS, as the leading product, associated with injuries coded by NEISS. Floors are the second leading category. See Lawrence, *et al.* (1999), Table 5, using data for 1995-1996, for an analysis for the top ten NEISS-coded products, ranked by injury cost, for various age groups. As well as ranking first for all ages, stairs rank first for 5 of 12 age groups (preschool children and middle-age adults) and second for another three. Only for the two highest age categories, 70-79 and 80 or more (for which stair use is relatively rare), do floors rank first, reflecting the contribution of gait and balance deterioration. However, stairs are still the second leading product for the 70-79 age group and third (after beds) for the 80-plus age group."

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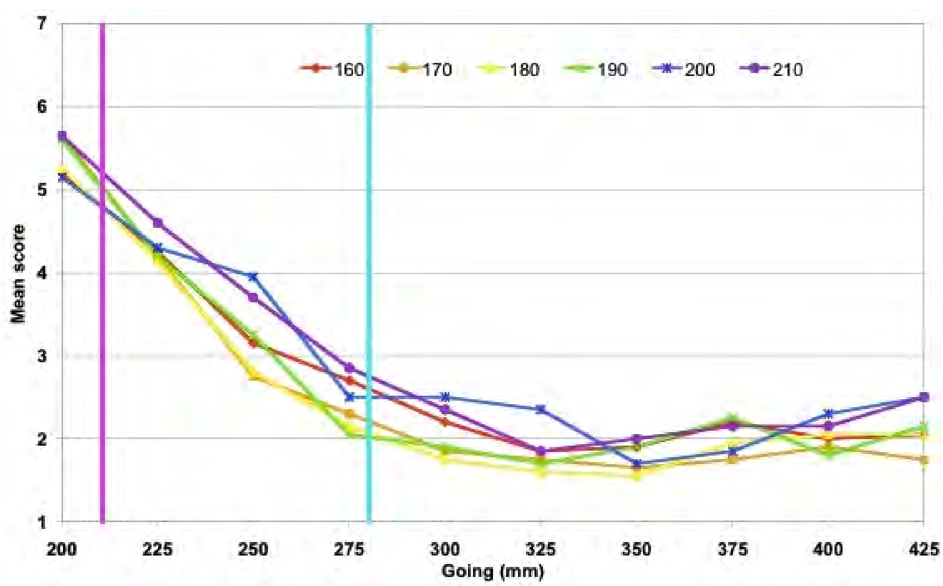
UK Research. Mike Roys and Mike Wright, UK Building Research Establishment have conducted some extraordinarily useful research in recent years, with the last of their papers published in May 2008. Working with a test stairway that offered 10 combinations of tread depth ("going" as it is called in the UK and "run" in some other places), in the range of 200 to 425 mm or 7.9 to 16.7 inches, with 6 combinations of rise height, in the range of 160 to 210 mm or 6.3 to 8.3 inches, they clearly showed the benefits of larger tread depths. Altogether, 60 adult subjects walked up and down each of 20 stair arrangements. Their work, while not completely published yet, is represented centrally in my recent one-day workshops on stairway usability and safety, the PowerPoint slides of which (including a fair selection of the BRE study slides) are available for downloading from my website in the folder titled, "Presentations at MUTN Conference in BC, Canada, April 2009." Papers on this work include Roys, 2001; Wright and Roys, 2005; and Wright and Roys, 2008. (Dr Wright moved to the USA in late 2008 so that now we are fortunate to have, in the USA, one of the top world talents in designing and conducting studies of step geometry and stair use performance.)

Answering a very old question in the code field, they showed that optimum tread depth in terms of many objective and subjective measures was much larger than 11 inches; 14 inches is about where this becomes optimum. The much-used 11-inch criterion is approximately where the graph of some of their findings, reproduced below as Figure 2, shows a change of direction from steep to more gradual slope and finally leveling off at the "optimum" tread depth of about 14 inches or 350 mm. This supports treating 11 inches as the minimum and clearly not the "optimum."

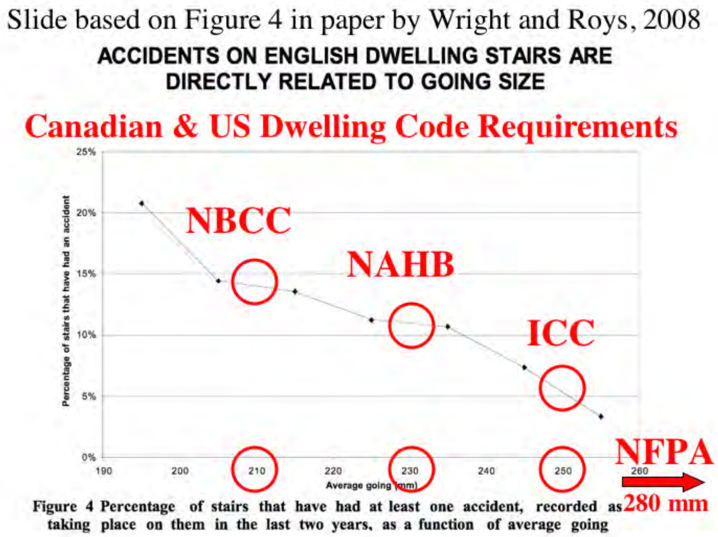
Figure 2. Graph of Findings from the UK Research by Wright and Roys, as Presented (in a PowerPoint) in 2005 at an International Conference on Falls in the UK.



The responses plotted here are to the scaled remark, "I felt safe walking down the stair," with the "most-safe" responses at the bottom of the curves.

The most recent of their papers, Wright and Roys (2008), contains some of the most interesting and valuable work—*in this case conducted in the field and inquiring into actual fall incidents as a function of home stairway rise and tread depth ("going" in the graph).* This is shown in Figure 3, onto which I have superimposed some of the criteria for US and Canadian home stair minimum tread depth, the same range shown in Figure 2 with the vertical bars at the left half of the Figure, specifically at the 210 and 280 mm, 8 1/4 and 11-inch minimum tread depth criteria. Note that any rounding or beveling of the nosing and presence of carpet and pad (in some cases, especially on typical home stairs), the effective tread depth is significantly reduced from these values so that the effective tread depth of some home stairs, built to code, is as small as 180 mm or 7 inches. Incidentally, the testing that led to the results in Figure 2, were with uncarpeted treads with no more than 13 mm or 1/2 inch loss of effective tread depth due to rounding of the nosing. The safety differences among the various tread depths are large and cannot be ignored.

Figure 3. Role of Stair Tread Depth ("Going" in UK) in Stair-related "Accidents" in Homes (PowerPoint slide based on Wright and Roys, 2008)



Recent US Research on Step Geometry. While there are other studies that could be referenced and described here in relation to the step geometry issue, in the interests of time and space, I will note only one more. This was a paper based on 80 relatively intensively investigated stair-related fall injuries that led to litigation and subsequent investigation by one of the top three or so research and investigation experts in North America with excellent ergonomics credentials. The paper was published in January of 2009 *Professional Safety,* the peer-reviewed journal of the American Society of Safety Engineers and was titled, "Stairway Falls: an ergonomic analysis of 80 cases," by Cohen, LaRue and Cohen (2009). Among their conclusions they note: "In this analysis, excessive dimensional variation appeared to be the most pervasive factor in stairway fall causation, followed by noncompliance with the 7-11 design rule for risers and treads, respectively. As with dimensional variation, this investigation showed a tendency for staircase geometry to fall outside the recommended limits of established building codes. Therefore, stairs that do not follow these requirements are more likely to be involved in falls. It stands to reason that greater adherence to the criteria specified in existing codes (i.e., risers in the range of 7 in. and treads in the range of 11 in.) would decrease the number of actual stairway falls that occur. Therefore, it is essential for both architects and builders to adhere to existing codes regarding stairway dimensions. Furthermore, prevailing codes must be enforced by building code officials, plan checkers and field inspectors, since stair dimensions can often be overlooked in the haste to issue building occupancy permits."

Any ICC chapter wishing to have their members participate in a one-day workshop (also slated for presentation in Eastern Canada on September 14, 2009) should contact Jake Pauls. It is available in a not-for-profit mode. Code authorities should be prepared to deal knowledgeably with consumers who, upon discovering the defects in their home stairs, contact their local building department and ask for a re-inspection of their home stairways. If there has been an injurious fall on such a stairway they should also be prepared to deal with resulting legal actions that might name the local building department as a third party defendant. (ICC itself is also a potential third-party defendant—as are homebuilders and their trade associations—a matter taken up in the so-called "New Orleans Declaration" I issued in the spring of 2009 and posted on my website Downloads area.) Inspectors should at least know about how measurements of the stair step geometry are performed that are of a quality expected in such litigation actions. These measurement techniques, usually requiring use of a spirit level or electronic level, are all described in the workshop materials posted on the above-mentioned website Downloads area and on the DVD of the Spring 2009 workshop noted above. These measurement techniques are consistent with the ICC requirements both as currently stated and as further clarified if the package of proposals I put forward is accepted.

As indicated with all of the epidemiological and etiological work outlined in this proposal, the home stair-related injury issue is many times larger than is the home fire-related injury problem. It should thus be nearly a no-brainer, after adopting home sprinkler requirements, for responsible ICC members to vote for the mainstreaming of the "7-11" step geometry standard. I will be counting on such ICC members and others who can sway opinion to speak out with conviction based on the primacy of their duties to the public, the first item in the code of ethics for certified officials, a code which is available on my website if it cannot be located on ICC's.

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Pauls, J. and Harbuck, S. (2008). Ergonomics-based Methods of Inspecting, Assessing and Documenting Environmental Sites of Injurious Falls Resulting from Missteps on Small Elevation Differences, Slopes and Steps. *Proceedings of the American Society of Safety Engineers Professional Development Conference & Exposition*, Las Vegas, NV, 2008. (Downloadable as file, "Pauls-Harbuck-ASSE-paper.pdf," from folder, "Home Stairway Safety and Codes," accessible from the Downloads area of http://web.me.com/bldguse/Site/Downloads.html.)

Roys, M.S. (2001). Serious stair injuries can be prevented by improved stair design. *Applied Ergonomics*, Vol. 32, pp. 135-139.

Wright, M. and Roys, M. (2005). Effect of changing stair dimensions on safety. In Bust, P.D. and McCabe (eds.) *Contemporary Ergonomics 2005*, Taylor and Francis Books, pp. 469-474.

Wright, M. and Roys, M. (2008). Accidents on English dwelling stairs are directly related to going size. In Bust, P.D. (ed.) *Contemporary Ergonomics 2008*. Taylor and Francis, 632-637.

Cost Impact: The code change proposal will increase the cost of construction. However, more importantly, the change will lead to much larger benefits in injury reduction and usability, especially for older users.

ICCFILENAME: Pauls-E4-1012.3

Public Hearing Results

PART II- IRC B/E
Committee Action: Disapproved

Committee Reason: The committee feels the data submitted seems to be a gray area in what the data is revealing. The solution does not necessarily show that it is related to the problem. The committee feels the "7 3/4-10" standard is a good standard and prefers to keep it.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jake Pauls, Silver Springs, MD, representing self, requests Approval as Submitted.

Commenter's Reason: Several aspects of the IRC RB Committee actions and related, more general policy, process and ethics issues central to this proposal are—as this comment is submitted on the deadline (February 8, 2010)—still subject to an Appeal process filed by the proponent and submitter of this comment. The public hearing on this appeal is scheduled to occur four days after the comment filing deadline. Requests to ICC staff, to extend the comment submission deadline for E74-09/10, were rebuffed as if to say the Appeal process is not important anyway so what does it matter if the comment deadline precedes the Appeal process.

One aspect of the Appeal did occur before the comment submission deadline. That was the IRC RB Committee reconsideration of its action on E74-09/10 Part II. It was not much of a reconsideration—in terms of the central issue of conflict of interest of the four National Association of Home Builders (NAHB) representatives—as a sustaining of the Committee's action at the Baltimore hearings in October. The extent of the hold that the NAHB has on the Committee was exemplified by the fact that the motion to sustain previous action was made and seconded by NAHB representatives. Neither they nor anyone else on the Committee even bothered to try to justify their mostly nonsensical reason for disapproval. That published reason for disapproval was the following.

> Committee Reason: The committee feels the data submitted seems to be a gray area in what the data is revealing. The solution does not necessarily show that it is related to the problem. The committee feels the "7 3/4-10" standard is a good standard and prefers to keep it.

What does this mean? What does the committee mean by "gray area?" The Committee, during its reconsideration, never even bothered to try to explain this or other weaknesses in the reasoning.

Taken as a whole—with year after year of growing injury tolls related to the least regulated of stairs—combined with decades of research specifically on the relationships between step geometry and falls—*all of which was made known to the Committee via the supplied CD of many publications and available more publicly on the referenced websites*, the data are very clear. They are in stark black and white, not gray!

It is now well established by etiological research and by abundant epidemiological data that home stairs are relatively dangerous and the largest set of factors behind the increased dangers are mainly the smaller tread depths, complicated somewhat with higher risers, for dwelling unit stairs.

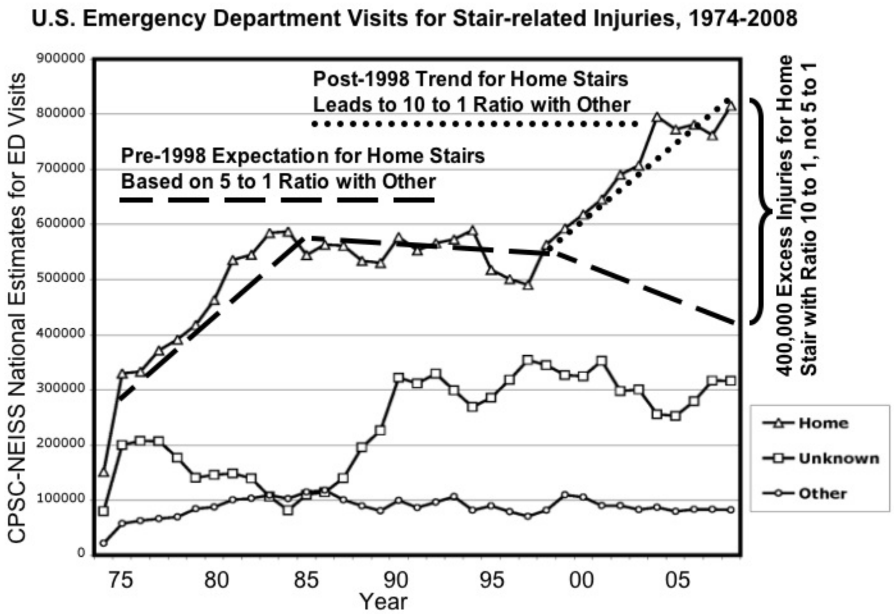
If there is any correct use of the term "gray area," it is in the Committee Reason's use of the phrase, "The committee feels." US residents are currently paying about one million dollars per hour for medical treatment costs *alone* for stair-related injuries—*90 percent of which occur in home settings.* Thus, the most legitimate feelings are indignation over the inaction on the part of ICC, responsible code officials and home builders about the unnecessary perils to which unsuspecting home stair users are exposed.

I do not mean to be critical of only the four NAHB representatives on the IRC BE committee. If they were the only problem here, the vote would have been about seven to four on approval of the proposal rather than nine to two on disapproval. No, the committee appears to have some builder confederates or, at the minimum, some people who want codes based on vague feelings rather than facts or who are not sufficiently aware of the facts. With one or two standout exceptions (including at least one member who appears to have considered the facts with great care), the code officials on the committee appear not to care about facts or due process. This is why the current appeal focuses on ethics issues in the ICC process and these are on the hearing agenda for February 12, 2010.

Notably, the majority of the IRC BE Committee are out of step with the ICC membership as reflected in the assembly vote immediately after the Committee voted 9 to 2 to disapprove E74-09/10 Part II; that assembly vote of nearly 1,000 ICC members was 63 percent in favor of approval of E74-09/10.

The last sentence of the provided reason is especially astonishing. In the face of contrary facts, the committee again "feels" something but does not put any force of action behind the feeling. At least four of the twelve committee members represent the National Association of Home Builders (NAHB) which, for years, has had a policy preventing code professionals from adopting and enforcing even the compromise "7 3/4-10" standard for which there was never a good research basis. The research basis was for the "7-11" standard. (It is another fact that, for all but homes, "7-11" has been the most widely used standard in the world for step geometry in buildings where the stair-related injury toll is showing slight decreases—a few percent per year in the US when population corrected—while US home stairs are showing large increases, especially since ICC and the NAHB made their business agreement that was intended, in part, to keep home stairs at a low standard. If there were a case to be made for the “7 3/4-10” standard, then why haven’t all the codes that adopted the “7-11” standard reverted to the lower, “7 3/4-10” standard? The performance of the “7-11” standard is based on fact, not “feeling.” There are decades of experience with “7-11” in buildings other than homes and as seen in Figure 1, we are now reaping the benefits of that enlightened policy, unfortunately only in the settings where people are least vulnerable. The data in Figure 1 come from the US Consumer Product Safety Commission (CPSC) National Electronic Injury Surveillance System (NEISS for hospital emergency department-treated injuries which comprise about 40 percent of all medically treated injuries—which total about 2 million home stair-related injuries per year in the USA. Thus Figure 1 tends to understate the total medical problem posed by stair-related injuries.

Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years
This is an update, including data for 2008, of Figure 1 in proposal E74-09/10



Five reasons have been identified recently for the diverging injury records for home stairways and for stairways in all other settings that are clearly shown in Figure 1. The former are rising rapidly (approaching a growth rate of over 4 percent, about five times US population growth) in a trend begun at about the time the ICC started affecting residential codes in the USA through its production and promotion of the International Residential Code. The latter are now dropping at a notable rate (about 2 percent reduction per year at a time of about 1 percent a year of population growth in the USA). These factors, in no particular order, are:

(A) Significantly lower ICC standard for maximum rise and minimum tread depth for home stairs (the result of the code-development compromise and the code-adoption compromise).
(B) The systemic top-of-flight defect in many homes’ (and some other buildings’) stairs partly due to ICC's failure to provide clearly stated code requirements and to include the rules preventing this in their inspection guides.
(C) ICC's adoption of seriously compromised requirements for handrails for home stairways.
(D) An apparent deterioration in enforcement/inspection quality generally in relation to homes, partly influenced by the widespread perception—possibly nurtured by ICC leaders—that the builders’ work should receive minimal scrutiny in view of their “Strategic Partnership.”
(E) The concurrent deterioration of movement performance of population capability generally with the effects of reduced physical activity, overweight and obesity. (In a public health model, this should lead to increased—*not decreased*—compensation with the design and construction of critical built environment features such as stairways, particularly in the home settings where the most vulnerable populations and use conditions are common and easily predicted.)

Other code change proposals, before ICC this cycle, address at least three of the five reasons. For example, two comments have been submitted in relation to item B (on proposals RB46-09/10 and RB47-09/10). Comments could have been submitted also on item C, especially as there were competing proposals from the Stairway Manufacturers Association (SMA) and from Pauls focused on either expanding or eliminating, respectively, the ability to use Type II handrails. This commenter hopes that the ICC members have the good sense to refuse any expansion of Type II handrail usage and, on a more proactive front, prohibit their further use in all settings, especially dwellings where there is a larger proportion of users disserved by the oversized, ungraspable Type II railings, especially on stairways.

Item D is being addressed in the public hearing on February 12, 2010, just four days after the deadline for submission of comments. (ICC staff refused to provide a later date for comments that would be based on the outcome of the public hearing—as if to imply that the public hearing result was predetermined and would not affect the nature of comments on E74-09/10 one way or another.)

This comment focuses on item A and for the benefit of all who did not see the proponent’s handout at the Baltimore hearings here follow some highlights of that handout. They focused partly on comparisons between home sprinkler requirements and “7-11” stair geometry rule for dwelling unit stairs.

Information on Home Stairways and Sprinklers for Fire Safety Authorities, Building Code Authorities and Others (Re. IRC-BE Proposals E74-09/10 and E97-09/10)

ICC members—including new members wanting to participate in the deliberations on the home fire sprinkler issue, beyond supporting home fire sprinklers (by defeating proposals to pull back from the position taken last year), *should also support proposal E74-09/10 re. home stair step geometry and proposal E97-09/10 re. stair handrails.*

This approach is best for your colleagues, for the public and your mission. For example, fire services—in their EMS work—attend to more non-fire injuries (e.g. from falls) than to fire-related ones. Many of the fall injuries occur because of stairs—*90 percent are in homes.* Currently, the number of medically treated home stair-related injuries in the US total about 2 million per year. About 800,000 of these are treated in hospital emergency departments—*and this toll is increasing at about 5 percent per year*. Meanwhile, *reflecting better codes and enforcement for non-home stairs—e.g. "7-11" stairs*, other settings show a recent 2 percent per year drop in injuries. See Figure 1.

Risk. Fatalities from fire and (under-reported) stair-related fatalities are similar with a risk of about one in 100,000 per year. Annual risk of nonfatal injury is greater for stairs at about one medically treated injury in 150 while for fires the risk is one civilian injury in 17,600.

A civilian has about 100 times greater risk of nonfatal injury due to stairs than from a structural fire with the latter often more serious.

Fire services have to use the same bad stairs in homes during fire response, but they face even more usability and safety challenges, e.g., lack of familiarity, plus stairs with badly undersized treads that are very difficult and dangerous for firefighters to use with large boots, breathing apparatus and other gear affecting vision and movement.

Fire services: Improved home stair step geometry and proper handrails are essential for your members and your mission.

Role of Step Geometry in Stair-related Falls and Injuries. Much has been learned since 2003, the last time there were code-change proposals on the "7-11" rule for homes. Research at the UK Building Research Establishment, based on a survey of "accident" experience by home owners, suggests that the added risk of the short, 9-in tread depths, compared to even a 10-in tread depth (the largest for which sufficient home-based data were available), was a factor of about four (i.e. a risk of 0.12 versus 0.03 of an "accident" occurring in a two-year period). See Table 1; this replaces illegible Fig. 3 of proposal E74-09/10.

Table 1. Risk of Falls Relative to Home Stair Tread Depth
(Risk estimates derived from Wright and Roys (2008) Figure 4)

Tread Depth dimension	Relative risk of falls	Used for home stairs by
255 mm (10.0")	0.03	ICC Codes in USA
245 mm (9.6")	0.07	
235 mm (9.3")	0.11	
225 mm (8.9")	0.12	NAHB in USA
215 mm (8.5")	0.13	
205 mm (8.1")	0.14	NBCC in Canada
195 mm (7.7")	0.21	

NBCC—*National Building Code of Canada*

Based on evidence from actual falls on home stairs, a 10-in tread depth is nearly four times safer than is 9-inches; 11 inches is even more favored and safer. See Figure 2 re. *optimum depth*—14 in.

Figure 2. Findings about the Effectiveness of Ten Tread Depths and Six Step Rise Heights from UK Research by Wright and Roys, as presented in 2005 at an International Conference on Falls

("Going" is the UK and international term for tread depth. Lower is better in the graph.)

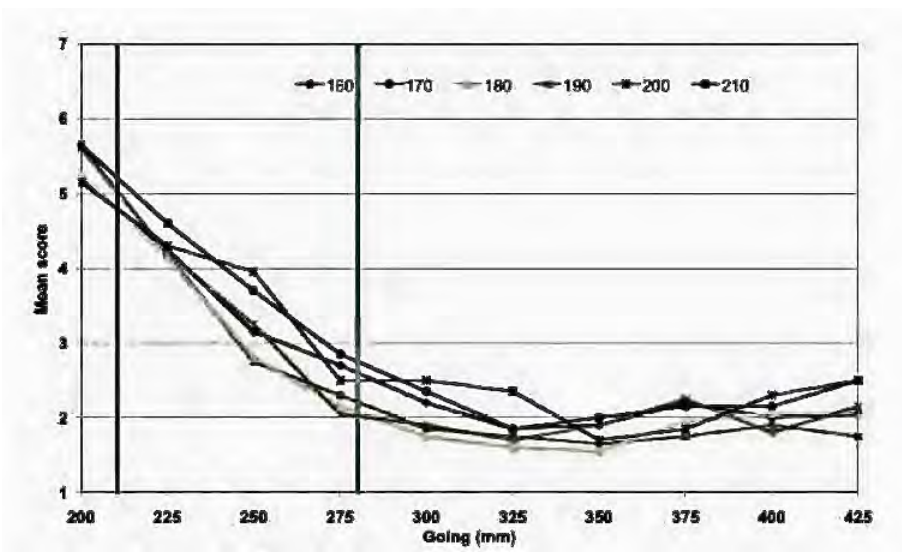


Figure 2 is one of several studies reported after 2003; this counters the claim made by the SMA representative at the Batlimore Hearings that there was nothing new in the research since the prior proposal, in 2003, to have the "7-11" step geometry rule apply to dwelling unit stairs. Among other studies there were some from 2008 (e.g., the study behind Table 1) and 2009. Other incorrect claims made, by the NAHB representative, in the Baltimore hearing and/or the Committee reconsideration relate to the dwelling unit stair rules long used in the UK; he claimed that the UK requirements allowed 220 mm (8.67 inch) dimensions for both rise and tread depth. This is completely wrong as these limits are applied in conjunction with two other rules; you cannot have both a maximum height riser and a minimum tread depth due to the application of the other limits. The SMA representative made a big deal, or so was the initial impression, about the fact that two recommendations came out of the UK Building Research Establishment (BRE) team who did the research. One was for a minimum 300 mm (12-inch) tread depth for all but dwellings and 250 mm (10 inches) for dwellings. What he failed to take into account is that, as in all other countries traditionally—*due to homebuilding industry pressures on both code-development bodies and on technical institutes such as the industry-sponsored BRE*—there was a built in premise that there would be a continuation of the double, lower standard for step geometry in dwellings—even if the research did not support this conclusion.

From Figure 2, it is clear that there are two regions of the graphs, the portion with a fairly steep slope and the region where the slope is relatively gradual. The break between the two regions occurs at approximately 275 mm (about 11 inches). This means that every inch that you add to the depth up to about 11 inches contributes more benefit, in safety performance, than do the inch increments beyond 11 inches (about 275 mm). This is one bit of evidence, among many for the 11-inch minimum.

Also very notable from Figure 2 is that 11 inches (about 275 mm) is not an "optimum" tread depth. That is not achieved until the tread depth is about 14 inches or 350 mm.

Benefits and Costs. Any analysis should address the lifetime benefits and costs, for some period like 50 years. First costs or even mortgage payments are not enough. The long-term costs of not building the house stairs properly—or, conversely, the benefits of building them properly, i.e., to the "7-11" standard—must be taken into account. This was done in 2003, for the ICC-IRC proposal on mainstreaming the "7-11" step geometry rule. Except for the $23,000 item, Table 2 is based on one of the tables from the detailed analysis by Pauls (2003).

Table 2. Values per new home, over a fifty-year period, 2000-2050 (with all costs and benefits expressed in constant year 2000 dollars). Unless noted, the stair step geometry (max. rise by min. tread depth) is 8 1/4 by 9, the step geometry demanded by NAHB.

Cost of new home stairs:	$800
Added cost if "7-11" stair geometry used:	$250-980
Medical care cost for new-stair related injuries:	$3,000
Comprehensive cost of new-stair related injuries:	$30,000
Benefit of injury reduction with "7-11"—at least:	$23,000
Usability benefit for all new-stair users(@$0.002/use):	$2,000
Total usability benefit for certain elderly users of new stairs with "7-11" step geometry:	$7,000

Note: The $800 base cost for home stairways came from data in a house building cost analysis published by NAHB (1999). Injury cost data come from world experts on this: Lawrence, et al. (1999).

Given current data on home stair falls, in relation to step geometry, changing home stair step geometry from what the builders provide to the "7-11"—at a per-home cost of about $1,000—would save at least $23,000 in comprehensive injury costs and provide $7,000 additional in usability benefit, per home, between 2000 and 2050.

Annual US, per capita, comprehensive costs of stair-related injuries are about $300—a grand total of $100 billion annually for all of US.

Concluding Comments. Along with fire sprinklers, improved stair step geometry and functional handrails are cost-effective, especially for our aging and less physically fit population. Each can ultimately save a few thousand lives per year, but better stairways impact a larger number of injuries than can fire sprinklers. Stairs have an ongoing normal use while sprinklers significantly reduce property loss. Fire services and other advocates for home sprinklers: your interests are well served by also advocating for improved home stairways.

Referring back to Figure 1 and Table 2, ICC members (who will be voting on comments such as this one) should ask the following questions. Do they want one of the legacies of the ICC to be the fact that during ICC's time of influence in the model code field in the USA, the number of home stair related injuries grew from five times those in all other settings to ten times those in all other settings. (Note that, according to the latest US injury statistics, homes are—overall—the site of about one-half of all injuries treated in hospital emergency departments. Thus stairs are in a different league in terms of their impact in home settings compared to all others. As indicated in the first four items in the list of five sets of factors affecting home stair-related injuries, the design, construction and regulation of home stairs are major factors in the heightened dangers with stairs in homes. ICC, through its code development process and through its strategic partnership with NAHB—the topic of the public hearing on February 12, 2010—is thus the number one suspect when blame is laid for the huge and growing toll of stair-related injuries, currently costing about 10 million dollars per hour for societal costs in the USA. Also, on the matter of costs and benefits, what other aspects of buildings provide the kind of benefit-cost ratios that we see for properly designed and constructed stairs (Table 2)? Clearly not the vast majority of issues that occupy ICC members in code-development hearings and in their day to day work in building regulation.

Finally, on the frequently made comment by IRC BE Committee members: "the 7 3/4 by 10 standard is a good one; let's stay with it." If it is so good why then has there never been a proposal, let alone a successful proposal to replace the "7-11" rule with the 7 3/4 by 10 rule? Also, for the NAHB members on the IRC BE Committee who claimed the 7 3/4 by 10 is a good standard; why does not the organization they represent then even allow its adoption at state and local level. Hypocrisy does not quite cover the nature of such comments coming from the organization that has done immense harm to home stair users for decades. Soon they will pay. Will ICC, as a Strategic Partner of NAHB pay also in dollars or credibility or both? That, fellow ICC members is something you should think about very carefully.

Final Action: AS AM AMPC____ D

E75-09/10, Part I

1009.4.5, 1009.4.5.1 (New), 1009.4.5.2 (New), 1009.4.5.3 (New) [IFC [B] 1009.4.5, 1009.4.5.1 (New), 1009.4.5.2 (New), 1009.4.5.3 (New)]

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I.

Proposed Change as Submitted

PART I – IBC MEANS OF EGRESS

Revise as follows:

1009.4.5 (IFC [B] 1009.4.5) Nosing and Riser Profile. The radius of curvature at the leading edge of the tread shall be not greater than $^{9}/_{16}$ inch (14.3 mm). Beveling of nosings shall not exceed $^{9}/_{16}$ inch (14.3 mm). Risers shall be ~~solid~~

~~and~~ vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.52 rad) from the vertical. ~~The leading edge (nosings) of treads shall project not more than 1 ¼ inches (32 mm) beyond the tread below and all projections of the leading edges shall be of uniform size, including the leading edge of the floor at the top of a flight.~~

~~Exceptions:~~

1. ~~Solid risers are not required for stairways that are not required to comply with Section 1007.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~
2. ~~Solid risers are not required for occupancies in Group I-3 or in F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.~~
3. ~~Solid risers are not required for spiral stairways constructed in accordance with Section 1009.9.~~
4. ~~Solid risers are not required for alternating tread devices constructed in accordance with Section1009.10.~~

1009.4.5.1 (IFC [B] 1009.4.5.1) Nosing Projection Size. The leading edge (nosings) of treads shall project not more than 1 ¼ inches (32 mm) beyond the tread below.

1009.4.5.2 (IFC [B] 1009.4.5.2) Nosing Projection Uniformity. All nosing projections of the leading edges shall be of uniform size, including the projections of the nosings leading edge of the floor at the top of a flight.

1009.4.5.3 (IFC [B] 1009.4.5.3) Solid Risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for stairways that are not required to comply with Section 1007.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.
3. Solid risers are not required for spiral stairways constructed in accordance with Section 1009.9.
4. Solid risers are not required for alternating tread devices constructed in accordance with Section 1009.10.

Reason: There is no technical change to the requirements in this proposal. It is a clarification of intent by separating out and labeling the separate issues of (1) nosing and riser profile or shape, (2) nosing projection size, (3) nosing projection uniformity, and (3) open risers. Based on evidence of poor compliance and inspection, it has been confusing for various topics to be lumped together in one long paragraph.

My special concern here is the apparent widespread failure to build and inspect stairs with regard to uniformity of nosing projection, especially at the top of stair flights. For this reason alone, it is important for this section—with a few topics in one paragraph—to be divided into smaller pieces dealing with a smaller set of issues. It appears that the nosing projection uniformity issue— particularly omitting the nosing projection on the landing nosing—might be mostly responsible for the rapid growth of what I refer to as "Excess Injuries" in Figure 1. Over the several years where these "Excess Injuries" have been seen in the CPSC-NEISS national estimates, there have been a total of about 2 million such "Excess Injuries" which have an associated annual societal cost in the USA of about $200 billion (yes, that is billion with a "b") with the medical care component of these "Excess Injuries" accounting for about $20 billion. (The substantial basis for these cost-of-injury estimates comes from the work of Lawrence, et al., 1999.)

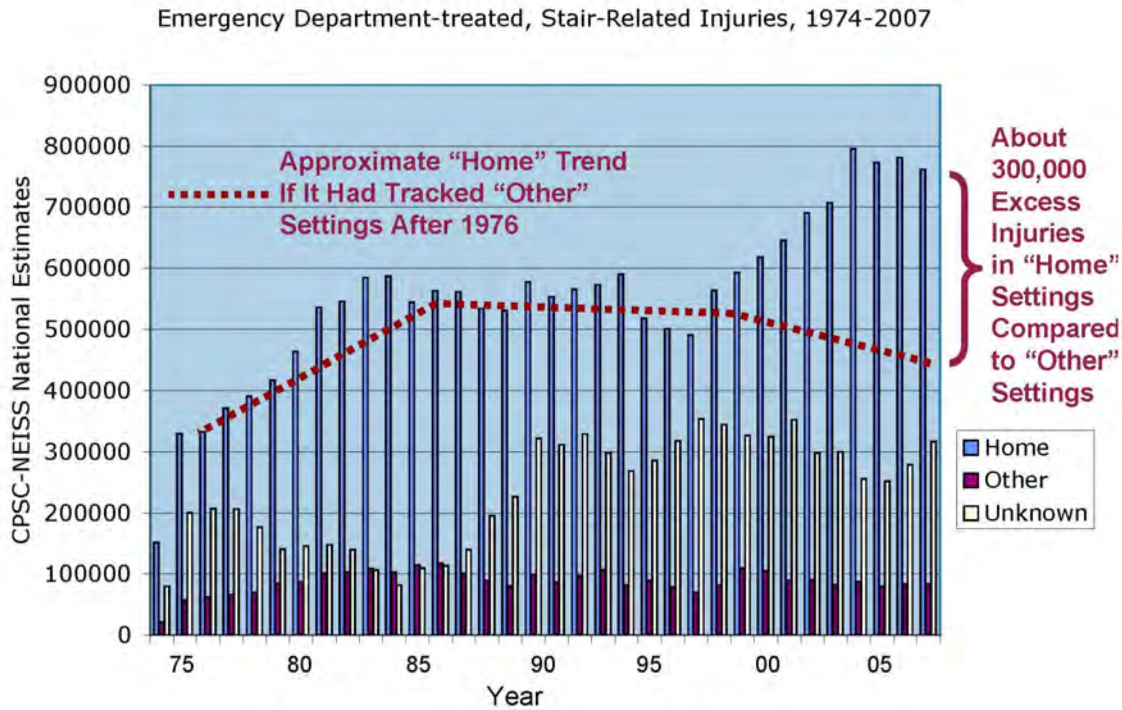


Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years.

A far too common error in design and construction of stairways is the lack of attention to keeping all tread depths, especially the top one in a flight, uniform in size, particularly where projecting nosings are provided on a flight of stairs installed as a manufactured unit which does not include the top or landing nosing projection. Thus this is a dual issue of non-uniform tread depths and non-uniform nosing projections. ICC IRC guides for inspection and for the homebuilding industry (published by ICC in conjunction with NAHB) fail to even mention these two important IRC rules. These two ICC publications are listed in the Bibliography. Surely it is fairly strong evidence of a code inadequacy when even ICC experts apparently do not recognize the existence and importance of two rules governing the most potent of factors—step geometry uniformity—for the most dangerous product in homes and other buildings.

The resulting non-uniformities in tread depths, with a larger top tread followed by smaller treads in the flight make the stair flight orders of magnitude more dangerous for descent-direction users. This pervasive systemic defect has also become so concerning to leading stairway safety professionals such as myself that a special website page has been created simply to deal with this issue. See http://web.me.com/bldguse/Site/Stairways.html for information on this including the graph provided below as Figure 1 showing a large increase in the number of home stair-related injuries identified in the CPSC NEISS national estimates for the USA in the last several years. Excerpts of text from the Stairways website page are also quoted below as are excerpts from an American Society of Safety Engineers 2008 Professional Development Conference paper by Pauls and Harbuck. The full ASSE conference paper is freely accessible as a PDF download from the Downloads area of my website, http://web.me.com/bldguse/Site/Downloads.html. Generally, it is suspected that with recent greater use of manufactured stair flights, the incidence of systemic, top-of-flight non-uniformities has grown with resulting significant increases in home stair-related injuries.

On the Stairways website page, referenced above, is the following text and photograph (here identified as Figure 2) of a typical dwelling unit stairway with the systemic top-of-flight defect in nosing projection non-uniformity, the most common reason for the tread depth below the landing to be larger in size than the tread depths below it. Below Figure 2 is an additional photograph, Figure 3, showing what a stair flight looks like it very likely conforms to the uniformity requirements. The crouch-and-sight, visual test is helpful but is neither perfect nor quantitative; therefore, the stair geometry should be properly measured, at least at the top three steps, to confirm that there is not a rare coincidence of both larger tread depth and larger rise dimensions at the top step.

Figure 2. Typical Dwelling Unit Stairway with the Systemic, Top-of-Flight Defect.

Here follows the text from the website (http://web.me.com/bldguse/Site/Stairways.html) which has been publicly available since May 2009.

"While more investigation is required, it appears that a major reason for the recent 'excess' injuries related to home stairs might be a systemic defect on many home stairways (as well as some in other settings) in the USA and Canada. This defect is a non-uniformity of the nosing projection at the top of stair flights; due to the omission of a $10 nosing piece, at the landing level, at the time of stairway construction. This makes the top tread below the landing effectively larger than all the steps below it.

This common defect greatly increases the risk of an 'overstepping misstep' on the second or third step down the flight. Such missteps can lead to a very serious fall down the stair flight, with resulting injuries.

This is why we should now give our stairways 'a second look.' Specifically we should perform the simple 'crouch and sight' test. Do this from the landing above the stair flight you wish to check. Crouch down so you are able to see all the stair nosings (the leading edges) line up. If the top, landing nosing does not line up with all the other step nosings, your stair likely has the systemic defect. Here is a home stairway with the systemic defect."

The "Stairways" page of the website goes on to provide advice specifically for homeowners who perform the "crouch and sight" test and discover that their stairway has the systemic, top-of-flight defect.

"If your home stairway has this defect—which results from the non-uniformities of nosing projections and of what are called 'tread depth' or 'run' dimensions—and your home was recently constructed, call your local building inspection authorities and request that the stairway be re-inspected for building code compliance. Both the non-uniform nosing projection and the non-uniform tread depth or run are building code violations, for example under widely used codes in the USA.

If there has been a fall and significant injury on the non-uniform stair flight, you might also want to confer with an attorney (experienced in dealing with stair-related injury cases), especially if the home was recently constructed.

Much more information on this (and other) safety problems with stairways is found in the downloadable files associated with this website. See especially the latest papers and presentations by Jake Pauls on home stairways in the two most recently posted folders.

- Home Stairway Safety and Codes (Posted February 2009)
- Presentations at MUTN Conference in BC, Canada, April 2009

Also, in early summer 2009, watch this website for an announcement of the availability of an educational DVD package, based on the one-day workshop at the MUTN Conference in BC, Canada, in April 2009. (Contact Jake Pauls for purchase information.)"

Figure 3. Dwelling Unit Stair Very Likely Not Having the Systemic, Top-of-Flight Defect.

Any ICC chapter wishing to have their members participate in a one-day workshop (also slated for presentation in Eastern Canada on September 14, 2009) should contact Jake Pauls. It is available in a not-for-profit form. Code authorities should be prepared to deal knowledgeably with consumers who, upon discovering the systemic defect in their homes (after performing their own "crouch-and-sight" test), contact their local building department and ask for a re-inspection of their home stairways. If there has been an injurious fall on such a stairway they should also be prepared to deal with resulting legal actions that might name the local building department as a third party defendant. They should know how to perform the measurements of the stair step geometry that are of a quality expected in such litigation actions. These measurement techniques, usually requiring use of a spirit level or electronic level, are all described in the workshop materials posted on the above-mentioned website Downloads area and on the DVD of the Spring 2009 workshop noted above. These measurement techniques are consistent with the ICC requirements both as currently stated and as further clarified if this proposal is accepted.

In order to begin stopping all future misinterpretations of the IRC requirements for tread depth uniformity—and thus preventing many predictable and preventable missteps and falls (NOT "accidents" which are defined in the public health field as unpredictable and unpreventable events)—it is hoped that all code enforcement authorities heed very carefully the current and clarified requirements in IBC 109.4.5 (and1009.4.2) as well as R311.7.4.2 (and R311.7.4.3).

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ICC (2007). Residential Inspector's Guide Based on the 2006 IRC, Chapters 1-11. International Code Council, Washington, DC., ISBN 978-1-58001-568-4.

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Lawrence, B.A. et al. (1999). Estimating the costs of nonfatal consumer product injuries in the United States. *Proceedings of 7th International Conference on Product Safety Research*, September 30 - October 1, 1999, Washington, DC, pp. 97-113. Also, *Injury Control & Safety Promotion*, Vol. 7, No. 2, pp. 97-113.

Pauls, J. and Harbuck, S. (2008). Ergonomics-based Methods of Inspecting, Assessing and Documenting Environmental Sites of Injurious Falls Resulting from Missteps on Small Elevation Differences, Slopes and Steps. *Proceedings of the American Society of Safety Engineers Professional Development Conference & Exposition*, Las Vegas, NV, 2008. (Downloadable as file, "Pauls-Harbuck-ASSE-paper.pdf," from folder, "Home Stairway Safety and Codes," accessible from the Downloads area of http://web.me.com/bldguse/Site/Downloads.html.)

Cost Impact: The code change proposal will not increase the cost of construction as there is no technical change proposed. (The nosing piece required to comply with both the current code and the code as clarified by this proposal costs about $10 per home stair flight in terms of material, in oak, at retail level.)

ICCFILENAME: PAULS-E1-1009.4.5.1

Public Hearing Results

PART I IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Committee Reason: By breaking the current text into smaller sections the proposal clarifies the requirements for stair nosings and risers.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufactures' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.4.5 (IFC [B] 1009.4.5) Nosing and Riser ~~Profile~~ Cross Section. The ~~radius of~~ curvature or beveling of the nosing ~~at the leading edge of the tread shall be not greater than 9/16 inch (14.3 mm). Beveling of nosings~~ shall not exceed 9/16 inch (14.3 mm) from the leading edge. Risers shall be solid and vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.52 rad) from the vertical.

Exceptions:

1. Solid risers are not required for stairways that are not required to comply with Section 1007.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.
3. Solid risers are not required for spiral stairways constructed in accordance with Section 1009.9.
4. Solid risers are not required for alternating tread devices constructed in accordance with Section 1009.10.

1009.4.5.1 (IFC [B] 1009.4.5.1) Nosing Projection Size. The leading edge (nosings) of treads shall project not more than 1 ¼ inches (32 mm) beyond the tread below.

1009.4.5.2 (IFC [B] 1009.4.5.2) Nosing Projection Uniformity. All nosing projections of the leading edges shall be of uniform size, including the projections of the nosings leading edge of the floor at the top of a flight.

~~**1009.4.5.3 (IFC [B] 1009.4.5.3) Solid Risers.** Risers shall be solid.~~

~~**Exceptions:**~~

1. ~~Solid risers are not required for stairways that are not required to comply with Section 1007.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~
2. ~~Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.~~
3. ~~Solid risers are not required for spiral stairways constructed in accordance with Section 1009.9.~~
4. ~~Solid risers are not required for alternating tread devices constructed in accordance with Section 1009.10.~~

Commenter's Reason:
1. This modification to Part I changes the section title to use a term more appropriate to the content and technical language used in the code and by those persons and industries using the code.
2. The radius of the curvature has no effect on stair safety provided the point at which the curvature begins on the walking surfaces can be controlled. Please see the illustrated use of larger radii to provide a rounded nosing that is actually less intrusive on the walking surface of the tread. The control for beveling and curvature can in fact be one in the same there by simplifying the text. (See Figures 1 - 3 below)
3. There is no need to establish another section to regulate the properties of risers. An additional section will only cause confusion and misinterpretation. The solidity of the riser is a property of its cross section. Cross section is aptly part of the section title proposed. For this reason all related text and exceptions have been moved back into section 1009.4.5 where they should remain.
4. No comment is offered for E75 Part II because we support the IRC committee's reasons for disapproval of E75 Part II and approval as modified of RB46.

The Figures below show that larger radii can be safely allowed by regulating the extent of the curvature in the same way beveling is regulated.

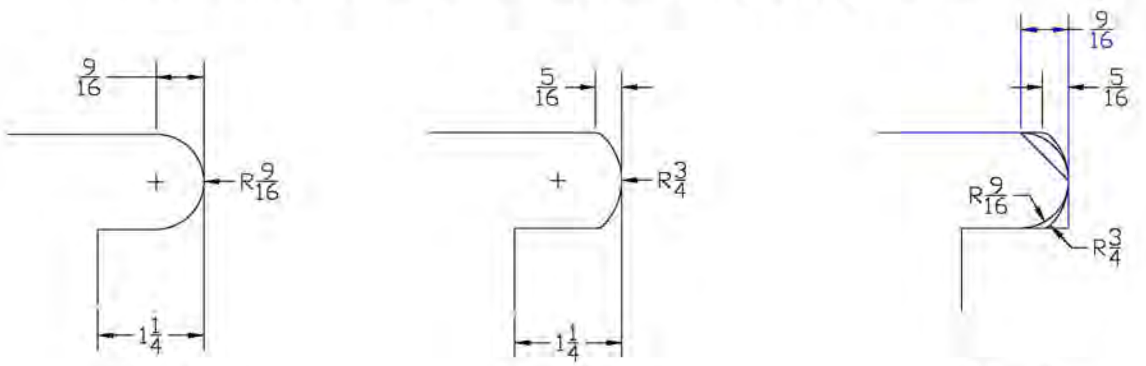


Figure 1 **Figure 2** **Figure 3**

Figure 1 illustrates the maximum radius at the nosing regulated by the current radius dimension

Figure 2 illustrates an alternate curvature or rounding using a radius larger than allowed.

Figure 3 illustrates the maximum beveling in blue in a composite with the nosings of figure 2 and 3.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY- SEE ABOVE

E75-09/10, PART II – IRC

IRC R311.7.4.3, R311.7.4.3.1 (New), R311.7.4.3.2 (New), R311.7.4.3.3 (New)

PART II – IRC BUILDING/ENERGY

Revise as follows:

R311.7.4.3 Nosing and Riser Profile. The radius of curvature at the nosing shall be no greater than $^{9}/_{16}$ inch (14 mm). ~~A nosing not less than ¾ inch (19 mm) but not more than 1 ¼ inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than $^{3}/_{8}$ inch (9.5 mm) between two stories, including the nosing at the level of floors and landings.~~ Beveling of nosings shall not exceed ½ inch (12.7 mm). Risers shall be vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.51 rad) from the vertical. ~~Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.~~

~~**Exceptions:**~~

1. ~~A nosing is not required where the tread depth is a minimum of 11 inches (279 mm).~~
2. ~~The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.~~

R311.7.4.3.1 Nosing Projection Size. A nosing projection of not less than ¾ inch (19 mm) but not more than 1 ¼ inches (32 mm) shall be provided on stairways with solid risers.

Exception: A nosing projection is not required where the tread depth is a minimum of 11 inches (279 mm).

R311.7.4.3.2 Nosing Projection Uniformity. The greatest nosing projection shall not exceed the smallest nosing projection by more than $^{3}/_{8}$ inch (9.5 mm) within each flight of stairs, including the nosing at the level of floors and landings.

R311.7.4.3.3 Open Risers. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch

<u>diameter (102 mm) sphere.</u>

<u>Exception:</u> <u>The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less</u>.

Reason: See Part I-E75-09/10

Cost Impact: See Part I-E75-09/10

PART II- IRC B/E
Committee Action: **Disapproved**

Committee Reason: The committee feels the code already addresses this and it is an enforcement and education issue. There is a concern about correlation of this with the previous action on RB46-09/10. The committee suggests both parties work together and bring this back later.

Assembly Action: **None**

E77-09/10
1009.5 (IFC [B] 1009.5)

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise text as follows:

1009.5 (IFC [B] 1009.5) Stairway Landings. There shall be a floor or landing at the top and bottom of each stairway. The width of landings shall not be less than the width of stairways they serve. Every landing shall have a minimum dimension measured in the direction of travel equal to the width of the stairway. Such dimension need not exceed 48 inches (1219 mm) where the stairway has a straight run <u>or where a curved stairway has a continuous radius</u>. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing. When wheelchair spaces are required on the stairway landing in accordance with Section 1007.6.1, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

Exception: Aisle stairs complying with Section 1028.

Reason: There are many curved or radius stairways that exceed the minimum required egress width. In those cases, to require the length of the landing in the direction of travel to be equal to the width of the stair is impractical and takes up valuable floor space. Per Section 1005.1, egress width must be maintained to the termination of the means of egress so changes in direction of the stair will not be allowed to be less than the width of the stair.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KRANZ-E3-1009.5.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The term “continuous radius” is not clear and will lead to inconsistent interpretations.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.5 (IFC [B] 1009.5) Stairway Landings. There shall be a floor or landing at the top and bottom of each stairway. The width of landings shall not be less than the width of stairways they serve. Every landing shall have a minimum dimension measured in the direction of travel equal to the width of the stairway. Such dimension need not exceed 48 inches (1219 mm) where the stairway has a straight run~~ or where a curved stairway has a continuous radius~~. Where a curved stairway consists of flights connected by a landing of equal or larger radius in a continuous run rotating in the same direction the minimum dimension need not exceed 48 inches (1219 mm). Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing. When wheelchair spaces are required on the stairway landing in accordance with Section 1007.6.1, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

Exception: Aisle stairs complying with Section 1028.

Commenter's Reason: This modification clarifies the original proponent's intent to provide for intermediate landings of reasonable size in curved stairways where changes in the direction of the user are controlled by the design of a consistent path of travel and thereby also addresses the committees concerns.

Final Action: AS AM AMPC____ D

E85-09/10
1009.13 (IFC [B] 1009.13)

Proposed Change as Submitted

Proponent: David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects

Revise as follows:

1009.13 (IFC [B] 1009.13) Stairway to roof. In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope). In buildings four stories or more above grade plane, without an occupied roof, access to the roof from the top story shall be permitted to be by an alternating tread device or ladder.

Reason: The second sentence in Section 1009.13 isn't clear as to what it applies to; buildings four or more stories above grade plane, buildings of any height, or any building without an occupied roof? The proposed amendment clarifies the criteria to apply to buildings four stories above grade plane and having an unoccupied roof.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Collins-E4-1009.13

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: While ladder access may be a viable alternative for roof access, requirements for what type of ladder would be permitted are needed (i.e., fixed).

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.13 (IFC [B] 1009.13) Stairway to roof. In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope). In buildings four stories or more above grade plane, without an occupied roof, access to the roof from the top story shall be permitted to be by an alternating tread device or ship ladder.

Commenter's Reason: The modification addresses the committee's concern in define what type of ladder. Ship ladders are regulated by Section 1009.11 Ship ladders.

Final Action: AS AM AMPC____ D

E86-09/10
1009.13 (IFC [B] 1009.13)

Proposed Change as Submitted

Proponent: J. Nigel Ellis, Ph.D., PE, Ellis Fall Safety Solutions, LLC

Revise as follows:

1009.13 (IFC [B] 1009.13) Stairway to roof. In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope). In buildings without an occupied roof, access to the roof from the top story shall be permitted to be by an alternating tread device. <u>Hatch openings shall be provided with a means to facilitate access and exit such as ladder grab bars that can be grasped by the climber. Ladder grab bars shall be elevated above the roof and horizontally arranged in a uniform manner.</u>

Reason: The code is presently silent on roof hatch fall hazards.

To avoid necessity for crouching to stabilize balance before entering the roof hatch or to reduce the incidence of tripping on the curb before descending, he externally mounted grab bars can be reached without stooping to permit access or bodily turn around with reduced falling hazard; such fall hazard can be up to 30 ft. in some mental buildings with highly injurious or fatal consequences.

The requirement would also apply to fixed ladder roof hatch access where exemptions to the IBC Code are permitted.

ANSI A14.3 – 2008 Section 5.3.4.3 states the following: "5.3.4.3 Hatch opening shall be provided with a means to facilitate access and exit from a fixed ladder (i.e, grab bars or other such items that can be grasped by the climber."

The University of Michigan Biomechanics Laboratory research report 4/08 financed by NIOSH (awarded by The Center to Protect Worker' Rights) supports the selection of effective horizontal grab bars over ineffective vertical grab bars. NIOSH/CDC is the National Institute of Occupational Safety & Health/Center for Disease Control.

A picture of ladder grab bars for roof hatch access is attached for a commercial building roof hatch. Ladder grab bars have been recognized for decades in industry by OSHA and ANSI known simply as "grab bars". Since 1971, OSHA 1910.27(b)(5) and (d)(4) only has "grab bars" in mind for fixed ladders which are typically 12 inches long, one inch diameter, bolted or welded at each end and 1.5-4" space to grab where a fixed ladder is used. I am proposing that these ladder grab bars only be placed horizontally. Side rails are always vertically arranged which when grasped is a hazard when you fall more than approx. six inches because the hand slides as shown in the University of Michigan ladder report which I submitted electronically to ICC with the file name UM_CPWR_Final1.pdf and can be viewed on the FallSafety.com website under Ladder Improvements. CPWR (Center for Protection of Worker Rights) dispenses NIOSH grants for research. Another reference is the US Corps of Engineers EM385-1-1 (2003) (mandatory) Appendix Fixed Ladder and Stairs J3(h) "Openings shall be provided with elevated horizontal grab bars to facilitate access and exit from upper levels", J4(d) Horizontal grab bars shall be provided to facilitate grip in case of a fall".

I also understand the use of the term "grab bar" since 1990 approx. for bathroom safety rails in the building code and to which no reference is made in this proposal.

ANSI (American National Standards Institute) has used the term "grab bars" for ladder holding stability (when rungs and side rails were not available) since 1956 in the A14.3 fixed ladder standard, as defined in section 2 as follows:
"2.14 Grab Bars are individual handholds placed adjacent to or as an extension above ladders for the purpose of providing access beyond the limits of the ladder"

Fixed ladder grab bars are addressed in <u>proposed</u> OSHA standard 1910.23(c)(21), and alternating tread type stairs are addressed in ANSI A1264.1-2007 section 6 and also <u>proposed</u> OSHA Standard 1910.25(f) and Fig. D3 (4 10 90). OSHA/DOL is the Occupational Safety & Health Administration/Department of Labor.

Horizontal grab bars can be attached by bolting or welding to protective guardrails arranged around roof openings for access to and from alternating tread devices and fixed ladders. More information on www.FallSafety.com Ladder Improvements related to ladder horizontal grab bars.


Cost Impact: Roof Hatch grab bars permanently installed approximately $320 cost and four bolt holes to drill for installation. Where guardrails are added around the roof hatch, the total system costs approximately $1300 before installation.

ICCFILENAME:Ellis-E1-1009.12

Public Hearing Results

Committee Action: Disapproved

Committee Reason: While this safety issue for hatch access on a roof should be addressed, for consistent enforcement additional information is needed for height and attachment of the handholds. Perhaps this would be better located in the International Mechanical Code of International Plumbing Code since this deals with unoccupied roofs.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

J. Nigel Ellis, Ph.D., PE, representing Ellis Fall Safety Solutions, LLC, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

<u>**1009.13.3 Roof hatch grab bars.** Roof hatch openings shall be provided with a means to facilitate access and exit such as grab bars that can be grasped by the climber. Grab bars shall be one inch in diameter and elevated up to 3.5 feet above the roof and horizontally arranged in a uniform manner passed which the access is made.</u>

Commenter's Reason: The code is presently silent on roof hatch fall hazards. Roof maintenance by the owner is anticipated along with periodic contractor visits accompanied by the owner's escort over the life of the building making the IBC the correct location for the wording.

To avoid necessity for crouching to stabilize balance before entering the roof hatch or to reduce the incidence of tripping on the curb before descending, the externally mounted elevated grab bars can be reached and held firmly, without the present curb nipping hazard, to grasp and permit stepping access and/or bodily turn-around with reduced falling hazard; such fall hazard can be up to 30 ft. in some buildings with highly injurious or fatal consequences. Alternatively, grab bars may be part of a hatch opening guard system bolted to the curb.

The requirement would also apply to fixed ladder roof hatch access and where exemptions to the IBC Code are permitted.

ANSI A14.3 – 2008 Section 5.3.4.3 states the following: "5.3.4.3 Hatch opening shall be provided with a means to facilitate access and exit from a fixed ladder i.e. grab bars or other such items that can be grasped by the climber".

Horizontal Grab Bars: A peer-reviewed article in Human Factors & Ergonomics Journal published October 2009 entitled "Hand-Handhold Coupling: Effect of Handle Shape, Orientation and Friction on Breakaway Strength" can be viewed on www.FallSafety.com "Ladder Improvements" showing the ineffective use of vertical grab bars in controlling a fall, and the successful use of horizontal grab bars during a free fall.

Two pictures of alternative horizontal grab bars for roof hatch access are attached for a commercial building roof hatch. Ladder grab bars have been recognized for decades in industry by OSHA and ANSI known simply as "grab bars". Since 1971, OSHA 1910.27(b)(5) and (d)(4) only has "grab bars" in mind for fixed ladders which are typically 12 inches long, ¾" - one inch diameter, bolted or welded at each end and 1.5-4" space to grab where a fixed ladder is used. I am proposing that these ladder grab bars only be placed horizontally above each other spaced one foot apart as is found on a ladder. Side rails are always vertically arranged which when grasped is a hazard when you fall more than approx. six inches because the hand slides as shown in the University of Michigan ladder report UM_CPWR_Final1.pdf. CPWR (Center for Protection of Worker Rights) dispenses NIOSH grants for research. Another reference is the US Corps of Engineers EM385-1-1 (2003) (mandatory) Appendix Fixed Ladder and

Stairs J3(h) “Openings shall be provided with elevated horizontal grab bars to facilitate access and exit from upper levels”, J4(d) Horizontal grab bars shall be provided to facilitate grip in case of a fall”.

I also understand the use of the term “grab bar” since 1990 approx. for bathroom safety rails in the building code and to which no reference is made in this proposal.

ANSI (American National Standards Institute) has used the term “grab bars” for ladder holding stability (when rungs and side rails were not available) since 1956 in the A14.3 fixed ladder standard, as defined in section 2 as follows: "2.14 Grab Bars are individual handholds placed adjacent to or as an extension above ladders for the purpose of providing access beyond the limits of the ladder", and “6.3 shall extend at least 3ft 6 inches above the access/egress level” and “6.4 Grab Bar diameters shall be the equivalent of ladder round-rung diameters”

Fixed ladder grab bars are addressed in proposed OSHA standard 1910.23(c)(21), and alternating tread type stairs are addressed in ANSI A1264.1-2007 section 6 and also proposed OSHA Standard 1910.25(f) and Fig. D3 (4 10 90). OSHA/DOL is the Occupational Safety & Health Administration/Department of Labor.

Horizontal grab bars can be part of protective guardrails arranged around the roof opening for access to and from the alternating tread device or fixed ladder. See examples below.


Final Action: AS AM AMPC____ D

E87-09/10
1010.1 (IFC [B] 1010.1)

Proposed Change as Submitted

Proponent: Jon Siu, City of Seattle, representing Washington Association of Building Officials Technical Code Development Committee

Revise as follows:

1010.1 (IFC [B] 1010.1) Scope. The provisions of this section shall apply to ramps used as a component of a means of egress.

Exceptions:

1. Other than ramps that are part of the accessible routes providing access in accordance with Sections 1108.2 through 1108.2.4 and 1108.2.6, ramped aisles within assembly rooms or spaces shall conform with the provisions in Section 1028.11.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian exit access shall not be required to comply with Sections 1010.3 through 1010.9 when they are not an accessible route serving accessible parking spaces~~,~~ or other required accessible elements ~~or part of an accessible means of egress~~.
4. In a parking garage where one accessible means of egress serving accessible parking spaces or other accessible elements is provided, a second accessible means of egress serving that area shall be permitted to include a vehicle ramp that does not comply with Sections 1010.4 through 1010.8.

Reason: This proposal solves a practical problem with current code language. In parking garages where parking is provided on the ramps, the accessible parking spaces are usually located on flat areas at the ends of the ramps. One accessible means of egress can usually be easily provided on the flat portion of the garage ramp. However, many times the second required means of egress is provided at the other end or at the center of the garage, and is accessed via the vehicle ramp. While the ramp may be able to provide the correct slope to provide the second accessible means of egress from the accessible parking spaces (1 vertical in 12 horizontal), it is impractical in these types of garages to provide features such as handrails on both sides of the ramp, or to provide a landing for every 30 inches of rise.

The proposed text is modeled on Section 1010.1 exception 3, which allows the deletion of the some provisions for vehicle ramps used as exit access for pedestrians. However, because the ramp still needs to be used as an accessible means of egress, it is necessary to maintain a usable cross-slope (Section 1010.3). In addition, protection at the edges of the ramp should still be provided where the accessible means of egress is along the edge of the vehicle ramp (Section 1010.9). On the other hand, if the accessible means of egress is not near the edge of the vehicle ramp (the most likely scenario), Section 1010.9, Exception 1 can be used to eliminate the edge protection, since the requirement for 1:10 sloped “flares” will easily be met.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: SIU-E1-1010.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is a design issue for the accessible level. There are concerns for the cross slope and lack of landings for an accessible means of egress route.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler representing City of Seattle Dept. of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1010.1 (IFC [B] 1010.1) Scope. The provisions of this section shall apply to ramps used as a component of a means of egress.

Exceptions:

1. Other than ramps that are part of the accessible routes providing access in accordance with Sections 1108.2 through 1108.2.4 and 1108.2.6, ramped aisles within assembly rooms or spaces shall conform with the provisions in Section 1028.11.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian exit access shall not be required to comply with Sections 1010.3 through 1010.9 when they are not an accessible route serving accessible parking spaces, or other required accessible elements.
4. In a parking garage where one accessible means of egress serving accessible parking spaces or other accessible elements is provided, a second accessible means of egress serving that area shall be permitted to include a vehicle ramp that does not comply with Sections 1010.4, 1010.5, ~~through~~ and 1010.8.

Commenter's Reason: The original proposal was submitted to solve a practical problem with parking garages where parking is provided on the ramps. The accessible parking spaces are usually located on flat areas at the ends of the ramps, so that one accessible means of egress can usually be easily provided on the flat portion of the garage ramp. The problem is that many times the second required means of egress must be accessed via the vehicle ramp. It is often impractical in these types of garages to provide features such as handrails on both sides of the ramp.

The Code Development Committee disapproved the proposal due to concerns for the cross slope and lack of landings for an accessible means of egress route. To address that concern, the proposal is modified to eliminate only the requirements related to vertical rise between landings and handrails. The revised proposal requires landings wherever there is a change in direction on the ramp because Section 1010.6 is not part of the exception.

Final Action: AS AM AMPC____ D

E90-09/10
1011.2 (New) [IFC [B] 1011.2 (New)]

Proposed Change as Submitted

Proponent: Donald LeBrun, CBO, State of Indiana, Fire & Building Safety, representing Indiana Association of Building Officials

Add new text as follows:

1011.2 (IFC [B] 1011.2) Location. When exit signs are mounted on the same vertical plane as the exit or exit-access door served the sign shall be centered above the door with the bottom of the sign no more than 12 inches (305 mm) above the door leaf. Other exit signs used to direct persons to the exit or exit-access door shall be no higher than 10 feet (3.05 m) above the finish floor.

(Renumber subsequent sections)

Reason: Currently we have no direction as to where exit signs should be located. With the higher ceilings being used in more structures we are finding exit signs being mounted well above the exit served, sometimes as much as 25 feet above the door. In an emergency situation people will seek exiting information at their eye level and never see the exit sign 20 feet above their heads. Mounting exit signs at the proposed levels would greatly increase the visibility and effectiveness of the exit signs.

Cost Impact: This proposal will not increase the cost of construction

ICCFILENAME:Lebrun-E1-1011.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This would be a conflict in industrial facilities where high ceilings are needed to move equipment or to signs are located high in order to see them over obstructions. The proponent may choose to narrow this down to certain occupancies where high ceilings are found but clearances are needed (i.e., restaurants).

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

George Kellogg, Rocklin, CA, representing Sacramento Valley Association of Building Officials, requests Approval as Submitted.

Commenter's Reason: This proposal does not appear to conflict with high ceilings in industrial facilities as they can be suspended from the ceiling, mounted on the wall above the door or near the floor. The proposal is needed in large commercial and assembly properties where display walls can cause exiting confusion, making the exits difficult to identify. With clearer exit signage, life/safety can be improved in large and confusing occupancies.

Public Comment 2:

Donald LeBrun, Indianapolis, IN, representing Indiana Association of Building Officials, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1011.2 (IFC [B] 1011.2) Location in Groups A, B, E, I, M and R. In Groups A, B, E, I, M and R, when exit signs are mounted on the same vertical plane as the exit or exit-access door served the sign shall be centered above the door with the bottom of the sign no more than 12 inches (305 mm) above the door leaf. Other exit signs used to direct persons to the exit or exit-access door shall be no higher than 10 feet (3.05 m) above the finish floor.

Commenter's Reason: This proposal does not appear to conflict with high ceilings in industrial facilities as they can be suspended from the ceiling, mounted on the wall above the door or near the floor. The proposal is needed in large commercial and assembly properties where display walls can cause exiting confusion, making the exits difficult to identify. With clearer exit signage, life/safety can be improved in large and confusing occupancies.

Final Action: AS AM AMPC____ D

E91-09/10
1011.2 (New) [IFC [B] 1011.2 (New)]

Proposed Change as Submitted

Proponent: Donald LeBrun, CBO, State of Indiana, Fire & Building Safety, representing Indiana Association of Building Officials

Add new text as follows:

1011.2 (IFC [B] 1022.1) Floor-level exit signs in Group R-1. Where exit signs are required by Section 1011.1, additional low-level exit signs shall be provided in all corridors serving guest rooms in Group R-1 occupancies.

The bottom of such sign shall be not less than 6 inches (152mm) nor more than 8 inches (203mm) above the floor level. For exit and exit-access doors, the sign shall be on the door or adjacent to the door with the closest edge of the sign within 4 inches (102 mm) of the door frame.

(Renumber subsequent sections)

Reason: This proposal is specifically intended for use group R-1 occupancies where the occupants are transient and not familiar with their surroundings. The current practice of installing exit signs above the heads of most people works well except in a smoke filled space which often accompanies a fire situation. As the space fills with smoke the effectiveness of the high level exit signage diminishes forcing evacuees to crawl on the floor to reach the nearest exit. The installation of these low level will greatly assist these persons in safely exiting the structure.

Cost Impact: This proposal will increase the cost of construction

ICCFILENAME:Lebrun-E2-1011.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Technical justification was not provided to indicate how these floor exit signs would assist exiting in Hotels. If there is smoke in the corridor, the proper approach in a hotel room is to close the door and wait for assisted rescue, not to crawl to the exit or try and make it past the fire. The geometry indicating locations may be a conflict with other parts of the codes (i.e., minimum bottom rails on accessible door). There needs to be UL requirements for these signs. If this is an issue for hotels, it should include Group R-2 transient as well as Group R-1.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Donald LeBrun, Indianapolis, IN, representing the Indiana Association of Building Officials, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1011.2 (IFC [B] 1022.1) Floor-level exit signs in Group R-1. Where exit signs are required in Group R-1 by Section 1011.1, additional low-level exit signs shall be provided in all ~~corridors~~ areas serving guest rooms in Group R-1 occupancies and shall comply with Section 1011.4.

The bottom of the ~~such~~ sign shall be not less than ~~6~~ 10 inches (~~152~~ 254 mm) nor more than ~~8~~ 12 inches (~~203~~ 305 mm) above the floor level. The sign shall be flush mounted to the door or wall. When mounted on the wall, the edge of the sign shall be within 4 inches (102 mm) of the door frame on the latch side. ~~For exit and exit-access doors, the sign shall be on the door or adjacent to the door with the closest edge of the sign within 4 inches (102 mm) of the door frame.~~

Commenter's Reason: The Means of Egress Committee voiced four comments to the original proposal:

1. That the transient uses in Group R-2 should be included in this proposal.
2. That the proposed mounting heights may allow damage to the signs from wheelchairs.
3. That hotel room occupants should stay in their rooms and await rescue.
4. That a standard needed to be brought forward for these signs.

This proposal was specifically intended for Group R-1 occupancies where the occupants are transient and not familiar with their surroundings. As there are no transient uses in Group R-2, we have not added that group to this proposal. While we agree that the Group R-2 should be included, it is not for the committee's reason and feel that staying with the Group R-1 is more appropriate at this time.

The mounting heights prescribed in this proposal have been increased slightly to take into account the heights of kick plates as well as wheelchair foot rests and push bars.

The statement by the committee is that people should stay in their rooms and await rescue is well and good in theory. However, it does not serve to model real life. The first thing people try to do in a fire situation is to get out of the building. Over the years, thousands have died from smoke inhalation while attempting to flee the burning building.

A reference to Underwriters Laboratory Standard UL 924, Standard for Emergency Lighting and Power Equipment, has been added by the reference to Section 1011.4. This standard is already reference in Section 1011.4 and is included in Chapter 35. This is similar to the language for low level exit signs in special amusement buildings in Section 411.7.

The current practice of installing exit signs above the door frames works well except in the smoke filled spaces which occur in a fire situation. The effectiveness of these high level signs is lost when the smoke layer develops at the ceiling. As the space fills with smoke the evacuees are forced to crawl on the floor to reach the nearest exit. They will be confronted with many doors, all looking the same and will not know which is really the exit door. The installation of these low level exit signs will greatly assist these persons in safely exiting the building.

Additionally, these low level exit signs will serve to increase firefighter safety while on the fire scene. In their efforts to evacuate the occupants the firefighters will be in that smoke filled hallway. They may also become dependent upon this low level signage while trying to locate the doors to the stair tower and safely egress the fire floor.

Final Action: AS AM AMPC____ D

E95-09/10
1012.2 (IFC [B] 1012.2)

<u>Proposed Change as Submitted</u>

Proponent: Kenneth F. Traugott, NVR, Inc, representing self

Revise as follows:

1012.2 (IFC [B] 1012.2) Height. Handrail height, measured above stair tread nosings, or finish surface of ramp slope shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). Handrail height of alternating tread devices and ship ladders, measured above tread nosings, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

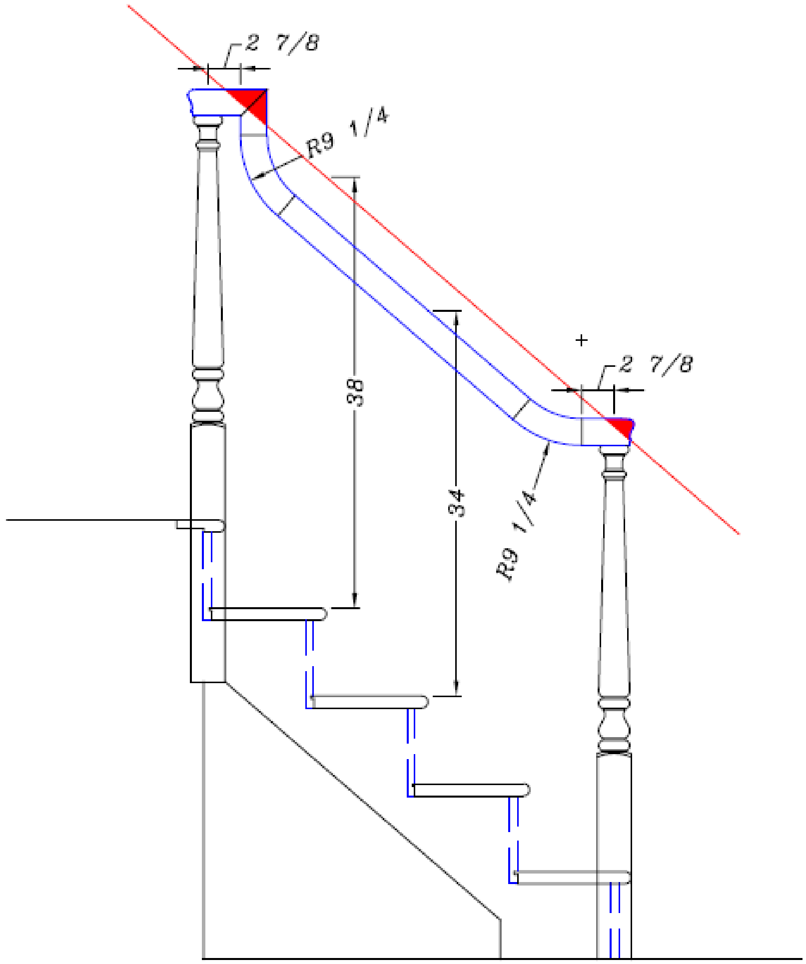
> <u>**Exception:** In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual dwelling units in Group R-2 occupancies; when handrail fittings or bendings are used to provide continuous transition between flights, transition at winder treads, transition from handrail to guard, or when used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.</u>

Reason: The above information is being requested to clarify the Code. Fittings such as easings and gooseneck risers are commonly used features intended to provide rail continuity at locations where a straight transition is not possible. Incorporating such features is consistent with the provisions of IBC Section 1012.4 (Continuity) and with standard architectural and construction practice.

The intent of the Code is that the provisions of Section 1012.3 be applied only over the stair run, and not at landings. The handrail height requirements are applicable over the stairway run, not at landings. The height of the handrail, when it doglegs or u-turns over a landing, will vary so that the handrail can remain continuous in accordance with Section 1012.4 and 1012.5. The handrail extensions at the end must also meet the protruding object provisions if they return to a support post (Section 1003.3.2 and 1012.5).

Unfortunately, the current wording of the Code, although it does indicate that height requirements should be "measured above stair tread nosings," does not clearly state that the height requirements do not apply over landings, at winder treads, where handrails meet a guardrail, or when used at the start of a flight. Inspectors, plan reviewers, and other building code officials in many jurisdictions are currently not accepting handrail fittings such as easings or gooseneck risers which are provided to maintain continuity.

This would be consistent with the provisions in the International Residential Code, Section R311.7.7.1, Exp. 2.



Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Lebrun-E2-1011.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Goosenecks portions of the handrails (as illustrated in the proponent's reason statement) can result in a vertical handhold on the railing which can be a safety issue for occupants using that portion of the handrail.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufacturers' Association, requests Approval as Submitted.

Commenter's Reason: The fittings and bendings noted in the exception are already permitted in Section 1012.4 Continuity. This new exception only applies to residential applications and is equivalent to the IRC in R311.7.7.1 Handrail height, thus providing for consistent interpretation of the codes. This exception allows the cost effective use of stock fittings as opposed to hand carving custom wreaths and or fabrication of custom bends. What the committee did not understand is this exception only applies when a continuous transition is made and provides an additional margin of safety than the alternative interruption of the rail by a newel at these same locations as specified in Section 1012.4 Continuity.

Final Action: AS AM AMPC____ D

E100-09/10, Part I
1002.1, 1013.2 (IFC [B] 1002.1, 1013.2)

Proposed Change as Submitted

PART I – IBC MEANS OF EGRESS

1. Add new definition as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

FIXED SEATING. Furniture or fixture designed and installed for the use of sitting and secured in place including bench-type seats and seats with or without back or arm rests.

2. Revise as follows:

1013.2 (IFC [B] 1013.2) Height. Required guards shall not be less than 42 inches (1067 mm) high, measured vertically ~~above the~~ as follows:

1. From the adjacent walking surfaces;
2. From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches of a required guard, the guard height shall provide a minimum 42 inches measured diagonally between the top of the guard and the nearest edge of the seat surface; ~~or~~
3. On stairs, from the line connecting the leading edges of the tread ~~treads~~ nosings; and
4. On ramps, from the ramp surface at the guard.

Exceptions:

1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the *guard* also serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
3. The guard height in front row assembly seating areas complying ~~shall be in accordance~~ with Section 1028.14.
4. Along *alternating tread devices* and ship ladders, *guards* whose top rail also serves as a *handrail*, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Climbable Guards". The scope of the activity is noted as:

The study of climbable guards will focus on determining the need for appropriate measures to prevent or inhibit an individual from utilizing the elements of a guard system, including rails, balusters and ornamental patterns, to climb the guard, thereby subjecting that person to the falling hazard which the guard system is intended to prevent.

The purposes of this proposal are to address several items raised last cycle during consideration of code change E85-07/08 which was approved. In particular, this proposal clarifies what constitutes "fixed seating" and proposes a horizontal distance between an object that reduces the "effective" height of a required guard rather than placing total reliance on the term "adjacent".

Definition: The definition of "fixed seating" provides for a common understanding where the term is used. This was a concern that was raised in Public Comment #2 to E85 which was not successful.

Item #2: The concern addressed in this revision is that of fixed seating, with or without arm rests and with or without back rests including bench seating located within 22" of the guard. This seating provides a potential standing surface which as a result reduces the effective height of the guard. For seating within 22" of the guard, the guard height is to be measured diagonally from the nearest edge of the seat to the top of the guard. This measurement method is currently utilized in Section 1028.14.3. The guard would be required to extend past the "last" seat in a row so that the guard top is 42" above the edge of the last seat.

The distance of 22" utilized in this exception has been determined by CTC to be a reasonable distance for the purpose described.

Item #3: The current text is modified to indicate that the line is to be between the tread nosings. In the case of a single riser, hence a single nosing, a minimum tread depth of 11 inches on the lower walking surface establishes the slope.

Item #4: The guard height at the edge of a ramp is to be measured at the guard without consideration for the ramp slope as the dimensional change in the guard height is relatively insignificant. With a ramp slope towards the guard of 1/12, the highest point 22" from the guard is 1.83 inches above the ramp surface at the guard. If the ramp slope is 1/8, at 22" from the guard, the ramp surface is 2.75 inches above the ramp surface at the guard.

IBC Exception **3:** The provisions for guard reduction for front row seating are primarily intended to accommodate the sight line for seated occupants- see section 1028.14.2. The seating within 22 inches of the guards elsewhere would necessitate an increase in the required guard height as indicated in **Item #2.**

ICCFILENAME:Heilstedt-E3-1013.2

Public Hearing Results

PART I IBC MEANS OF EGRESS
Committee Action: Disapproved

Committee Reason: In Section 1013.2, Item 2, there was no substantiation for the 22 inch separation between the fixed seating and the guard. The task force needs to work with experts in assembly seating. The front row concept does not address all the issues for the line of site in venues such as sports stadiums where the event is over the field and not a point.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC); Ed Roether, representing Populous (Formerly HOK Sport Venue Event) requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1013.2 (IFC [B] 1013.2) Height. Required guards shall not be less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces;
2. From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches <u>measured horizontally</u> of a required guard, the guard height shall provide a minimum 42 inches measured diagonally between the top of the guard and the nearest edge of the seat surface;
3. On stairs, from the line connecting the leading edges of the tread nosings; and
4. On ramps, from the ramp surface at the guard.

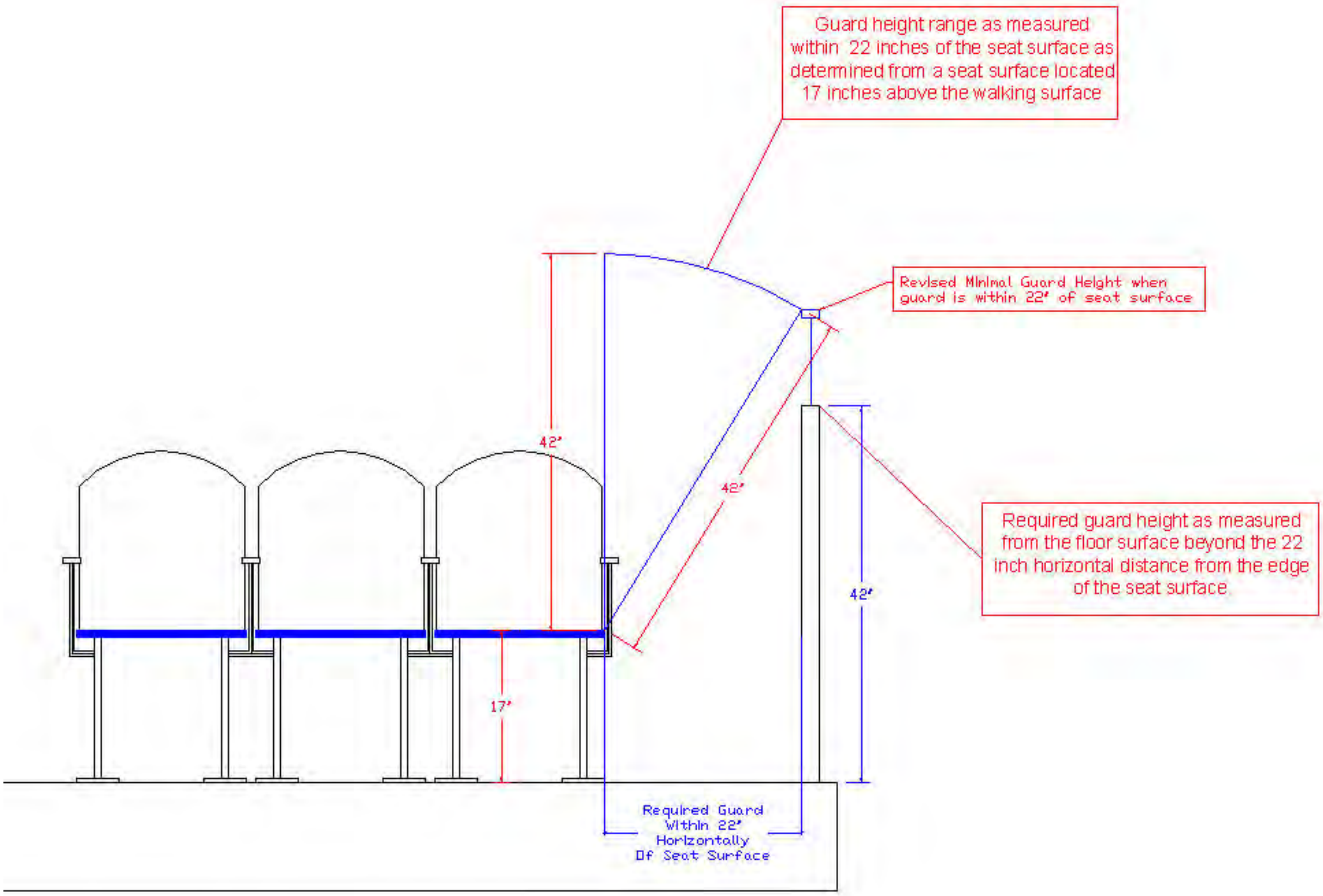
Exceptions:

1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the *guard* also serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
3. The guard height in ~~front row~~ assembly seating areas ~~complying~~ <u>shall comply</u> with Section 1028.14.
4. Along *alternating tread devices* and ship ladders, *guards* whose top rail also serves as a *handrail*, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

Commenter's Reason: As noted by the code committee, there was some confusion as to how to make the measurements as well as the need to coordinate these changes with experts in assembly seating. In response, the CTC has partnered with the proponent of code change E147 who is an expert in assembly seating. Further, the CTC provides the following illustrations which show the relationship between the height of the guard and its proximity to the seating surface. This comment should be considered with E147.

If the code change is approved, the illustrations is intended to be added to the IBC Commentaries. The following illustrates the applications of the code requirements:

Elevation view of individual seat configuration, IBC Section 1013.2, Item 2:



Public Comment 2:

Stephen Thomas, Colorado Code Consulting, LLC, representing Colorado Chapter ICC requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1013.2 (IFC [B] 1013.2) Height. Required guards shall not be less than 42 inches (1067 mm) high, measured vertically above the as follows:

1. From the adjacent walking surfaces;
~~2.~~ ~~From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches of a required guard, the guard height shall provide a minimum 42 inches measured diagonally between the top of the guard and the nearest edge of the seat surface or~~
~~3.~~ 2. On stairs, from the line connecting the leading edges of the tread nosings; and
~~4.~~ 3. On ramps, from the ramp surface at the guard.

Exceptions:

1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the *guard* also serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
3. The guard height in ~~front row~~ assembly seating areas complying shall be in accordance with Section 1028.14.
4. Along *alternating tread devices* and ship ladders, *guards* whose top rail also serves as a *handrail*, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

Commenter's Reason: When jurisdictions start adopting the 2009 edition and see the fixed seating requirement, they cringe at the enforcement issues surrounding the guard that would now be 5 feet tall in areas that the a bench or some type of seating surface is attached to the floor. Just because a seat is "fixed" doesn't mean that it is permanent. What happens when the seating is relocated later? Does the guard at the new location need to be increased to 60 inches above the floor? How will the guard at the old location look without the seating? This requirement is unenforceable.

The committees noted that the proposed language needs additional work for the assembly seating requirements. The current language in Section 1028 adequately covers the requirements for guards in assembly spaces. We do not need to revise those requirements. This comment deletes the restriction to the front row assembly seating and addresses all assembly seating in exception 3.

The addition of the fixed seating guards in the 2009 IBC was over restrictive. Whether a seating surface is fixed or movable, a child can still climb over the guard and fall. In fact, children can climb over guards when there is no seating adjacent to a guard. The code cannot be written to protect everyone. We must draw the line at some point and this requirement crossed that line.

Final Action: AS AM AMPC____ D

E100-09/10, Part II

IRC R202, R312.2

Proposed Change as Submitted

PART II – IRC BUILDING/ENERGY

1. Add new definition as follows:

SECTION R202
DEFINITIONS

FIXED SEATING. Furniture or fixture designed and installed for the use of sitting and secured in place including bench-type seats and seats with or without back or arm rests.

2. Revise as follows:

R312.2 Height. Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches high measured vertically ~~above the~~ as follows:

1. From the adjacent walking surface;
2. From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches of the required guard, the guard height shall provide a minimum 36 inches measured diagonally between the top of the guard and the nearest edge of the seat surface ~~or~~;
3. On stairs, from the line connecting the leading edges of the tread ~~treads~~ nosings; and
4. On ramps, from the ramp surface at the guard.

Exceptions:

1. Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Climbable Guards". The scope of the activity is noted as:

The study of climbable guards will focus on determining the need for appropriate measures to prevent or inhibit an individual from utilizing the elements of a guard system, including rails, balusters and ornamental patterns, to climb the guard, thereby subjecting that person to the falling hazard which the guard system is intended to prevent.

The purposes of this proposal are to address several items raised last cycle during consideration of code change E85-07/08 which was approved. In particular, this proposal clarifies what constitutes "fixed seating" and proposes a horizontal distance between an object that reduces the "effective" height of a required guard rather than placing total reliance on the term "adjacent".

Definition: The definition of "fixed seating" provides for a common understanding where the term is used. This was a concern that was raised in Public Comment #2 to E85 which was not successful.

Item #2: The concern addressed in this revision is that of fixed seating, with or without arm rests and with or without back rests including bench seating located within 22" of the guard. This seating provides a potential standing surface which as a result reduces the effective height of the guard. For seating within 22" of the guard, the guard height is to be measured diagonally from the nearest edge of the seat to the top of the guard. This measurement method is currently utilized in Section 1028.14.3. The guard would be required to extend past the "last" seat in a row so that the guard top is 42" above the edge of the last seat.

The distance of 22” utilized in this exception has been determined by CTC to be a reasonable distance for the purpose described.

Item #3: The current text is modified to indicate that the line is to be between the tread nosings. In the case of a single riser, hence a single nosing, a minimum tread depth of 11 inches on the lower walking surface establishes the slope.

Item #4: The guard height at the edge of a ramp is to be measured at the guard without consideration for the ramp slope as the dimensional change in the guard height is relatively insignificant. With a ramp slope towards the guard of 1/12, the highest point 22” from the guard is 1.83 inches above the ramp surface at the guard. If the ramp slope is 1/8, at 22” from the guard, the ramp surface is 2.75 inches above the ramp surface at the guard.

IBC Exception **3:** The provisions for guard reduction for front row seating are primarily intended to accommodate the sight line for seated occupants- see section 1028.14.2. The seating within 22 inches of the guards elsewhere would necessitate an increase in the required guard height as indicated in **Item #2.**

ICCFILENAME:Heilstedt-E3-1013.2

Public Hearing Results

PART II- IRC B/E

Committee Action: Disapproved

Committee Reason: The committee feels this does address the issue but it does not address it fully. It will create some gray areas that will require interpretation of what the code intends. This needs more work. The committee suggests the addition of figures would improve the clarity on the intent.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC); Ed Roether, representing Populous (Formerly HOK Sport Venue Event) requests Approval as Modified

Modify the proposal as follows:

R312.2 Height. Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches high measured vertically as follows:

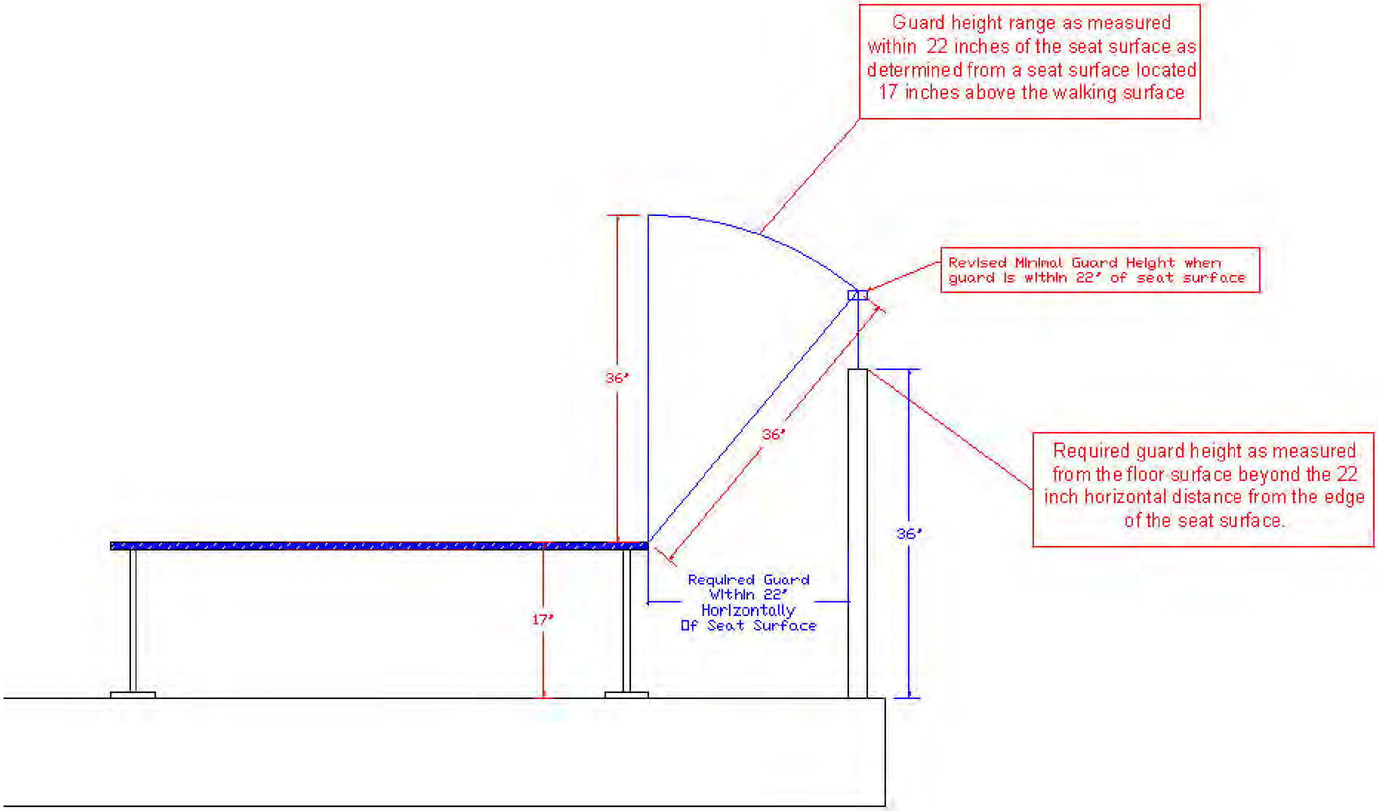
1. From the adjacent walking surface;
2. From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches <u>measured horizontally</u> of the required guard, the guard height shall provide a minimum 36 inches measured diagonally between the top of the guard and the nearest edge of the seat surface;
3. On stairs, from the line connecting the leading edges of the tread nosings; and
4. On ramps, from the ramp surface at the guard.

Exceptions:

1. Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Commenter’s Reason: As noted by the code committee, there was some confusion as to how to make the measurements as well as the need to coordinate these changes with experts in assembly seating for the IBC requirements. If the code change is approved, the illustrations is intended to be added to the IRC Commentaries. The following illustrates the applications of the code requirements:

Elevation view of bench seat configuration – IRC 312.2, Item 2:



Public Comment 2:

Stephen Thomas, Colorado Code Consulting, LLC, representing Colorado Chapter ICC requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R312.2 Height. Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches high measured vertically as follows:

1. From the adjacent walking surface;
~~2. From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches of the required guard, the guard height shall provide a minimum 36 inches measured diagonally between the top of the guard and the nearest edge of the seat surface;~~
2.~~3.~~ On stairs, from the line connecting the leading edges of the tread nosings; and
3.~~4.~~ On ramps, from the ramp surface at the guard.

Exceptions:

1. Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Commenter's Reason: When jurisdictions start adopting the 2009 edition and see the fixed seating requirement, they cringe at the enforcement issues surrounding the guard that would now be nearly 4-1/2 feet tall (i.e., 18" + 36") in areas that the a bench or some type of seating surface is attached to the floor or deck. Just because a seat is "fixed" doesn't mean that it is permanent. What happens when the seating is relocated later? Does the guard at the new location need to be increased to 54 inches above the floor? How will the guard at the old location look without the seating? What if a homeowner adds fixed seating next to a guard? Will they now need a permit to install the seat? This requirement is unenforceable.

The addition of the fixed seating guards in the 2009 IRC was over restrictive. Whether a seating surface is fixed or movable, a child can still climb over the guard and fall. In fact, children can climb over guards when there is no seating adjacent to a guard. The code cannot be written to protect everyone. We must draw the line at some point and this requirement crossed that line.

Final Action: AS AM AMPC____ D

E105-09/10

1014.3, Table 1014.3 (New) [IFC [B] 1014.3, Table 1014.3 (New)]

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, City of San Jose**,** representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay)

1. Revise as follows:

1014.3 (IFC [B] 1014.3) Common path of egress travel. The common path of egress travel shall not exceed the travel distances in Table 1014.3. ~~In occupancies other than Groups H-1, H-2 and H-3, the common path of egress travel shall not exceed 75 feet (22 860 mm). In Group H-1, H-2 and H-3 occupancies, the common path of egress travel shall not exceed 25 feet (7620 mm). For common path of egress travel in Group A occupancies and assembly occupancies accessory to Group E occupancies having fixed seating, see Section 1028.8.~~

~~Exceptions:~~

1. ~~The length of a common path of egress travel in Group B, F and S occupancies shall not be more than 100 feet (30 480 mm), provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.~~
2. ~~Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall not be more than 100 feet (30 480 mm).~~
3. ~~The length of a common path of egress travel in a Group I-3 occupancy shall not be more than 100 feet (30 480 mm).~~
4. ~~The length of a common path of egress travel in a Group R-2 occupancy shall not be more than 125 feet (38 100 mm), provided that the building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.~~

2. Add new Table as follows:

TABLE 1014.3 (IFC TABLE [B] 1014.3)
COMMON PATH OF EGRESS TRAVEL

OCCUPANCY	**WITHOUT SPRINKLER SYSTEM (feet)**			**WITH SPRINKLER SYSTEM [a] (feet)**
	Any Occupant Load (OL)	**Occupant Load**		
		OL 30	**OL 30**	
B, S	Not Applicable	100	75	100
U	Not Applicable	100	75	75
F	75	Not Applicable	Not Applicable	100
H-1, H-2, H-3	Not Permitted	Not Permitted	Not Permitted	25
R-2	75	Not Applicable	Not Applicable	125 [b]
I-3	100	Not Applicable	Not Applicable	100
All others [c]	75	Not Applicable	Not Applicable	75

a. Approved automatic sprinkler system in accordance with Section 903.3.1.1
b. Approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2
c. For Group A occupancies and assembly occupancies accessory to Group E occupancies having fixed seating, see Section 1028.8

Reason: This is an editorial change to simplify this code section. The existing paragraphs, with accompanying exceptions, have been replaced with a table which is easier to understand and follow. The content and code requirements are not altered in any form or shape.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Maiel-E2-1014.3

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The table format is easier to read and brings clarity to the requirements for common path of egress travel.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Eirene Oliphant, MCP, City of Leawood, representing the Metropolitan Kansas City Chapter of the ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 1014.3 (IFC TABLE [B] 1014.3)
COMMON PATH OF EGRESS TRAVEL

OCCUPANCY	WITHOUT SPRINKLER SYSTEM			WITH SPRINKLER SYSTEM[a]
	~~Any Occupant Load (OL)~~	Occupant Load (OL)		
		OL≤30	OL>30	
B, S	~~Not Applicable~~	100	75	100
U	~~Not Applicable~~	100	75	75
F	~~75~~	~~Not Applicable~~ 75	~~Not Applicable~~ 75	100
H-1, H-2, H-3	~~Not Permitted~~	Not Permitted	Not Permitted	25
R-2	~~75~~	~~Not Applicable~~ 75	~~Not Applicable~~ 75	125[b]
I-3	~~100~~	~~Not Applicable~~ 100	~~Not Applicable~~ 100	100
All others[c]	~~75~~	~~Not Applicable~~ 75	~~Not Applicable~~ 75	75

a. Approved automatic sprinkler system in accordance with Section 903.3.1.1
b. Approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2
c. For Group A occupancies and assembly occupancies accessory to Group E occupancies having fixed seating, see Section 1028.8

(Portions of proposal not shown remain unchanged)

Commenter's Reason: I applaud the original proponent for developing the table as it does simplify the language in the code. However, the column identified as "any occupant load" creates confusion as well. The two factors are whether or not the building is sprinklered and whether the occupant load is not more than 30. The proposed changes address all occupant loads for all occupancy groups identified in the table.

Public Comment 2:

Maureen Traxler, representing the City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1014.3 (IFC [B] 1014.3) Common path of egress travel. The common path of egress travel shall not exceed the common path of egress travel distances in Table 1014.3.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The subject of Section 1014.3 is common path of egress travel, so the reference to "travel distance" is replaced with "common path of egress travel" for consistency and to correlate with Table 1014.3.

Final Action: AS AM AMPC____ D

E106-09/10
1014.3 (IFC [B] 1014.3)

Proposed Change as Submitted

Proponent: Gene Boecker, Code Consultants Inc., representing Code Consultants, Inc.

Revise as follows:

1014.3 (IFC [B] 1014.3) Common path of egress travel. In occupancies other than Groups H-1, H-2 and H-3, the common path of egress travel shall not exceed 75 feet (22 860 mm). In Groups H-1, H-2 and H-3 occupancies, the common path of egress travel shall not exceed 25 feet (7620 mm). For common path of egress travel in Group A occupancies and assembly occupancies accessory to Group E occupancies having fixed seating, see Section 1028.8

Exceptions:

1. The length of a common path of egress travel in Group B, F and S occupancies shall not be more than 100 feet (30 480 mm), provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall not be more than 100 feet (30 480 mm).
3. The length of a common path of egress travel in a Group I-3 occupancy shall not be more than 100 feet (30 480 mm).
4. The length of a common path of egress travel in a Group R-2 <u>or R-3</u> occupancy shall not be more than 125 feet (38 100 mm), provided that the building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason It is only appropriate that the exception should apply to a dwelling unit that is a single or double and not "three or more." Where a dwelling unit is associated with another occupancy and there are multiple apartments it will be an R-2 occupancy. If there is only the owner's apartment or two small apartments, then it would be treated as an R-3 occupancy. This is the case in urban areas. Additionally, R-3 needs the second means of egress where the area of the dwelling unit exceeds 4,000 sf (resulting in an occupant load >20) or where the unit is more than 3 stories in height.

By extending the exception to these dwelling units, it is only clarifying that the same rules apply to these types of uses whether there are one, two or three units in the same building.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Boecker-E4-1014.3

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The occupants of a dwelling unit are familiar with the space; therefore, where two exits are required for Group R-3 occupancy, the common path of travel should be applicable in the same manner as a Group R-2 unit.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephan Thomas, Colorado Code Consulting, LLC, representing Colorado Chapter ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1014.3 (IFC [B] 1014.3) Common path of egress travel. In occupancies other than Groups H-1, H-2 and H-3, the common path of egress travel shall not exceed 75 feet (22 860 mm). In Groups H-1, H-2 and H-3 occupancies, the common path of egress travel shall not exceed 25 feet (7620 mm). For common path of egress travel in Group A occupancies and assembly occupancies accessory to Group E occupancies having fixed seating, see Section 1028.8

Exceptions:

1. The length of a common path of egress travel in Group B, F and S occupancies shall not be more than 100 feet (30 480 mm), provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall not be more than 100 feet (30 480 mm).
3. The length of a common path of egress travel in a Group I-3 occupancy shall not be more than 100 feet (30 480 mm).
4. The length of a common path of egress travel in a Group R-2 ~~or R-3~~ occupancy shall not be more than 125 feet (38 100 mm), provided that the building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
5. <u>The length of a common path of egress travel in a Group R-3 occupancy located in a mixed occupancy building shall not be more than 125 feet (38 100 mm), provided that the building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.</u>

Commenter's Reason: The proponent was trying to clarify that the common path requirements for a Group R-3 occupancy is the same as a Group R-2 occupancy. We agree with that premise. However, Section 1021.2 states Group R-3 buildings are only required to have one exit. Therefore, the common path requirements do not apply to a building that only contains a Group R-3 occupancy. But, when a Group R-3 use is located in a mixed occupancy building, Section 1021.2 would not apply. This public comment attempts to clarify the original intent of the proponent and eliminate the potential conflict between Sections 1014.3 and 1021.1.

Final Action: AS AM AMPC____ D

E107–09/10

1015.2.1 (IFC [B] 1015.2.1)

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, City of San Jose**,** representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay)

Revise as follows:

1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access doorways. Where two exits or exit access doorways are required from any portion of the exit access, the exit doors or exit access doorways shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access doorways. Interlocking or scissor stairs shall be counted as one exit stairway.

Exceptions:

1. Where exit enclosures are provided as a portion of the required exit and are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor. <u>The exit or exit access doorway to such enclosures shall not be less than 25 feet (7.62 m), measured in a straight line, from the exit or exit access doorway of another exit enclosure.</u>
2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the exit doors or exit access doorways shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

Reason: The current exception 1 allows the separation of two exits to be measured in a line of travel within a rated corridor. Although this length (traveling within a corridor) may be longer than one-half of the overall diagonal, the exit enclosures can be placed very close to each other. Thus a fire could compromise both exits. Furthermore, the travel distance in the corridor can be reduced to one third (per exception 2) which can further exacerbate this problem.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Maiel-E1-1015.2.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: No technical justification was provided for the 25 feet separation requirement. Highrise provisions are already addressed in Section 403, and this requirement may be too restrictive for very small buildings. The term 'exit access' door is not applicable to exit enclosures.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, PE, CBO, City of San Jose, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Chapters), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access doorways. Where two exits or exit access doorways are required from any portion of the exit access, the exit doors or exit access doorways shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access doorways. Interlocking or scissor stairs shall be counted as one exit stairway.

Exceptions:

1. Where exit enclosures are provided as a portion the required exit and are interconnected by a 1-hour fire-resistance- rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor. ~~The exit or exit access doorway to such enclosures shall not be less than 25 feet (7.62m), measured in a straight line, from the exit or exit access doorway of another exit enclosure.~~ <u>The exit enclosures interconnected by a 1-hour fire-resistance-rated corridor shall be separated by a distance of not less than 30 feet, or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area served. This distance shall be measured in a straight line between the nearest points of the exit enclosure.</u>
2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the exit doors or exit access doorways shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

Commenter's Reason: The original proposal adding a sentence to Exception 1 is modified in this public comment to delete the original proposed wording and substitute wording identical to that used in 2009 IBC Section 403.5.1, Remoteness of exit stairway enclosures.

This substituted wording addresses the comments received from the ICC Egress Committee by using currently established exit enclosure separation distance criteria from Section 403.5.1, and by removing the term "exit access doorway". The fact that very small footprint buildings normally only need one exit per Table 1021.2, and that this provision only applies once two exits are required, should mitigate the concern raised about the separation being too restrictive when applied to very small footprint buildings.

The 2009 IBC's inclusion of a straight line separation requirement between exit enclosures applicable to High Rise Buildings (having an occupied floor located more than 75 feet above the lowest level of fire department vehicle access) is equally applicable in buildings of fewer stories, because of the code's underlying premise for having a minimum separation of exits is that all occupants should be reasonably assured to have the use of at least <u>one</u> of the two required exits.

Final Action: AS AM AMPC____ D

E108-09/10
1016.1, 1022.1 (IFC [B] 1016.1, 1022.1)

Proposed Change as Submitted

Proponent: Ronald W. Clements, Jr., representing Chesterfield County Virginia Building Inspection Department; Gregory R. Keith, Professional heuristic Development, representing The Boeing Company; and Michael L. Perrino, CBO, representing Code Consultants, Inc.; Sarah Rice, CBO, representing self

Revise as follows:

1016.1 (IFC [B] 1016.1) Travel distance limitations. Exits shall be so located on each story such that the maximum length of exit access travel, measured from the most remote point within a story along the natural and unobstructed path of egress travel to an exterior door at the level of exit discharge, an entrance to a vertical exit enclosure, an exit passageway, a horizontal exit, an exterior exit stairway or an exterior exit ramp shall not exceed the distances given in Table 1016.1.

Exceptions:

1. Travel distance in open parking garages is permitted to be measured to the closest riser of open exit stairways.
2. In outdoor facilities with open exit access components and open exterior exit stairways or exit ramps, travel distance is permitted to be measured to the closest riser of an exit stairway or the closest slope of the exit ramp.
3. ~~In other than occupancy Groups H and I, the exit access travel distance to a maximum of 50 percent of the exits is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps when connecting a maximum of two stories. The two connected stories shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.~~
4. ~~In other than occupancy Groups H and I, exit access travel distance is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps in the first and second stories above grade plane in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. The first and second stories above grade plane shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.~~

Where applicable, travel distance on unenclosed exit access stairways or ramps and on connecting stories shall also be included in the travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stairway.

1022.1 (IFC [B] 1022.1) Enclosures required. Interior exit stairways and interior exit ramps shall be enclosed with fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both. Exit enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the exit enclosure shall include any basements but not any mezzanines. Exit enclosures shall have a fire-resistance rating not less than the floor assembly penetrated but need not exceed 2 hours. Exit enclosures shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An exit enclosure shall not be used for any purpose other than means of egress.

Exceptions:

1. In other than Group H and I occupancies, stairways and ramps that serve only one adjacent story need not be enclosed. Any two such interconnected stories shall not be open to other stories. ~~In all occupancies, other than Groups H and I occupancies, a stairway is not required to be enclosed when the stairway serves an occupant load of less than 10 and the stairway complies with either Item 1.1 or 1.2. In all cases, the maximum number of connecting open stories shall not exceed two.~~
    - ~~1.1. The stairway is open to not more than one story above its level of exit discharge, or~~
    - ~~1.2. The stairway is open to not more than one story below its level of exit discharge.~~
2. Exits in buildings of Group A-5 where all portions of the means of egress are essentially open to the outside need not be enclosed.
3. Stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
4. Stairways in open parking structures that serve only the parking structure are not required to be enclosed.
5. Stairways in Group I-3 occupancies, as provided for in Section 408.3.8, are not required to be enclosed.
6. Means of egress stairways as required by Section 410.5.3 and 1015.6.1are not required to be enclosed.
7. Means of egress stairways from balconies, galleries and press boxes as provided for in Section 1028.5.1, are not required to be enclosed.

Reason: This proposal is intended to correlate and correct fundamental interior exit stairway enclosure provisions. The history and technical inconsistency of current provisions were brought to light during ICC Code Technology Committee (CTC), Unenclosed Exit Stairway Study Group discussions associated with the drafting of a CTC code change proposal for the current (2009/2010) development cycle. One of the main charges of the study group was to validate the relationship between Chapter 10 required exit, access to exit, exit enclosure and exit access travel distance provisions. These provisions lie at the heart of means of egress design philosophy.

Unfortunately, the 2000 Edition of the IBC did not do a particularly good job of consolidating the means of egress provisions contained in the former model (legacy codes). This was owed to several factors, not the least of which was the significantly different systems or approaches to means of egress design used by the various contributing codes. This is probably best illustrated through the 2000 IBC exceptions to interior exit stairway enclosure requirements. In fact, none of the 2000 IBC general design related exceptions appeared in any of the legacy codes. The exceptions were spawned as compromises with former provisions. The BOCA building code fundamentally maintained that required interior exit stairways at all stories be enclosed. The ICBO building code, on the other hand, basically allowed that in other than Group H and I occupancies, exit enclosures were not required for interior stairways serving only one adjacent story. The 2000 IBC resolved the issue by permitting 50% of the required stairways to be unenclosed. That provision supported neither legacy philosophy.

In subsequent editions, the related provisions have been manipulated to a point that current requirements create or support no functional means of egress strategy. Unfortunately, with the inability of the IBC to effectively state its intent, practitioners have largely resorted to their specific legacy indoctrination resulting in varying interpretations. In the 2003 Edition, an additional exception to exit enclosure provisions allowed for all interior exit stairways to be unenclosed at the first and second stories of a sprinklered building of other than Group H and I occupancies. The 2006 Edition formalized the concept of accessing required exits from adjacent levels by way of unenclosed interior stairways and ramps. In the 2009 Edition of the IBC, two fundamental exceptions to exit enclosure requirements were moved to Section 1016.1, travel distance provisions. As has been previously mentioned, various provisions have been manipulated over time in an attempt to contort them to a desired technical end. Virtually all of these attempts have failed to recognize the delicate technical relationships between the fundamental means of egress concepts of numbers of exits, access to required exits and exit access travel distance.

The 2009/2010 CTC interior stairway proposal effectively establishes such a system with supporting terminology and requirements based on current IBC means of egress provisions. The study group intentionally avoided including substantial technical changes in its code change proposal, although a majority of members may have agreed with a certain concept or provision.

This proposal is intended to further cultivate and clarify the <u>IBC system</u> of means of egress design. Essentially, it allows for a general two-story exception to the enclosure of required interior exit stairways in other than Group H and I occupancies. This arguably represents the cumulative impact of numerous current exceptions addressing unenclosed exits or access to exits. It also serves to reinforce access to exits at adjacent building level provisions. The ultimate goal is to require that all interior exit stairways (required exit components) be enclosed without specifying their required location. Effectively, this allows a given means of egress design to dictate which exit components are employed and where. It also acknowledges that exits may be accessed from an adjacent story or level within prescribed exit access travel distance limitations.

This proposal effectively integrates the related legacy requirements with current IBC provisions. The reason that this provision was not included in the 2009/2010 CTC interior stairway proposal is that it represents a relaxation of current IBC exit enclosure requirements. Again, please bear in mind that current IBC enclosure requirements are based on an ICC Means of Egress Drafting Committee technical compromise. What is recommended in this proposal is identical in concept to that of the former Uniform Building Code. Such a means of egress design method has decades of distinguished performance history. It is also consistent with the means of egress philosophy promoted in the 2009/2010 CTC interior stairway proposal. That is, that formal exits, or access to exits, shall be provided in prescribed numbers from each building level. Unenclosed stairways and ramps (certain occupancies notwithstanding) may access exits at an adjacent building level within prescribed exit access travel distance limitations. Accordingly, buildings more than two stories in height will have not less than two enclosed interior exit stairways. It is acknowledged that such exit enclosures may not serve all building stores based on the specific building and means of egress design; however, such enclosed exits are within the exit access travel distance limitations and are not more than one level removed from the exit. It should be noted that when exit enclosures are employed to support a given design, they typically serve all building stories. Occasionally, security or privacy concerns dictate that access to enclosed interior exit stairways at all stories is undesirable. Nevertheless, occupants at those levels have access to exits comparable to that required for any building level. Additionally, the fire service has protected enclosures to serve as staging areas for the attack of a fire at, above or below the story of incident origin.

In summary, this proposal eliminates many of the technical inconsistencies associated with current means of egress provisions. This proposal, in combination with the 2009/2010 CTC interior stairway proposal, effectively repairs the IBC means of egress system design requirements and their technical relationships. Each of the proponents of this proposal was a voting member of the ICC Code Technology Committee, Unenclosed Exit Stairway Study Group and they represent a majority of voting study group members.

Cost Impact: The code change proposal will not increase the cost of construction.

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The revised text loses the allowance for fully sprinklered buildings to have two open exit access stairways. It is not clear if the stairways in Section 1022.1 Exception 1 are interior or exterior stairways, or if they are exit or exit access stairways. Technical justification should be provided to indicate that open stairways should be permitted between floors. It is not clear how this will work with the provisions accepted in E5-09/10. This proposal seems to be taking protection away from stairways.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing the Boeing Company, Ron Clements, representing Chesterfield County Building Inspection Dept., Mike Perrino, representing Code Consultants, Inc., Sarah Rice, CBO, representing self, requests Approved as Modified by this public comment.

Replace the proposal with the following:

SECTION 1021(IFC [B] 1021)
NUMBER OF EXITS AND ~~CONTINUITY~~ <u>EXIT CONFIGURATION</u>

<u>**1021.1 (IFC [B] 1021.1) General.** Each story and occupied roof shall have the minimum number of exits, or access to exits, as specified in this section. The required number of exits, or exit access stairways or ramps providing access to exits, from any story shall be maintained until arrival at grade or a public way. Exits or access to exits from any story shall be configured in accordance with this section.</u>

1021.2 (IFC [B] 1021.2) Number of exits. Each story and occupied roof shall have a minimum of one exit, or one exit access stairway or ramp that provides access to an exit.

Two exits, or exit access stairways or ramps providing access to exits, from any story or occupied roof shall be provided where one of the following conditions exists:

1. The occupant load exceeds one of the values in Table 1021.2.
2. The exit access travel distance exceeds that specified in Table 1021.2 as determined in accordance with the provisions of Section 1016.1.
3. Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.

Exceptions:

1. Rooms, areas and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.
2. Group R-3 occupancy buildings shall be permitted to have a one exit.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one exit.
4. Air traffic control towers shall be provided with the minimum number of exits specified in Section 412.3.
5. Individual dwelling units with a maximum occupant load of 20 in Group R-2 and R-3 occupancies shall be permitted to have one exit.
6. Group R-3 and R-4 congregate residences shall be permitted to have one exit.

Where one exit, or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with one exit shall not be located more than one story below grade plane.

~~**1021.1 (IFC [B] 1021.1) Exits from stories.** All spaces within each story shall have access to the minimum number of approved independent exits as specified in Table 1021.1 based on the occupant load of the story. For the purposes of this chapter, occupied roofs shall be provided with exits as required for stories.~~

~~**Exceptions:**~~

1. ~~As modified by Section 403.15 (Additional exit stairway).~~
2. ~~As modified by Section 1021.2.~~
3. ~~Exit access stairways and ramps that comply with Exception 3 or 4 of Section 1016.1 shall be permitted to provide the minimum number of approved independent exits required by Table 1021 on each story.~~
4. ~~In Groups R-2 and R-3 occupancies, one means of egress is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.~~
5. ~~Within a story, rooms and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.~~

~~The required number of exits from any story shall be maintained until arrival at grade or the public way.~~

~~**TABLE 1021.1 (IFC [B] TABLE 1021.1)**~~
~~**MINIMUM NUMBER OF EXITS FOR OCCUPANT LOAD**~~

~~**OCCUPANT LOAD (persons per story)**~~	~~**MINIMUM NUMBER OF EXITS (per story)**~~
~~1-500~~	~~2~~
~~501-1,000~~	~~3~~
~~More than 1,000~~	~~4~~

~~**1021.1.2 (IFC [B] 1021.1.2) Parking structures.** Parking structures shall not have less than two exits from each parking tier, except that only one exit is required where vehicles are mechanically parked. Unenclosed vehicle ramps shall not be considered as required exits unless pedestrian facilities are provided.~~

~~**1021.1.3 (IFC [B] 1021.1.3) Helistops.** The means of egress from helistops shall comply with the provisions of this chapter, provided that landing areas located on buildings or structures shall have two or more exits. For landing platforms or roof areas less than 60 feet (18 288 mm) long, or less than 2,000 square feet (186 m^2) in area, the second means of egress is permitted to be a fire escape, alternating tread device or ladder leading to the floor below.~~

~~**1021.2 (IFC [B] 1021.2) Single exits.** Only one exit shall be required from Group R-3 occupancy buildings or from stories of other buildings as indicated in Table 1021.2. Occupancies shall be permitted to have a single exit in buildings otherwise required to have more than one exit if the areas served by the single exit do not exceed the limitations of Table 1021.2. Mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with a single exit shall not be located more than one story below grade plane.~~

TABLE 1021.2 (IFC [B] TABLE 1021.2)
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT

STORY	OCCUPANCY	MAXIMUM OCCUPANTS (OR DWELLING UNITS) PER ~~FLOOR~~ STORY	~~AND~~ MAXIMUM EXIT ACCESS TRAVEL DISTANCE
First story or basement	A, B[b] ~~[d]~~, E[c] ~~[e]~~, F[b] ~~[d]~~, M, U, S[b] ~~[d]~~	49 occupants ~~and~~	75 feet
	H-2, H-3	3 occupants ~~and~~	25 feet
	H-4, H-5, I, R	10 occupants ~~and~~	75 feet
	S	29 occupants ~~and~~	100 feet
Second story	B~~[b]~~, F, M, S~~[a]~~	29 occupants ~~and~~	75 feet
	R-2	4 dwelling units ~~and~~	50 feet
Third story	R-2[a] ~~[c]~~	4 dwelling units ~~and~~	50 feet
Fourth story and above	NP	NA	NA

For SI: 1 foot = 3048.mm
NP – Not Permitted
NA – Not Applicable
~~a. For the required number of exits for parking structures, see Section 1021.1.2.~~
~~b. For the required number of exits for air traffic control towers, see Section 412.3.~~
~~c.~~ a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1026.
~~d.~~ b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.
~~e.~~ c. Day care occupancies shall have a maximum occupant load of 10.

1021.2.1 (IFC [B] 1021.2.1) Three or more exits. Three exits, or exit access stairways or ramps providing access to exits at other stories, shall be provided from any story or occupied roof with an occupant load of 501-1,000. Four exits, or exit access stairways or ramps providing access to exits at other stories, shall be provided from any story or occupied roof with an occupant load greater than 1,000.

1021.2.2 (IFC [B] 1021.2.2) Additional exits. In buildings over 420 feet in height, additional exits shall be provided in accordance with Section 403.5.2.

Commenter's Reason: (Note: E108-09/10 is a companion code change proposal to E5-09/10. If E5-09/10--which was approved as submitted by the ICC Means of Egress Code Committee in Baltimore--is disapproved during the final action hearing process, this public comment will be withdrawn.) This proposal contains the same language as that included in E5-09/10 with the two following revisions: 1) The deletion of the last two sentences and exceptions in Section 1021.1. 2) The addition of the first sentence in Section 1021.2. Due to ICC public comment formatting protocols, the modification appears much more extensive and complex than it actually is.

The ICC Code Technology Committee (CTC) appointed an Unenclosed Exit Stairway Study Group to validate the relationship between Chapter 10 required exit, access to exit, exit enclosure and exit access travel distance provisions. Based on their research, that study group developed a comprehensive code change proposal E5-09/10 that was approved as submitted by the ICC Means of Egress Code Committee in Baltimore. During their discussions, the study group recognized that 2009 Section 1022 exit enclosure provisions were inconsistent with the exit/access stairway system requirements that had been restructured through E5-09/10. Specifically, it was felt that the IBC should not arbitrarily require enclosed interior exit stairways at each building level above the first story. Rather, it was felt that number of exit, separation of exit, exit access travel distance and vertical opening protection requirements should stand on their own merit based on the specific building design. This allows greater flexibility in building design while maintaining appropriate levels of occupant safety.

The study group, however, felt that this issue exceeded the scope of their reorganization effort and it should not be included in E5-09/10. A majority of the study group members did agree with the technical/philosophical concern and agreed to submit a separate code change that would eliminate the 2009 IBC provision that 50 percent of interior exit stairways be enclosed in other than Group H and I occupancies. This was submitted as proposal E108-09/10. It should be noted that the ICC Code Technology Committee agreed with that technical position. Unfortunately, the proposal was out of context when applied to 2009 means of egress provisions. The concept was intended to overlay E5-09/10 provisions; however, procedurally needed to modify current IBC requirements. This created a great deal of confusion with the code committee and assembly.

There is a very subtle and complicated relationship between various means of egress provisions. Through its organization and terminology, E5-09/10 greatly clarifies Chapter 10 design requirements. In their published committee action reason statement substantiating disapproval, the ICC Means of Egress Code Committee stated, "The revised text loses the allowance for fully sprinklered buildings to have two open exit access stairways." Such is not the case. E5 Section 1009.3, Exception 1 states, "In other than Group I-2 and I-3 occupancies, exit access stairways that serve, or atmospherically communicate between, only two stories, are not required to be enclosed." Another committee comment was that, "It is not clear if the stairways in Section 1022.1 Exception 1 are interior or exterior stairways, or if they are exit or exit access stairways." Section 1022 specifies that it applies to interior, exit stairways. That comment does reinforce the notion that current stairway/exit provisions are misunderstood. An additional comment stated, "Technical justification should be provided to indicate that open stairways should be permitted between floors." The IBC has always allowed for open stairways (and shaft openings) between floors under prescribed conditions. It was also observed that, "It is not clear how this will work with the provisions accepted in E5-09/10." This public comment provides that clarification by adjusting number of exits, access to exits and interior exit stairway provisions in the context of E5-09/10 and each other. The final committee comment was, "This proposal seems to be taking protection away from stairways." One of the primary reasons for assigning a study group to investigate this area of study was the widely varying opinions and applications of stairway enclosure requirements. In fact, E5 Section 1009.2.2 specifically states that all interior exit stairways shall be enclosed, with no exceptions. The only unenclosed or "open" stairways permitted by E5 are delineated in E5 Section 1009.3, exceptions that are based on current IBC stairway and shaft exceptions. In each case, such unenclosed stairways are "exit access stairways" by definition and travel distance is accounted for.

The means of egress design progression clarified by E5-09/10 begins with Section 1021 that requires specific numbers of exits, or access to exits, for each story or occupied roof. It is not intended to specifically require any particular exit component at a given building level. Rather, it is intended that the design of the building and means of egress system will dictate the type and location of various means of egress components. As regards interior exit stairways (formerly exit enclosures), they are required by need similar to other exit components.

Fundamentally, E5 Sections 1021.1 and 1009.3 generally allow access to exits at an adjacent building level in other than Group I-2 and I-3 occupancies. E5 Section 1021.3.1 clarifies that such access be by stairways or ramps and shall be included within the required exit access travel distance limitations. In multi-story buildings more than two stories in height, enclosed interior exit stairways would always be included in the building design. E5 Section 1022.1 requires that, once established, all interior exit stairways lead to, or be extended to, the exterior of the building.

This proposal effectively eliminates the current requirement generally mandating that at least 50 percent of exits from certain building levels be enclosed interior exit stairways. It is felt that exit access travel within two adjacent stories is appropriate and that individual exit components should not be specified by the IBC. Number of exits, separation of exits and exit access travel distance requirements will dictate the incorporation of exit components into the building design.

The approval as modified of E108-09/10 will coordinate with the system of means of egress design established through the approval of E5-09/10 by the ICC Means of Egress Code Committee. In combination, these proposals will greatly enhance the understanding and effectiveness of fundamental means of egress design.

Final Action: AS AM AMPC____ D

E109-09/10

1016.3 (New), Table 1016.3 (New), 1016.3.1 (New); [IFC [B] 1016.3 (New), Table 1016.3 (New), 1016.3.1 (New)]

Proposed Change as Submitted

Proponent: Jay Wallace, The Boeing Company and Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Add new text and table as follows:

1016.3 (IFC [B] 1016.3) Aircraft manufacturing facilities. In buildings used for the manufacturing of aircraft, exit access travel distances indicated in Section 1016.1 shall be increased in accordance with the following:

1. The building shall be of Type I or II construction.
2. Exit access travel distance shall not exceed the distances given in Table 1016.3.

TABLE 1016.3 (IFC [B] TABLE 1016.3)
AIRCRAFT MANUFACTURING EXIT ACCESS TRAVEL DISTANCE

HEIGHT (feet) [b]	MANUFACTURING AREA (sq. ft.) [a]					
	≥150,000	≥200,000	≥250,000	≥500,000	≥750,000	≥1,000,000
≥ 25	400	450	500	500	500	500
≥ 50	400	500	600	700	700	700
≥75	400	500	700	850	1,000	1,000
≥ 100	400	500	750	1,000	1,250	1,500

For SI: 1 foot = 304.8 mm

a. Contiguous floor area of the aircraft manufacturing facility having the indicated height.

b. Minimum height from finished floor to bottom of ceiling or roof slab or deck.

1016.3.1 (IFC [B] 1016.3.1) Associated areas. Egress from rooms, areas and spaces associated with the primary manufacturing area shall be permitted through such area having a minimum height as indicated in Table 1016.3. Exit access travel distance within the associated room, area or space shall not exceed that indicated in Table 1016.1 based on the occupancy classification of that associated area. Total exit access travel distance shall not exceed that indicated in Table 1016.3.

Reason: Many aircraft manufacturing buildings are unusually large due to the size of the commercial or military aircraft being produced. For instance, an assembled Boeing 747 has a tail height of over 63 feet. The rectangular footprint of a Boeing 747-800 is over 56,000 square feet.

Group F-1 occupancies greater than 150,000 square feet can have difficulty complying with 250 foot, sprinklered exit access travel distance limitations without incorporating exit passageways or horizontal exits into the design of the building means of egress system. The use of either exit component is somewhat problematic. Due to the compartmentalized nature of horizontal exits, they do not lend to aircraft production processes or movement of the finally assembled aircraft. For similar reasons, exit passageways are generally installed below the floor of the assembly level. The use of underground exit passageways during an emergency in a very high volume space is generally contrary to human nature. Once aware of an event, employees would instinctively evacuate the building at the level with which they are most familiar. Also, it is relatively easy to move away from the point of origin of a fire due to a person's sensory awareness within the entire open space. Given the fact that occupants sense safety as they move away from the fire, it is counter-intuitive to enter an underground area unless as a last resort.

Regardless of human nature, it must be demonstrated that high volume spaces provide a tenable environment for the evacuation or relocation of building occupants. The Boeing Company conducted smoke and temperature fire modeling using the NIST FDS (National Institute of Standards and Technology - Fire Dynamics Simulator) computer program.

In order to establish a performance baseline, a series of worse case scenarios were combined into the first test. We referenced previous Boeing proprietary laboratory test data on a large, 10 megawatt fire and duplicated and calibrated those data in our fire and smoke model. We placed the 10 megawatt event in an interior corner of a 400 foot x 400 foot building with exterior exit doors at the midpoints of each exterior wall. A corner fire was considered worse case because anticipated radiation off of adjacent 90° walls focuses and accelerates the progression of the fire.

The minimum ceiling height permitted in the means of egress by the International Building Code is 7'-6"--impractically low for an aircraft manufacturing area ceiling height. A similarly impractical ceiling height of 10 feet was selected as a worse case baseline for data determination purposes. Active fire suppression was not included in the model; therefore, the test fire burns until it is consumed. It should be noted that because sprinklers were not utilized in the model, they are not included as a requirement in the proposed provision. That being said, it is recognized that to achieve the qualifying contiguous areas of proposed Table 1016.3, the building would be sprinklered based on the fire area thresholds in Section 903. This proposal lets each issue stand on its own merit without introducing a new sprinkler trade-off. Also, for simplicity, it was also assumed that when smoke is introduced into the space, smoke detection would shut down any HVAC systems. Therefore, no mechanical ventilation is included in the model. The model assumed no fuel contribution by the building itself; therefore, the proposed provisions are limited to buildings of Type I or II construction.

Six modeling runs were conducted. One, for the 400 foot x 400 foot space with a 10 foot ceiling height for data base line purposes. Four additional runs were made for the same building area with ceiling heights of 25, 50, 75 and 100 feet for purposes of data development. One additional run was conducted for a 1,000,000 square foot building with a 100 foot ceiling height for data interpolation purposes. These data points were selected to support the area and height thresholds established in proposed Table 1016.3.

The 160,000 sf, 10' high ceiling baseline model indicates: (Maximum permitted travel distance: 200 feet [Group F-1, unsprinklered; Table 1016.1]. Based on an assumed rate of travel of 250 feet per minute, maximum travel time is 48 seconds.)

After 4 minutes, the exit nearest the point of origin of the fire is still completely free of smoke and heat from the fire.

Ceiling temperatures near the source immediately reach 165 degrees and the fire sprinkler system would activate.

The 160,000 sf, 25' high ceiling model indicates: (Maximum proposed travel distance: 400 feet [≥150,000 sf, ≥ 25'; Table 1016.3]. Based on an assumed rate of travel of 250 feet per minute, maximum travel time is 96 seconds.)

After 120 seconds, the smoke plume extends approximately 100 feet from the point of origin of the fire. The smoke level is at approximately 20 feet above the floor. After 360 seconds, the smoke level is at approximately 10 feet above the floor (360 - 96 = 264 ÷ 96 = 2.75 factor of safety).

After 150 seconds, the ceiling temperature has just reached 165 degrees directly above the point of origin of the fire. Sprinkler activation occurs 54 seconds after building evacuation has occurred. After 300 seconds, no ceiling temperature is greater than 127 degrees.

The 160,000 sf, 50' high ceiling model indicates: (Maximum proposed travel distance: 400 feet [≥150,000 sf, ≥ 25'; Table 1016.3]. Based on an assumed rate of travel of 250 feet per minute, maximum travel time is 96 seconds.)

After 120 seconds, the smoke plume extends approximately 100 feet from the point of origin of the fire. The smoke level is at approximately 42 feet above the floor. After 420 seconds, the smoke level is at approximately 25 feet above the floor (420 - 96 = 324 ÷ 96 = 3.37 factor of safety).

After 150 seconds, the ceiling temperature is 108 degrees directly above the point of origin of the fire. Sprinkler activation occurs 84 seconds after building evacuation has occurred. After 300 seconds, no ceiling temperature is greater than 98.5 degrees.

The 160,000 sf, 75' high ceiling model indicates: (Maximum proposed travel distance: 400 feet [≥150,000 sf, ≥ 25'; Table 1016.3]. Based on an assumed rate of travel of 250 feet per minute, maximum travel time is 96 seconds.)

After 120 seconds, the smoke plume extends less than 100 feet from the point of origin of the fire. The smoke level is at approximately 60 feet above the floor. After 420 seconds, the smoke level is at approximately 25 feet above the floor at one point (420 - 96 = 324 ÷ 96 = 3.37 factor of safety).

After 150 seconds, the ceiling temperature is 98.5 degrees directly above the point of origin of the fire. Sprinkler activation occurs 144 seconds after building evacuation has occurred. After 300 seconds, no ceiling temperature is greater than 98.5 degrees.

The 160,000 sf, 100' high ceiling model indicates: (Maximum proposed travel distance: 400 feet [≥150,000 sf, ≥ 25'; Table 1016.3]. Based on an assumed rate of travel of 250 feet per minute, maximum travel time is 96 seconds.)

After 120 seconds, the smoke plume extends less than 100 feet from the point of origin of the fire. The smoke level is at approximately 85 feet above the floor. After 420 seconds, the smoke level is at approximately 30 feet above the floor at one point (420 - 96 = 324 ÷ 96 = 3.37 factor of safety).

After 150 seconds, the ceiling temperature is 89 degrees directly above the point of origin of the fire. Sprinkler activation occurs 144 seconds after building evacuation has occurred. After 300 seconds, no ceiling temperature is greater than 89 degrees.

The 1,000,000 sf, 100' high ceiling model indicates: (Maximum proposed travel distance: 1,500 feet [≥1,000,000 sf, ≥ 100'; Table 1016.3]. Based on an assumed rate of travel of 250 feet per minute, maximum travel time is 360 seconds.)

After 360 seconds, the smoke plume extends less than 500 feet from the point of origin of the fire. The smoke level is at approximately 75 feet above the floor. After 720 seconds, the smoke level is still at approximately 75 feet above the floor (720 - 360 = 360 ÷ 360 = 1.0 factor of safety).

At 300 seconds, the ceiling temperature is 70 degrees directly above the point of origin of the fire. At 300 seconds, ceiling temperatures are dropping and no temperature is greater than 89 degrees.

Data clearly indicate that the proposed exit access travel distances for aircraft manufacturing facilities provide for a high for level of occupant tenability with a minimum factor of safety of 100 percent. It is intuitive that high volume spaces provide sufficient time for an occupant to safely access an exit. Nevertheless, The Boeing Company has reinforced that common sense through fire modeling that validates and quantifies that logic.

Most manufacturing facilities have other supporting occupancies including offices, break rooms, cafeterias, etc. This proposal would permit occupants of such associated spaces to egress through the manufacturing area with the increased exit access travel distance provided that the exit access travel distance within the associated areas does not exceed that specified in Table 1016.1 for the occupancy(s) under consideration.

Please do not be distracted by some of the larger exit access travel distance values contained in the proposed table. The longest allowance of 1,500 feet appears extreme compared to Table 1016.1 values. In reality, it only represents six minutes of travel time based on an assumed rate of travel of 250 feet per minute (*NFPA Life Safety Code Handbook* data), and it is only permitted in a building with a volume of over one hundred million cubic feet. Upon further examination, 71 percent of the cells of the proposed table require less than three minutes of exit access travel time for buildings having a volume of not less than 3.75 million cubic feet. The results of Boeing modeling runs would indicate that ceiling height is a major factor in the maintenance of occupant tenability during egress from a fire event. This proposal is limited to aircraft manufacturing facilities only. This is because of a high degree of occupant familiarity and the relatively low fuel loading compared with many other Group F-1 and S-1 occupancies.

In summary, the unique size of some aircraft manufacturing facilities inherently provides a tenable environment for building occupants as they travel to an exit. It is logical that spaces with higher ceilings provide for a greater level of occupant tenability than those with lower ceilings. Rather than arbitrarily selecting travel distance values based on former provisions or attempting an educated guess, The Boeing Company has conducted computer modeling in order to determine acceptable travel distances. Supporting data is available for review at http://www.boeing.com/nosearch/tds/. Approval of this proposal will acknowledge means of egress design issues associated with large area, high volume aircraft manufacturing spaces while providing a high degree of occupant safety during egress from such buildings.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Fattah-E1-1017.5

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Boeing should be commended for their fire model analysis on this issue, however, there are concerns about the assumptions in the model: for example what is the technical basis for the size of the fire; what are the tenability methods used; why the one location for the fire vs. moving it around; What is the growth of the fire. The American Society for Protection Engineers does have standards for performance based analysis or tenability methods from ISO that could be investigated. The egress analysis did not include people with mobility impairments or consideration of occupant delays upon alarm notification. The study should have a third party peer review. Quantitative information on the size and types of fuel loads and the resulting fire size should be provided – this is important as the industry moves to using more composite materials that may increase fuel loads. The technical data is applicable for large airplanes; however, a concern would be if this was applicable for small aircraft facilities. The anticipated occupant loading and how the occupants are notified were not included in the reason. Did the sprinkler systems activate?

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jay S. Wallace, representing The Boeing Company, Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Submitted.

Commenter's Reason Supporting technical data, to include formal peer review, are available for review at http://www.boeing.com/nosearch/tds/.

The Boeing Company submitted Item E109-09/10 that is intended to allow for increased travel distances in high volume aircraft manufacturing buildings. To support its proposal, Boeing conducted smoke and temperature fire modeling using the NIST FDS (National Institute of Standards and Technology - Fire Dynamics Simulator) computer program. Boeing correlated initial model fire data to an actual burn test conducted at a certified test facility in Washington State.

In their published reason statement for disapproval, the ICC Means of Egress Code Committee stated, "Boeing should be commended for their fire model analysis on this issue, however, there are concerns about the assumptions in the model: for example what is the technical basis for the size of the fire; what are the tenability methods used; why the one location for the fire vs. moving it around; What is the growth of the fire. The American Society for Protection Engineers does have standards for performance based analysis or tenability methods from ISO that could be investigated. The egress analysis did not include people with mobility impairments or consideration of occupant delays upon alarm notification. The study should have a third party peer review. Quantitative information on the size and types of fuel loads and the resulting fire size should be provided – this is important as the industry moves to using more composite materials that may increase fuel loads. The technical data is applicable for large airplanes; however, a concern would be if this was applicable for small aircraft facilities. The anticipated occupant loading and how the occupants are notified were not included in the reason. Did the sprinkler systems activate?"

It was evident that the key to gaining committee confidence in the proposal was the performance of a third party peer review. Virtually all of the specific technical questions would be addressed through the performance of such a review. The Boeing Company has obtained the services of Arup, a widely renowned design and consulting firm to perform this peer review. Arup reviewed the committee comments and provided Boeing with a revised set of parameters for new modeling runs. Speaking specifically to expressed concerns:

What is the technical basis for the size of the fire? Our original model run used data from a certified fire test that generated a peak heat release of about 5 megawatts. The technical basis for the size of the fire was a number of actual fire tests previously conducted by The Boeing Company and FM Global, our insurance underwriter. That sized fire is typical for the materials used in aircraft production, to include flammable liquids, and associated support equipment. Prior to our initial simulation run, FM Global agreed with the assumed fire size. The test article was a support cart laden with plastics, flammable liquid containers and ordinary combustibles that are typically found on an aircraft manufacturing support cart. To dispel any concerns about the fire size, current model runs are based on a 10 megawatt, steady growth rate fire.

What is the growth of the fire? Fire growth of the 5 megawatt fire was based on the data from the actual fire test. The 10 megawatt fire simulation uses a fast growth T^2 (Time/Temperature) fire that goes steady state at 10 megawatts.

Quantitative information on the size and types of fuel loads and the resulting fire size should be provided – this is important as the industry moves to using more composite materials that may increase fuel loads. The issue of composite materials in aircraft production was investigated. It was determined that such materials perform very similarly to traditional aluminum or other lightweight metallic products. This is due to the fact that when used as an element of assembly, such parts have been previously fabricated and cured. The overriding factor remains that the Federal Aviation Administration regulates the combustibility limits of commercial aircraft. The Boeing Company and FM Global have determined that a fire will likely originate at some individual process point as opposed to the entire aircraft itself.

The technical data is applicable for large airplanes; however, a concern would be if this was applicable for small aircraft facilities. The applicability of proposed Table 1016.3 to buildings of not less than 150,000 square feet in area and not less than 25 feet in height, excludes small aircraft facilities. Typically, smaller facilities do not require increased travel distance allowances.

What are the tenability methods used? Smoke obscuration and heat gradients were modeled by the FDS software in volumes having ceiling heights of 10 to 100 feet. Data were collected over time of smoke density at various elevations including 6 feet above the floor. The model showed no smoke extending to within 6 feet above the floor for the 25 to 100 foot tall spaces within proposed travel times (distances) and only minimal smoke extending to within 6 feet of the floor for the 10 foot tall space within the currently permitted travel time (distance). Heat gradients were also similar with much of the heat dissipating through the large volumes. Occupant exiting was determined to be a minimum of 240 seconds (for the 10 foot ceiling) and for the most part unlimited at the 100 foot ceiling level test.

Why the one location for the fire vs. moving it around? A corner fire was chosen as it is recognized that it represents a worst case scenario due to the effect of the walls on the fire dynamics. FM Global concurred with this assumption prior to initial modeling. Since the worst case scenario was selected, we reasoned that moving the fire to other locations would only produce a better result.

The egress analysis did not include people with mobility impairments or consideration of occupant delays upon alarm notification. Due to the nature of the work, people with mobility impairments are typically not involved in assembly operations. Should that not be the case, the employment of a person with a disability would trigger Americans with Disabilities Act, Title I requirements. Practically speaking, in the event of evacuation of work areas, able-bodied employees assist those who are disabled. This practice is demonstrated repeatedly in our evacuation exercises. Regarding the issue of occupant delay due to alarm notification, in a large manufacturing facility of this nature, occupants would either become aware of the incident though their senses (sight, smell and hearing) or be directed by a supervisors, industrial fire brigades or municipal fire department personnel. In very large volume buildings of this nature that do not have combustible interior finishes or continuous fuel packages, there is not a risk of a fire outpacing evacuation.

The anticipated occupant loading and how the occupants are notified were not included in the reason. Occupant loads are considerably less than those determined based on the Table 1004.1.1 factor of one occupant per 100 square feet. Typical occupant densities are in the 300 – 500 square foot per occupant range. Due to the large area of these spaces, initial notification is based on situational and sensory awareness. Those nearest the event trigger an internal notification system.

Did the sprinkler systems activate? Obviously, an automatic sprinkler system is required in a building of this size. Sprinklers, however, were not considered in the model run. It was felt that the test results should be based on a "worse case" scenario. Sprinkler activation is considerably delayed due to the dissipation of the heat from the fire in buildings with large volumes and very high roof lines. Additionally, simulation data revealed that building evacuation normally occurred prior to sprinkler activation. Unlike a paint hangar or a maintenance and repair facility, the fire loading in this use is quite low. The aircraft have never been painted or fueled and are primarily constructed with non-combustible materials. There are no foam-extinguishing or deluge sprinkler systems in these buildings. Even though not included in the model, it is recognized that if sprinkler activation were to occur, it would certainly contribute positively to the emergency egress scenario.

The Boeing Company has addressed all of the concerns expressed by the ICC Means of Egress Code Committee during discussion of E109-09/10. Most importantly, a third party peer review was conducted to validate Boeing research. Approval of this proposal will provide for appropriate travel distance requirements for very specialized, high volume aircraft manufacturing facilities.

Final Action: AS AM AMPC____ D

E111-09/10
1018.1 (IFC [B] 1018.1)

<u>Proposed Change as Submitted</u>

Proponent: Mark Blanke, PE, New York State Div. of Code Enforcement and Administration

Revise as follows:

1018.1 (IFC [B] 1018.1) Construction. Corridors shall be fire-resistance rated in accordance with Table 1018.1. The corridor walls required to be fire-resistance rated shall comply with Section 709 for fire partitions.

Exceptions:

1. A fire-resistance rating is not required for corridors in an occupancy in Group E where each room that is used for instruction has at least one door directly to the exterior and rooms for assembly purposes have at least one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A fire-resistance rating is not required for corridors contained within a dwelling or sleeping unit in an occupancy in Group R.
3. A fire-resistance rating is not required for corridors in open parking garages.
4. A fire-resistance rating is not required for corridors in an occupancy in Group B which is a space requiring only a single means of egress complying with Section 1015.1.
5. <u>A fire-resistance rating is not required for corridors where the length of the corridor is less than 2.5 times the least width.</u>

Reason: This proposed amendment provides a uniform application for corridor enclosure requirements and offers a design option to enlarge a corridor width in lieu of providing a fire resistance rating.

The IBC definition of a corridor does not readily establish when a space should be considered a room or a corridor. This is because it does not acknowledge narrowness or length as corridor characteristics commonly found in most dictionaries. The definition of a corridor is "an enclosed exit access component that defines and provides a path of egress travel to an exit." Any room is an enclosed exit access component that provides a path of egress to an exit. The room becomes a corridor when it actually defines a path to an exit. But the question is what room configuration defines a path to an exit where it becomes a corridor that should be subject to fire-resistance rating requirements. This proposed amendment provides a length-to-width ratio that more clearly and uniformly establishes this threshold.

The purpose of fire rating corridor enclosures is to protect occupants traveling in a confined space from the hazards of fire. The more the space is confined the greater the hazard, and by contrast, decreasing the confinement reduces the hazard. If a corridor width is increased, it begins to resemble a room where it becomes reasonable to eliminate the fire-resistance rating of the enclosure. As an example, a corridor measuring 3'x25' serving an occupant load of 40 in an unsprinklered Group B occupancy is required to have 1-hour fire-resistance rated enclosures with fire protection of door openings. Given the confined nature of this space, it is appropriate to require the necessary fire protection. However, if the corridor width were increased to 10 feet while maintaining its original length, the space becomes much less confined, less hazardous, and begins to resemble an adjoining or intervening room otherwise permitted without rated enclosures as part of an exit access. Some would argue that the enlarged space is no longer a corridor and not subject to the provisions of Section 1018.

The proposed amendment establishes a 2.5 length/width ratio as the transition for requiring fire-resistant rated corridor enclosures. This ratio was chosen because it is the same as that used in exception #3 of Section 1018.4 that would allow an unlimited dead end corridor where the length is less than 2.5 times the width. Given that the code has established this ratio as an appropriate exception to allow unlimited dead end corridors, it seems appropriate to use the same standard to corridor fire-resistance requirements.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Blanke-E1-1018.1

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The ratio 2.5:1 is commonly used for elevator lobbies off corridors for dead end provisions. If there is an exception for the construction this could be interpreted as requiring a rating for the corridor but not the elevator lobby. Defining corridors in this manner could affect rooms.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mark Blanke, PE, New York State Div. of Code Enforcement and Administration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1018.1 (IFC [B] 1018.1 Construction. Corridors shall be fire-resistance rated in accordance with Table 1018.1. The corridor walls required to be fire-resistance rated shall comply with Section 709 for fire partitions.

Exceptions:

1. A fire-resistance rating is not required for corridors in an occupancy in Group E where each room that is used for instruction has at least one door directly to the exterior and rooms for assembly purposes have at least one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A fire-resistance rating is not required for corridors contained within a dwelling or sleeping unit in an occupancy in Group R.
3. A fire-resistance rating is not required for corridors in open parking garages.
4. A fire-resistance rating is not required for corridors in an occupancy in Group B which is a space requiring only a single means of egress complying with Section 1015.1.
5. A fire-resistance rating is not required for corridors <u>which are not part of an elevator lobby and</u> where the length of the corridor is less than 2.5 times the least width.

Commenter's Reason: The committee's primary reason for disapproval is because the proposal may be interpreted to exempt fire-resistance rating requirements for fire partitions that enclose elevator lobbies. The modification should address this concern.

Final Action: AS AM AMPC____ D

E113-09/10
Table 1018.1 (IFC [B] Table 1018.1)

Proposed Change as Submitted

Proponent: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM): Thomas S. Zaremba, Roetzel & Andress, representing self

Revise as follows:

TABLE 1018.1 (IFC [B] TABLE 1018.1)
CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system[c]
H-1, H-2, H-3	All	Not permitted	1
H-4, H-5	Greater than 30	Not permitted	1
A, B, ~~E~~, F, M, S, U	Greater than 30	1	0
E	Greater than 30	1	1
R	Greater than 10	Not permitted	0.5
I-2[a], I-4	All	Not permitted	0
I-I, I-3	All	Not Permitted	1[b]

a. For requirements for occupancies in Group I-2. see Sections 407.2 and 407.3.
b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8.
c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 901.3.1.1 or 903.3.1.2 where allowed.

Reason:
Davidson/Shuman – This code change was proposed by several parties in the last development cycle as E117-07/08. Although half the Committee supported its adoption, the Chair broke a tie vote in favor of a recommendation of disapproval. At the Final Action Hearings, the Committee's recommendation was overturned, but a motion to "approve as submitted" failed to secure the 2/3 majority needed for adoption. The Membership voted 55% in favor of adoption.

There are good reasons that a solid majority of the Membership favors adopting this proposal. First, the E occupancies at issue represent structures built to house a dense population of children ranging from ages 4 through early teens. Group E occupancies typically have paper and other flammables hung from ceilings to floors throughout. Classrooms are filled with desks containing books, papers and other flammables. Science labs use chemicals and accelerants. Lunch rooms have stoves, ovens and trash cans spread throughout loaded with waste paper and other flammables. Theaters house clothing, wooden and cardboard props and paper banners strung from one end of the room to the other. Lockers contain books and hide things that are not easily monitored. Janitorial closets house cleaning solutions and solvents. Many Group E occupancies are multi-story buildings with classrooms on several floors.

Group E occupancies mix a high concentration of children with fuel loads on a daily basis. As budgets shrink, so do the number of adult supervisors. Our children are in schools because they are required to be there. We owe them a duty to ensure they are safe from the risk of fire while in school. We simply cannot wait for a catastrophe to protect children while at school.

Unfortunately the world of elementary, secondary and higher education learning has gone through tremendous changes in security measures undertaken, both operationally and hardware installations, due to the threat of violent acts committed against students and staff. Where we had educational facilities with highly effective fire drill evacuation procedures and actions during system activation, we now have written plans and training in place to ignore the activation of the fire alarm system if a "lockdown" has been declared because the activation of the fire alarm system may be a diversion to bring staff and students out into the open to serve as victims.

This is not a possible situation. This is a very real situation that occurs throughout the country in response to the acts of violence that have occurred at educational facilities. Though the exact procedure may vary site to site, the main premise of a "lockdown" is to gather staff and students into classrooms and offices and to lock the doors, preventing intruders from getting into the room and preventing staff and students from leaving the rooms until an all clear is announced. The staff and students are trained to ignore a fire alarm activation during a lockdown until they are ordered to evacuate after someone in authority, (could be a Principal or could be a Police Commander), makes a determination that the fire threat is real and that they must evacuate to survive the fire.

Because the students and staff will delay their evacuation while a fire is attacking the structure and potentially cutting off escape routes where corridors are not protected, this code change proposal will require all corridors serving an occupant load greater than 30 in group E educational occupancies to have 1 hour fire resistant rating except as allowed by Exception 1 to section 1018.1.

Exception 1 to Section 1018.1 is a legitimate exception for the one hour corridor fire resistant rating requirement, since it requires every classroom to have at least one door directly to the exterior and rooms used for assembly purposes have at least ½ of the required means of egress directly to the exterior as well. Under those conditions, there is no need for the students and other occupants to rely on exiting the building through the corridors since they can go directly to the exterior and move to a safe area of refuge. Once the announcement to evacuate occurs they can exit without being exposed to the fire threat potentially extended into the unprotected corridor.

However, if this is not the case, then the students, teachers, and other occupants of the educational occupancy must rely on the corridor system to exit safely from the building. In that case the paths of travel to get out of the building are restricted and the occupants may be exposed to the room of fire origin while trying to evacuate. Certainly, the basis for 1 hour fire resistive protection for corridors when the occupant load exceeds 30 is to provide for a reasonable level of protection for the occupants as they exit the building without having them unduly be exposed to a fire condition, water, and smoke which may impede their egress because they have delayed their evacuation due to a "lockdown".

It has been reported that there is an annual average of 14,700 fires in educational properties in the United States. The estimated average property loss from these fires is $85 million per year, and caused approximately 100 injuries. The costs of bussing students to alternate facilities, the impact of double sessions in schools to accommodate displaced students, and the mental aspect of the children who fell victim to the fires is less than construction costs of a 1 hour fire resistant corridor.

Nearly half (49.7 %) of these fires were incendiary or suspicious in nature. Structure fires can start in a wide variety of different areas. During 1999-2001, 23% of the fire origins were in bathrooms/locker rooms, 13% started in the kitchen area, 7% in the classrooms, and another 7% started in corridors. Even more disturbing are findings indicating that injuries per school fires are higher than those of ALL non-residential structure fires. Certainly, the fact that more than 70% of fires occur between 0800 and 1600, the hours students are most likely to be in school, and 16% of fires occur between 1700 and 2400; 12% occur between 2400 and 0800 shows that the threat of a fire occurring while children are present is real.

Currently, the International Building Code (IBC) allows the 1-hour fire –resistance rated corridor to be omitted where the building is protected by an automatic sprinkler system. We don't believe that such a "trade-off" is appropriate, especially in an educational occupancy where there are large numbers of children at relatively high density who are placed at risk in a fire situation. We believe that due to the expanding use of "lockdown" procedures a balanced design approach to providing life safety in educational occupancies is prudent so that the 1-hour fire resistance rated corridors can work in conjunction with the automatic sprinkler system to assure the level of life safety for the building's occupants intended by the code.

Note that an I-3 occupancy, (correctional centers, detention centers, jails, prerelease centers, prisons, and reformatories), requires the corridors to have 1 hour fire-resistance ratings when the occupancy is protected by a fire suppression system, regardless of the number of occupants. When a "lockdown" occurs in a school the staff and students are prisoners. They are prohibited from leaving the rooms or areas of protection until given permission (ordered) to do so, or because they are being held hostage. For consistency purposes the staff and students in educational occupancies deserve the same level of protection we provide to inmates. A comparison to the other I groups where evacuation of the occupants may be delayed or prevented because they are incapable of self preservation is also appropriate and substantiates a need to increase the protection level for corridors in the education group occupancies since in the case of "lockdowns" the staff and students are prevented from taking self preservation actions when the fire alarm activates until authorized, (ordered), to evacuate after an undetermined delay in time.

Other points to consider are the construction modifications made due to high-profile events and fuel loads in our schools. Events as the Columbine High School shootings, the need of school security can sometimes conflict with the requirements of fire safety. For example, exits may be restricted for security reasons preventing escape should a fire occur. Today's structures are unquestionably safer, yet the contents of today's classrooms are more combustible. Evidence suggests that fires in schools can spread far more rapidly due to the fuel load in the school buildings.

An additional benefit of the 1-hour fire resistance rated corridor is that it can assist fire fighters and tactical response team members in doing their job by providing a protected means of access to the interior of the building where they can perform their search and rescue missions, as well as fire fighting operations, in relative safety. Fire resistant corridors provide fire fighters and tactical response team members with additional time to conduct their life safety operations more effectively and safely.

From an economic perspective, fires rank as a major national problem, and since no individual safety measure is reliable all of the time, fire protection should and must be redundant. We are concerned that the compounding effect of sprinkler trade-offs could lead to greater risk to the life safety of the building occupants, especially if combined with the reduction in or the elimination of the 1 hour fire resistance rated corridors providing access to the exits or exit stairwells in an occupancy that routinely has staff and students drill and respond in real events to ignore fire alarm system activations. Too much reliance on automatic sprinkler systems may not be wise where life safety is a key consideration. We strongly believe that a balanced approach to fire and life safety in buildings should be provided when a fire occurs.

Zaremba -This code change was proposed by several parties in the last development cycle. Although half the Committee supported its adoption, the Chair broke a tie vote resulting in a Committee recommendation of disapproval. At the Final Action Hearings, however, the Committee recommendation was overturned. Although a motion to "approve as submitted" received a favorable vote of 55% of the Membership, it did not receive the 2/3 majority needed for adoption.

A majority of the Membership had good reason to favor the adoption of this proposal. First, the E occupancies at issue represent structures built to house a dense population of children ranging from ages 4 through early teens. Group E occupancies typically have paper and other flammables hung from ceiling to floor on every wall. Classrooms are filled with desks containing books, papers and other flammables. Science labs use chemicals and accelerants. Lunch rooms have stoves, ovens and trash cans spread throughout, all loaded with waste paper and other flammables. Theaters house clothing, wooden and cardboard props and paper banners strung from one end of to the other. Lockers contain books and hide things that are not easily monitored. Many Group E occupancies are multi-story buildings with relatively long corridors between classrooms and exit discharges.

In short, Group E occupancies represent a daily mix of high occupancy loads, children and significant fuel loads. As budgets shrink, so do the number of adult supervisors. E occupancies should provide children with an environment redundant in fire safety protections.

Especially because large numbers of children would be at risk in the event of a fire, redundant fire protection systems is warranted without waiting for a catastrophic loss of life to provide the motivation for making this change. Sprinklered Group E occupancies with corridors serving occupant loads of more than 30 children should include 1-hour fire resistance rated corridor construction.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME:Zaremba-E2-Table 1018.1

Public Hearing Results

Committee Action: Disapproved

Committee Reason: If you take away the trade off for sprinklers vs. rated corridors the result will be many more schools designed without sprinklers – sprinklered schools are safer during a fire event than schools with rated corridors. The antidotal data vs. the NFPA data does not justify the significant increase in the cost of construction. In addition there will be issues with maintaining the fire resistance rating of the walls especially to automatic closers on the doors being in-place and functional. The fire doors with automatic closers will be a problem for access to classrooms. This would also require rated corridors in day care facilities, which would be excessive. Information was not provided for the justification for the 30 occupant exception for the proposed ratings

The proponents continually brought up the possibility of a fire event during a lockdown situation. Rating of a corridor is a means of egress issue, not a security issue. Rated corridors will not protect students from terrorists during a lockdown situation. If there is, a concern for a fire event during a lock-down that needs to be addressed with the emergency responders in the fire and safety evacuation plans, not through a corridor rating. In addition, there are other safety concerns in schools. Schools commonly have doors with vision panels and sidelights for observation of the classrooms and student/teacher interaction. Requiring rated doors at these locations would either significantly raise the costs for the opening protective and/or result in solid doors without this necessary observation feature.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Mike Ashley, representing Alliance for Fire & Smoke Containment & Control, Inc., requests Approval as Submitted.

Commenter's Reason: All exit corridors in E occupancies should be 1 hour protected construction, this does not include the small corridors that may serve offices such as principle, councilors or other small areas.

With today's security issues school systems do not evacuate the buildings immediately when the fire alarm is sounded. The students and staff are held in place until the administrative staff checks for the problem and then the students and staff exit if necessary.

Without a rated corridor the safety of the students and staff become comprised due to the extra time required to exit the building.

Second with main streaming of students with special needs extra time is required to get special needs students into wheel chairs or other types of transporting devices and exit the building. Actual surveys show that one child with special needs that is in his or her study desk requires up to 12 minutes to assist the child out of the desk and placed into the wheel chair and then pushed to the safe area outside the building. The one hour protected corridor allows this child and staff person the added safety from fumes and gases and smoke that will occur in a fire event.

Public Comment 2:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee (GICC), a Committee of the Glass Association of North America (GANA); Robert J. Davidson, Davidson Code Concepts, LLC, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 1018.1
CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system[c]
H-1, H-2, H-3	All	Not permitted	1
H-4, H-5	Greater than 30	Not permitted	1
A , B , F , M , S , U	Greater than 30	1	0
E	~~Greater than 30~~ <u>All</u>	1	1
R	Greater than 10	Not permitted	0.5
I-2[a],I-4	All	Not permitted	0
I-I, I-3	All	Not Permitted	1[b]

a. For requirements for occupancies in Group I-2. See Sections 407.2 and 407.3.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 901.3.1.1 or 903.3.1.2 where allowed.

Commenter's Reason: Adopting this proposal will significantly increase the fire safety of both life and property in new schools. An increased level of fire safety is clearly justified in schools because, every year, there are an average of 5,500 fires in schools throughout the Country. More than 70% of these fires happen while students are in the classrooms. Every year, these fires claim approximately 125 injuries and more than $50 Million in property damage. (See, Topical Fire Research Series, Vol. 8, Issue 1 (August 2007) U.S. Fire Administration, Department of Homeland Security; Report of School Fires prepared by Catastrophic Fire Prevention Task Force of the National Association of State Fire Marshalls 2002).

There is nothing anecdotal about the need for increased levels of fire safety in our schools. It is a fact that fires regularly occur in schools throughout our country. Their frequency, severity and the fact that they regularly occur while occupied by teachers and students, clearly separates E-occupancies from the other occupancies with which they are currently grouped in Table 1018.1.

If adopted, this proposal would require 1-hour fire-resistance rated corridors in E-occupancies with fire areas less than 12,000 square feet. (Only E-occupancies with fire areas greater than 12,000 square feet are required to have automatic sprinkler systems pursuant to section 903.2.3 of the IBC.) It would require both sprinkler systems and rated corridors in E-occupancies with fire areas greater than 12,000 square feet. This would provide the same type of redundancy for sprinklered E-occupancies that is currently required in R-occupancies and many I-occupancies. Since our children, and our tax dollars, are both at stake in the level of fire protection afforded to our schools, the adoption of this change is both warranted and appropriate.

The Committee disapproved this proposal claiming that only "anecdotal" evidence had been submitted in support. As set forth above, that is, simply, not correct. Educational occupancies are the subject of frequent fires that repeatedly result in significant injuries and property losses every year.

The Committee also confused "security" issues and "life safety issues" as they relate to lockdowns. Post-9/11 and post-Columbine, educational occupancies have been forced to retreat from procedures requiring occupants to immediately exit schools as soon as a fire alarm is sounded out of concern that either a fire will be set or fire alarms falsely activated in order to draw students out of their classrooms, into the open where they are vulnerable to violent acts. This has resulted in the initiation of "lockdown" procedures typically requiring students to be locked in their classrooms following fire alarms until authorities can ascertain that the building is free of intruders. These new "security" procedures significantly increase the risks to life in the event of fire by significantly increasing the length of time that students are forced to remain in their classrooms before they are allowed to exit a burning building. These increased risks can and should be mitigated by requiring automatic sprinkler systems and one-hour fire-resistance rated corridors.

Adding rated corridors to sprinklered E-occupancies is not being proposed to somehow protect students from terrorists, as suggested by the Committee. It is being proposed to address the fact that numerous fires occur in our schools each and every year. Those fire risks are significantly increased by the realities of new lockdown procedures. This proposal is about safeguarding life and property in our schools from the risks of fire.

It was originally proposed that this change only apply to corridors serving occupant loads greater than 30. The Committee saw no justification for that exception and, accordingly, the proposal has been modified to remove it.

Final Action Agenda voters are strongly urged to vote against the standing motion to disapprove in order to vote in favor of a motion to approve E113 As Modified by this Public Comment.

Final Action: AS AM AMPC____ D

E114-09/10

1018.1, 1018.1.1 (New) [IFC [B] 1018.1, 1018.1.1 (New)]

Proposed Change as Submitted

Proponent: Robert J Davidson, Code Consultant, Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM); Thomas S. Zaremba, Roetzel & Andress representing self

Add new text as follows:

1018.1 (IFC [B] 1018.1) Construction. Corridors, other than those regulated by Section 1018.1.1, shall be fire-resistance rated in accordance with Table 1018.1. The corridor walls required to be fire-resistance rated shall comply with Section 709 for fire partitions.

Exceptions:

1. A fire-resistance rating is not required for corridors in an occupancy in Group E where each room that is used for instruction has at least one door opening directly to the exterior and rooms for assembly purposes have at least one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A fire-resistance rating is not required for corridors contained within a dwelling or sleeping unit in an occupancy in Group R.
3. A fire-resistance rating is not required for corridors in open parking garages.
4. A fire-resistance rating is not required for corridors in an occupancy in Group B which is a space requiring only a single means of egress complying with Section 1015.1.

TABLE 1018.1 (IFC [B] TABLE 1018.1)
CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system[c]
H-1, H-2, H-3	All	Not Permitted	1
H-4, H-5	Greater than 30	Not Permitted	1
A, B, E, F, M, S, U	Greater than 30	1	0
R	Greater than 10	Not Permitted	0.5
I-2[a], I-4	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1[b]

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3.
b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8.
c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

1018.1.1 (IFC [B] 1018.1.1) Category III and IV Buildings in Hurricane-Prone and Seismic Areas. Corridors in all Category III and Category IV buildings as defined in Table 1604.5 shall have a fire resistance rating of 1-hour if located in hurricane-prone regions defined in Section 1609.2 or assigned to seismic design categories C, D, E or F in Section 1613.5.6.

Reason:
Davidson, Shuman - Category III buildings are defined in Table 1604.5 as those “that represent a substantial hazard to human life in the event of failure.” They include, but are not limited to:

- Public assembly occupancies with occupant loads greater than 300,
- Elementary or secondary schools or day care facilities with occupant loads greater than 250,
- Adult education facilities with occupant loads greater than 500,
- Group I-2 occupancies with occupant loads greater than 50, and
- Group I-3 occupancies.

Category IV buildings are those which are designated as essential facilities. “Essential Facilities” are defined in section 1602.1 as “buildings and other structures that are intended to remain operational in the event of extreme environmental loading from flood, wind, snow or earthquakes. These include, but are not limited to:

- Designated earthquake, hurricane or other emergency shelters,
- Designated emergency preparedness, communications and operations centers and other facilities required for emergency response, and
- Fire, rescue, ambulance and police stations and emergency vehicle garages.

In the face of impending natural disasters, residents regularly seek refuge in, or are evacuated from their homes to, Category III or IV buildings. At the same time, hurricanes and earthquakes regularly render roads impassable, often times cutting these evacuation shelters off from municipal and emergency medical, police and fire services. Even if these sites remain accessible by road, first responders may be unable to promptly respond when confronted with the wide spread devastations of a hurricane or earthquake.

Adopting this code change would ensure that redundant safety features, in the form of sprinklers and fire resistance rated corridors, are in place to ensure a safe evacuation of high occupancy buildings used as emergency shelters in hurricane and seismic areas.

Zaremba - Buildings and infrastructures can be severely damaged in hurricanes and earthquakes.

Category III buildings are those that represent a “substantial hazard to human life in the event of failure” and include buildings with high occupancy loads, for example, public assembly buildings with occupant loads greater than 300; elementary or secondary schools or day care facilities with occupant loads greater than 250; adult education facilities with occupant loads greater than 500; Group I-2 occupancies with occupant loads greater than 50; and Group I-3 occupancies.

Category IV buildings are specifically intended to provide shelter in natural catastrophes. These are “essential facilities,” defined in section 1602.1 as those intended to remain operational throughout a natural disaster. They include designated earthquake, hurricane or other emergency shelters; designated emergency preparedness, communications and operations and emergency response centers; and fire, rescue, ambulance and police stations and emergency vehicle garages.

Hurricanes and earthquakes can quickly interrupt utilities, including power, communications and water supplies, while slowing or prohibiting travel to and from these facilities. A fire in a Category III or IV building during or after a hurricane or seismic event could result in a significant loss of life when large concentrations of people, including first responders, or those suffering from disabilities, are forced to evacuate under circumstances where communications and sprinkler systems are inoperable and emergency fire and rescue services are inaccessible or unavailable. To ensure safe evacuations in the event of fire, this proposal would require Cat. III and IV buildings in hurricane prone and seismic areas to include 1-hour fire-resistance rated corridors.

Cost impact: The code change proposal will increase the cost of construction.

ICCFILENAME:Davidson-Shuman-E2-1018.1.1

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Buildings in earthquake and hurricane areas are already designed to a higher standard, therefore this rated corridor requirement is not needed. Structural robustness is not related to fire-resistance-rated corridors. Technical justification was not providing indicating that the fire incidences are higher for the specified buildings in earthquake and hurricane areas. This would require rated corridors in schools, police stations, fire stations, all emergency shelters (i.e., churches, schools, community centers, football stadiums). This would be a serious operational issue for Group I-2 functions where this would require rated corridors.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee (GICC), a Committee of the Glass Association of North America (GANA); Robert J. Davidson, Davidson Code Concepts, LLC, representing self, requests Approval as Submitted.

Commenter’s Reason: This proposal will increase the fire safety of high hazard Category III and IV Buildings found in hurricane and seismic zones. In that regard, it proposes that occupants and property in these types of Buildings be protected from the risks of fire by 1-hour fire resistance rated exit corridors since hurricanes and earthquakes often cause a loss of water supply to sprinkler systems.

Category III and IV buildings are well defined in Chapter 16 of the IBC. Category III buildings are those that represent “a substantial hazard to human life in the event of failure” and Category IV buildings are those designated as “essential facilities.” See, Table 1604.5

In recommending disapproval, the Committee mistakenly believed that this proposal was somehow attempting to use the fire resistance ratings of exit corridors to address the “structural robustness” of Category III and IV buildings. While it may be understandable for the Committee to make such a mistake since this proposal did not come before the Committee until after 10:00 o'clock at night, it is clear that this proposal has nothing to do with "structural robustness." It proposes 1-hour fire resistance rated corridors to address and enhance the **fire** safety of Category III and IV buildings found in areas that suffer from a high risk that water supplies to their sprinkler systems will be lost during or after seismic and hurricane events.

Simply put, water supplies upon which sprinkler systems depend are often interrupted as a result of hurricanes and earthquakes. This means that occupants and property in Category III and IV buildings will be subjected to a higher risk of loss from fire if those buildings are only protected by sprinkler systems. That risk is magnified by the fact that during natural disasters, fire service and other emergency service response times are frequently delayed by overwhelming numbers of emergency calls; losses of power and communications; impassable roads; and many other dangers incident to the delivery of emergency services during natural disasters. The fire safety of these high hazard Category III and IV buildings can be significantly increased by requiring exit corridors with 1-hour fire resistance ratings.

Category III and IV buildings are very likely to be occupied during or after natural disasters. A failure of Category III or IV buildings to protect occupants from the risk of fire after a loss of water supply would represent "a substantial hazard to human life" and a substantial risk to the ability to provide essential services to those affected by natural disasters.

Final Action Agenda voters are strongly urged to vote against the standing motion to disapprove in order to vote in favor of a motion to approve E114 "As Submitted."

Final Action: AS AM AMPC____ D

E115-09/10

1018.2, Table 1018.2 (New) [IFC [B] 1018.2, Table 1018.2 (New)]

Proposed Change as Submitted

Proponent: John England, MCO, England Enterprises Inc., representing self

1. Revise as follows:

1018.2 (IFC [B] 1018.2) Corridor width. The minimum corridor width shall be as determined in Section 1005.1, but not less than specified in Table 1018.2 ~~but not less than 44 inches (1118 mm).~~

~~Exceptions:~~

1. ~~Twenty-four inches (610 mm)—For access to and utilization of electrical, mechanical or plumbing systems or equipment.~~
2. ~~Thirty-six inches (914 mm)—With a required occupant capacity of less than 50.~~
3. ~~Thirty-six inches (914 mm)—Within a dwelling unit.~~
4. ~~Seventy-two inches (1829 mm)—In Group E with a corridor having a required capacity of 100 or more.~~
5. ~~Seventy-two inches (1829 mm)—In corridors and areas serving gurney traffic in occupancies where patients receive outpatient medical care, which causes the patient to be not capable of self-preservation.~~
6. ~~Ninety-six inches (2438 mm)—In Group I-2 in areas where required for bed movement~~

2. Add new Table as follows:

Table 1018.2 (IFC [B] Table 1018.2)
MINIMUM CORRIDOR WIDTH

Occupancy	Width (inches)
Any facilities not listed below	44 inches
Access to and utilization of mechanical, plumbing or electrical systems or equipment	24 inches
Occupant load less than 50	36 inches
Within a dwelling unit	36 inches
Group E with occupant load of 100 or more	72 inches
Group B or I-2 outpatient medical facilities where patients are moved on gurneys	72 inches
Group I-2 in areas where care recipients are moved on beds	96 inches

For SI: 1 inch=25.4 mm

Reason: A table will make it easier to understand.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: The terminology used in the text of the exceptions is different than the terminology used in the proposed table. A concern would be if this change in terminology change the original interpretation of these exceptions.

ICCFILENAME:England-E1-1018.2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Placing the base requirement and exceptions in a table makes the requirements easier to understand.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Table 1018.2 (IFC [B] Table 1018.2)
MINIMUM CORRIDOR WIDTH

Occupancy	**Width (inches)**
Any facilities not listed below	44 inches
Access to and utilization of mechanical, plumbing or electrical systems or equipment	24 inches
~~Occupant load~~ With a required occupancy capacity less than 50	36 inches
Within a dwelling unit	36 inches
In Group E with a corridor having a required capacity ~~occupant load~~ of 100 or more	72 inches
In corridors and areas serving gurney traffic in occupancies where patients receive outpatient medical care, which causes the patient to be not capable of self-preservation ~~Group B or I-2 outpatient medical facilities where patients are moved on gurneys~~	72 inches
Group I-2 in areas where required for bed movement ~~care recipients are moved on beds~~	96 inches

For SI: 1 inch=25.4 mm

Commenter's Reason: The proposed modification is intended to address a valid question raised by the staff comment. While the intent of the code change is purely editorial, the slight differences in the current and revised text raises enough questions so that it won't consistently be interpreted the same as current code. One example: current code says that in Group E, corridors with a required capacity of 100 occupants have a minimum 72" width. In the original proposal, this is instead stated as a minimum 72" corridor width for ' Group E with an occupant load of 100 or more'. This bases the corridor width on the overall occupant load of the occupancy, rather than the required capacity of the specific corridor. The modification simply places wording identical to the current text into the newly proposed table.

Final Action: AS AM AMPC____ D

E122-09/10, Part I
1021.2 (IFC [B] 1021.2)

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I.

Proposed Change as Submitted

Proponent: Christine Reed and Stuart Tom, P.E., CBO, representing the California Fire Chiefs Association and the Los Angeles Basin Chapter, ICC; Jonathan C. Siu, representing City of Seattle, Department of Planning and Development

PART I – IBC MEANS OF EGRESS

Revise as follows:

1021.2 (IFC [B] 1021.2) Single exits. ~~Only one exit shall be required from Group R-3 occupancy buildings or from stories of other buildings as indicated in Table 1021.2.~~ Occupancies shall be permitted to have a single exit in buildings otherwise required to have more than one exit if the areas served by the single exit do not exceed the limitations of Table 1021.2. Mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with a single exit shall not be located more than one story below grade plane.

Reason:
PART I –Section 1015.1 and Section 1021.1 both contain identical, very specific, exception language that allows Group R-3 occupancies to be permitted with one means of egress provided the occupant load is limited to a maximum of 20 and the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. As currently written, Section 1021.2 creates two (2) potential conflicts.

In one case, a potential conflict arises if the stricken sentence remains because of the reference "… as indicated in Table 1021.2". Table 1021.2 limits the number of occupants on the first story or basement of Group R occupancies to a maximum of 10 and a maximum travel distance of 75 feet. This conflict would result in the severe limitation of the size of 1-story Group R-3 occupancies with one means of egress to only 2,000 square feet, which is contrary to Sections 1015.1 and 1021.1 which allow up to 4,000 square feet in buildings equipped throughout with an automatic sprinkler system.

In the second case, a potential conflict arises if the stricken sentence remains because some readers might ignore the reference " … as indicated in Table 1021.2" and provide only one means of egress for Group R-3 occupancy buildings regardless of size. This would be in conflict with Sections 1015.1 and 1021.1 which impose a size limitation of 4,000 square feet based upon the maximum occupant load limit of 20, considering the occupant load factor of 200 square feet per occupant as indicated in Table 1004.1.1.

This proposal eliminates a confusing sentence within Section 1021.2, that is currently in conflict with Sections 1015.1 and 1021.1, thereby making all three sections consistent.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME:tom-reed-siu-E1-1021.2

Public Hearing Results

PART I IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Committee Reason: The first sentence in Section 1021.2 is redundant with the text in Section 1021.1 and 1015.1. This should be correlated with the committee actions on E119 and E121.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Steve Orlowski, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1021.2 (IFC [B] 1021.2) Single exits. <u>Only one exit shall be required from</u> <u>one- and two-family dwellings and townhouses. All other</u> occupancies shall be permitted to have a single exit in buildings otherwise required to have more than one exit if the areas served by the single exit do not exceed the limitations of Table 1021.2. Mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with a single exit shall not be located more than one story below grade plane.

Commenter's Reason: Based on the supporting arguments made by the original proponent, NAHB considers this suggested modification to be in keeping with the proper style of code language and appropriately deals with the two concerns of the original proponent. This modification correctly address the concerns that there are times when a group R-3 occupancies need to require an additional exit based on its use, while still exempting one- and two- family dwellings and townhouses from the requirements of Table 1021.2 and allowing for a single exit.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

E122-09/10, PART II – IRC BUILDING/ENERGY
R311.4

Proponent: Christine Reed and Stuart Tom, P.E., CBO, representing the California Fire Chiefs Association and the Los Angeles Basin Chapter, ICC; Jonathan C. Siu, representing City of Seattle, Department of Planning and Development

Revise as follows:

R311.4 Vertical egress. Egress from habitable levels including habitable attics and basements not provided with an egress door in accordance with Section R311.2 shall be by ~~a~~ <u>one or more</u> ramp<u>s</u> in accordance with Section R311.8 or ~~a~~ <u>one or more</u> stairway<u>s</u> in accordance with Section R311.7 <u>or both</u>. <u>Habitable levels larger than 1,000 square feet (92.9 m^2) located more than one story above or below an egress door shall be provided with not less than two means of egress.</u>

Reason:
PART II –The IRC fails to address the fact that a single exit may not be sufficient for every R-3 occupancy One- or Two- Family Dwelling. While a single exit may be suitable for most dwellings, the same cannot be said of all dwellings. The IRC establishes the standards that will also apply to very large dwellings and dwellings constructed on steep lots, where egress design becomes more critical.

In comparison, the IBC addresses the need for a second means of egress through Sections IBC 1015.1 and IBC 1021.1. Both of these provisions will require a second means of egress from a Group R-3 occupancy if the occupant load exceeds 20 persons. Furthermore, since the IBC utilizes the 3-part means of egress design concept, Group R-3 occupancies regulated by the IBC would be required to have both means of egress comply with all applicable provisions of IBC Chapter 10.

Since the IRC does not utilize the 3-part means of egress concept nor the occupant load concept, it is not practical to use the same approach as the IBC in establishing whether a second means of egress is required in R-3 occupancies up to 3-stories in height. Furthermore, the need for a second means of egress is most critical on floors that are located more than one story above or below an egress door. This proposal does not require a second means of egress from 1- or 2- story Group R-3 occupancies because the length of vertical egress travel is inherently limited to a maximum of one story in such buildings. This proposal will only require a second means of egress from habitable levels that are located more than one level above or below the egress door, and only if such levels exceed 1,000 square feet in area. Egress from such occupied floor levels becomes more critical because of the combination of increased vertical egress travel combined with the increased travel distance within a large floor area exceeding 1,000 square feet.

The IRC also fails to adequately address egress from Group R-3 occupancy dwellings constructed on steep hillside lots, especially lots located on the down-slope side of a street. Many jurisdictions throughout the country have steep hillside residential areas, where it is common to construct homes on the down-slope side of a street with the topmost floor located at street level and two additional floors located below street level. Often such down-slope lots are so steep that there is no usable rear yard. Consequently, homes constructed on such steep terrain typically do not have a rear door (that could serve as a second means of egress), because a door that leads to a steep and unusable rear yard is not likely to be installed. This proposal would require such occupied levels that are greater than 1,000 square feet in area to be provided with a second means of egress.

This code change proposal will not affect the majority of Group R-3 occupancy One- and Two- Family Dwellings regulated by the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

PART II- IRC B/E
Committee Action: **Disapproved**

Committee Reason: The committee recognizes there is a need for this in large mansions. However, this proposal is unclear and confusing on how to apply. The 1000 square foot threshold is an arbitrary number. The remoteness of the two means of egress is not addressed. There is no data for deaths or injuries associated with this situation.

Assembly Action: **None**

E124-09/10
1022.3, 1022.4 (IFC [B] 1022.3, 1022.4)

<u>Proposed Change as Submitted</u>

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

1022.3 (IFC [B] 1022.3) Openings ~~and penetrations~~. Exit enclosure opening protectives shall be in accordance with the requirements of Section 715.

Openings in exit enclosures other than unprotected exterior openings shall be limited to those necessary for exit access to the enclosure from normally occupied spaces and for egress from the enclosure. <u>There shall be no communicating openings, whether protected or not, between adjacent exit enclosures.</u>

Elevators shall not open into an exit enclosure.

1022.4 (IFC [B] 1022.4) Penetrations. Penetrations into and ~~openings~~ through an exit enclosure are prohibited except for ~~required exit doors,~~ equipment and duct work necessary for independent pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication and electrical raceway serving the exit enclosure and terminating at a steel box not exceeding 16 square inches (0.010 m^2). Such penetrations shall be protected in accordance with Section 713.

There shall be no penetrations ~~or communicating openings~~, whether protected or not, between adjacent exit enclosures.

Reason: The current title of Section 1022.3 is somewhat misleading in that it references "penetrations." No provisions in Section 1022.3 apply to penetrations and there are no cross-references to Section 713. Section 1022.4, however, does address the penetration provisions applicable to exit enclosures. Technical references to openings in Section 1022.4 have either been removed or relocated to Section 1022.3. For instance, the reference to "required exit doors" in the first sentence has been eliminated because that concern is addressed in the second paragraph of Section 1022.3 that limits openings into an exit enclosure to those necessary for egress. Approval of this proposal will reduce confusion and assist users in the correct identification of applicable exit enclosure opening and penetration requirements.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Keith-E8-1022.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The current text for openings and penetrations is clear. It is not clear what the proponent was trying to address in the revisions.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Submitted.

Commenter's Reason: It appears that the ICC Means of Egress Code Committee may not have understood the intent of Item E124-09/10. In their published reason statement for disapproval, it was stated, "The current text for openings and penetrations is clear. It is not clear what the proponent was trying to address in the revisions.

The proposal was intended to be purely editorial in nature. It contained no technical changes. The intent of the proposal was to organize applicable technical provisions in the proper section. Currently, Section 1022.3 is titled, "Openings and penetrations"; however, it contains no requirements pertinent to penetrations and there are no cross references to Section 713. Therefore, "penetrations" was removed from the section heading. Section 1022.4 is titled, "Penetrations"; however, it contains some technical provisions applicable to openings. Those provisions have been properly relocated in Section 1022.3, Openings.

E124-09/10 simply creates proper section headings and correctly places applicable technical requirements within those sections. Approval of this proposal will reduce confusion and assist users in the correct identification of applicable exit enclosure opening and penetration requirements.

Final Action: AS AM AMPC____ D

E126-09/10

1022.4, 1023.6 (IFC [B] 1022.4, 1023.6)

Proposed Change as Submitted

Proponent: Matthew Davy, PE, Schirmer Engineering Corporation, representing self

Revise as follows:

1022.4 (IFC [B] 1022.4) Penetrations. Penetrations into and openings through an exit enclosure are prohibited except for required exit doors, equipment and ductwork necessary for independent ventilation or pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication systems and electrical raceway serving the exit enclosure and terminating at a steel box not exceeding 16 square inches (0.010 m^2). Such penetrations shall be protected in accordance with Section 713. There shall be no penetrations or communication openings, whether protected or not, between adjacent exit enclosures.

Exception: Membrane penetrations shall be permitted on the outside of the exit enclosure. Such penetrations shall be protected in accordance with Section 713.3.2.

1023.6 (IFC [B] 1023.6) Penetrations. Penetrations into and openings through an exit passageway are prohibited except for required exit doors, equipment and ductwork necessary for independent pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication and electrical raceway serving the exit passageway and terminating at a steel box not exceeding 16 square inches (0.010m^2). Such penetrations shall be protected in accordance with Section 713. There shall be no penetrations or communicating openings, whether protected or not, between adjacent exit passageways.

Exception: Membrane penetrations shall be permitted on the outside of the exit passageway. Such penetrations shall be protected in accordance with Section 713.3.2.

Reason: The purpose of Sections 1022.4 and 1023.6 is to limit through penetrations into an exit enclosure or exit passageway; however, membrane penetrations should be permitted on the outside of the exit enclosure or exit passageway. As currently written, a pull station next to a door into the stair, fire hose cabinets, fire extinguisher cabinets, request-to-exit devices related to access control locks, notification appliances, etc., are not permitted on the outside of the exit enclosure. This exceptions needs to clarify the intent of Sections 1022.4 and 1023.6.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME:Davy-E1-1023.5

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Membrane penetration in the walls of exit enclosures is a common practice. The allowance maintains a reasonable level of safety.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ali M. Fattah, P.E., City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1022.4 (IFC [B] 1022.4) Penetrations. Penetrations into and openings through an exit enclosure are prohibited except for required exit doors, equipment and ductwork necessary for independent ventilation or pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication systems and electrical raceway serving the exit enclosure and terminating at a steel box not exceeding 16 square inches (0.010 m2). Such penetrations shall be protected in accordance with Section 713. There shall be no penetrations or communication openings, whether protected or not, between adjacent exit enclosures.

E**xception:** Membrane penetrations for manual fire alarm boxes, access or egress control devices, emergency communication devices and fire alarm notification appliances shall be permitted on the outside of the exit enclosure. Such penetrations shall be protected in accordance with Section 713.3.2.

1023.6 (IFC [B] 1023.6) Penetrations. Penetrations into and openings through an exit passageway are prohibited except for required exit doors, equipment and ductwork necessary for independent pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication and electrical raceway serving the exit passageway and terminating at a steel box not exceeding 16 square inches (0.010m2). Such penetrations shall be protected in accordance with Section 713. There shall be no penetrations or communicating openings, whether protected or not, between adjacent exit passageways.

Exception: Membrane penetrations for manual fire alarm boxes, access or egress control devices, emergency communication devices and fire alarm notification appliances shall be permitted on the outside of the exit passageway. Such penetrations shall be protected in accordance with Section 713.3.2.

Commenter's Reason: This Code change as proposed and approved by the Means of Egress Committee is too broad and allows any membrane penetration into exit enclosures and exit passageways that are designed to allow occupants to egress through fire floors or through areas under fire. These exit elements are highly protected, have unlimited travel distance and send occupants through areas of the building that may be under fire conditions. Other egress components protect exit ways from smoke. The proponent testified and that it would be difficult to place a recessed manual fire alarm boxes immediately adjacent to exit doors into exit enclosures as is required in chapter 9. This section as approved will not prevent medicine cabinets, electrical panels, or a whole host of other large items from breaching the outer membrane of the exit passageway. Fire extinguishers and fire hose cabinets do not have to be installed on the walls of the exit enclosure.

Final Action: AS AM AMPC____ D

E129-09/10
1023.3 (IFC [B] 1023.3)

Proposed Change as Submitted

Proponent: Michael DiMascio, Arup, representing self

Revise as follows:

1023.3 (IFC [B] 1023.3) Construction. Exit passageway enclosures shall have walls, floors and ceilings of not less than 1-hour fire-resistance rating~~, and not less than that required for any connecting exit enclosure~~. When acting as a horizontal continuation of an exit enclosure on the level of exit discharge, the fire-resistance rating of the exit passageway shall not be less than the rating required for the exit enclosure. Exit passageways shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both.

Reason: This amendment is primarily intended as clarification. The present wording uses the term "any connecting exit enclosure". This has been interpreted to require a 2-hr exit passageway on a floor, other than the level of exit discharge, even when the exit passageway; (1) only provides access to a 2-hr vertical exit enclosure, which in turn continues to exit discharge, (2) only serves the floor on which it is located and (3) is separated from the vertical exit enclosure by 2-hr rated construction and the required opening protectives. This exit passageway is not a "continuation" of the vertical exit enclosure. It provides access to the vertical exit enclosure and is properly separated from the vertical exit enclosure. The level of protection provided is commensurate with the hazard, since the exit passageway is only protecting occupants from the hazards on the floor they are exiting. Whereas the vertical exit enclosure provides protection from the hazards on all floors it connects. In fact the code only requires a 1 hour rated vertical exit enclosure when the enclosure connects three floors or less.

This amendment provides needed clarification to the level of protection intended.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Dimascio-E1-1023.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Exit passageways when connected to an exit stairway at the level of exit discharge or at upper levels should have a consistent level of protection throughout. The reduction of the fire resistance rating is not justified.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Raymond A. Grill, Arup, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1023.3 (IFC [B] 1023.3) Construction. Exit passageway enclosures shall have walls, floors and ceilings of not less than 1-hour fire-resistance rating. When acting as a horizontal continuation of an exit enclosure required to have a fire-resistance rating of not less than 2 hours ~~on the level of exit discharge, the fire-resistance rating of~~ the exit passageway enclosure shall ~~not be less than the rating required for the exit enclosure~~ shall have a fire-resistance rating of not less than 2 hours. Exit passageways shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both.

Commenter's Reason: The original proposal never intended that the fire resistance rating be reduced for a passageway that connects two 2-hour rated stair enclosures (i.e., stair transfer). This was the committee's perception of the intent behind the original proposal as noted during the discussion of the committee action.

The modification makes it clear that if the passageway provides a continuation of a 2 hour fire rated enclosure, the passageway must be 2 hour.

A passageway that is provided solely to address travel distance such as in a mall and that may provide access to stairs,

Final Action: AS AM AMPC____ D

E130-09/10

1002.1, 1023.4 (IFC [B] 1002.1, 1023.4)

Proposed Change as Submitted

Proponent: Michael DiMascio, Arup; representing self

Revise as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXIT PASSAGEWAY. An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a horizontal direction to an exit or an exit discharge ~~or the public way~~.

1023.4 (IFC [B] 1023.4) Termination. Exit passageways on the level of exit discharge shall terminate at an exit discharge ~~or a public way~~. Exit passageways on other levels shall terminate at an exit.

Reason: This amendments are primarily intended as clarification. The present wording does not define the use of exit passageways on levels other than the level of exit discharge. This means it does not address the use of exit passageways in malls and on upper and lower floors in buildings with large floor plates. In malls, exit passageways are frequently used between the mall itself and the vertical exit enclosure. (See Section 402.4.5 and 402.4.6) Using exit passageways on levels other than the level of exit discharge is a common practice where the travel distance to the vertical exit enclosure exceeds the allowable travel distance. The removal of the term, "or a public way" is for consistency. Based on the definition of means-of-egress, you must pass through an exit discharge before you reach a public way. Since the exit passageway is an extension of the exit enclosure, it must end at an exit discharge when located on the level of exit discharge.

This amendment provides needed clarification as to when the exit passageway must terminate at an exit discharge and clarifies it would not end at a public way.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Dimascio-E2-1023.4

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal clarifies that transfer passageways at upper floors between exit enclosures are permitted and that the rating must be consistent for the entire enclosure.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Ali M. Fattah, P.E., City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXIT PASSAGEWAY. An exit component that is separated from other interior spaces of a building or structure by fire resistance rated construction and opening protectives, and provides for a protected path of egress travel in a horizontal direction to an exit or an exit discharge <u>or the public way</u>.

1023.4 (IFC [B] 1023.4) Termination. Exit passageways on the level of exit discharge shall terminate at an exit discharge <u>or a public way</u>. Exit passageways on other levels shall terminate at an exit<u> enclosure.</u>

Commenter's Reason: The proposed code change to Section 1023.4 as initially submitted will allow an exit passageway to terminate at a horizontal exit. It will also allow an exit enclosure that transfers horizontally via a passageway to terminate at a horizontal exit. Both are code violations and have never been permitted in any of the legacy codes. This code change will lead to conflicts with Section 1022 that states in part that "…Exit enclosures shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1". Section 1023.4 as published in the 2009 IBC is not broken and does need to be changed and this public comment respects the wish of the committee and attempts to correct an inadvertent omission.

Public Comment 2:

Lawrence G. Perry, AIA, representing the Building Owners and Managers Association (BOMA) International, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1023.4 (IFC [B] 1023.4) Termination. Exit passageways on the level of exit discharge shall terminate at an exit discharge. Exit passageways on other levels shall terminate at <u>or connect to</u> an exit.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The concern with the language as approved is that it can be read to require a physical separation (exit doors and walls) between a vertical exit enclosure and an exit passageway. Where an exit passageway is used on an upper floor to serve as a transfer corridor where the vertical enclosure offsets, there is no reason to be required to 'terminate' the exit passageway at each end. The proposed modification appears to retain the overall intent of the change, but eliminate the potential misapplication of separation requirements between exits and exit passageways.

Final Action: AS AM AMPC____ D

E131-09/10

1024.4 (IFC [B] 1024.4)

Proposed Change as Submitted

Proponent: Lee C. DeVito, PE, FIREPRO Incorporated, representing self

Revise as follows:

1024.4 (IFC [B] 1024.4) ~~Self-luminous and photoluminescent~~ <u>Luminescent materials</u>. Luminous egress path markings shall be permitted to be made of any material, including paint, ~~provided that an electrical charge is not required to maintain the required luminance~~. Such materials shall include, but are not limited to, self-luminous materials ~~and~~ photoluminescent materials <u>and electroluminescent materials</u>. Materials shall comply with either:

1. UL 1994; or
2. ASTM E 2072, except that the charging source shall be 1 foot-candle (11 lux) of fluorescent illumination for 60 minutes, and the minimum luminance shall be 30 millicandelas per square meter at 10 minutes and 5 millicandelas per square meter after 90 minutes.

Reason: Electrical systems provide the building management with more flexibility with the operation of the exit path marking systems.

Electrical systems do not need backup lighting which will allow building managers to control lighting. Furthermore, energy savings and Green/LEEDS requirements (for example thru the use of motion sensor lighting) may be further achieved with electroluminescent materials, as separate, continuously operational light sources are not required for charging purposes. A later section of this code, 1024.5 Illumination, requires means of egress illumination for photoluminscent exit path markings is required for at least 60 minutes prior to periods when the building is occupied. Electroluminescent exit path markings would not require this.

Electrical systems can be operated at any time as they have available power and they are protected with battery standby support. Therefore, the building management can utilize the electrical systems whenever there is an alarm activity or other situation in the building, whether the building power is available or not. Self luminous and photoluminescent materials only provide lighting when the background lighting is limited.

Electrical systems are supervised so the building management will know that there is a problem. Self-luminous materials and photoluminescent materials are not supervised, so they can be damaged or removed and no one is notified until a manual check is performed on the system. Whereas the systems are required in some high-rise buildings manual inspection will be time consuming and possibly burdensome, which may mean that self luminous or photoluminescent systems may not be inspected.

The building management can utilize the flexibility of electrical systems to provide further information on the availability or disruption of an egress path.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Devito-E1-1024.4

Public Hearing Results

Committee Action: Disapproved

Committee Reason: While this new technology will allow greater flexibility, this proposal is not clear on electrical backup and supervision requirements. There is still the issue of maintenance of the battery system. Would 'loss of power' be loss of power to the building or loss of emergency power?

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lee C. DeVito, PE, FIREPRO Incorporated, representing self, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

1024.4 (IFC [B] 1024.4) Luminescent materials. Luminescent exit path markings shall be permitted to be made of any material, including paint;. Such materials shall include, but not limit to, self-luminous ~~materials,~~ and photoluminescent materials ~~and electroluminescent materials~~ or electrical devices such as electroluminescent or LED strips. Materials shall comply with either:

Self-luminous and photoluminescent materials –

1. UL 1994, or
2. ASTM E 2072, except that the charging source shall be 1fc (10 lux) of fluorescent illumination for 60 minutes, and the minimum luminance shall be 5 milicandelas per square meter after 90 minutes.

Electrical devices –

1. UL 1994, and
2. The system shall have a backup emergency power supply that consists of a dedicated battery source that provides backup power for a minimum of 90 minutes and it is listed to UL 924.
3. The electrical devices shall illuminate within ten seconds in the event of a power failure in the area where the devices are located. The devices shall remain illuminated for 90 minutes following the loss of power.
4. The electrical system shall be supervised and provide a supervisory signal to the building fire alarm panel.

Commenter's Reason: The original proposal was rejected, but with the request that additional information be provided. The individual that provided a public objection also indicated an item of concern. I have addressed each of those concerns, which primarily addressed the battery backup requirements for the electrical systems.

Final Action: AS AM AMPC____ D

E132-09/10

707.3.10 (New), 1026 (IFC [B] 1026)

Proposed Change as Submitted

Proponent: Ron Clements, Chesterfield County Virginia Building Inspection Department, representing self

1. Revise as follows:

SECTION 1026 (IFC [B] 1026)
EXTERIOR EXIT STAIRWAYS ~~RAMPS~~ AND RAMPS ~~STAIRWAYS~~

1026.1 (IFC [B] 1026.1) General ~~Exterior exit ramps and stairways.~~ Exterior exit stairways ~~ramps~~ and ramps ~~stairways~~ serving as an exit component in the ~~element of a~~ ~~required~~ means of egress shall comply with this section.

> **~~Exception~~ Exceptions:** ~~Exterior exit ramps and stairways for outdoor stadiums complying with Section 1022.1, Exception 2.~~
>
> 1. Exits in buildings of Group A-5 where all portions of the means of egress are essentially open to the outside are not required be comply with this section.
> 2. Stairways in open parking structures that serve only the parking structure are not required to comply with this section.

1026.2 (IFC [B] 1026.2) Occupancy and height limitations ~~Use in a means of egress.~~ ~~Exterior exit stairways shall not be used as an element of a required means of egress for occupancies in Group I-2. For occupancies in other than Group I-2,~~ In other than Group I-2 occupancies, exterior exit stairways ~~ramps~~ and ramps ~~stairways~~ shall be permitted as ~~an element of~~ a required ~~means of egress~~ exit ~~for~~ in buildings not ~~exceeding~~ more than six stories above grade plane in height or having occupied floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

1026.3 (IFC [B] 1026.3) Open side. Exterior exit stairways ~~ramps~~ and ramps ~~stairways~~ ~~serving as an~~ ~~element of a required means of egress~~ shall be open to a yard, court or public way on at least one side. ~~An~~ The open side shall have a minimum ~~of~~ 35 square feet (3.3 m^2) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

~~**1026.4 (IFC [B] 1026.4) Side yards.** The open areas adjoining exterior exit ramps or stairways shall be either yards, courts or public ways; the remaining sides are permitted to be enclosed by the exterior walls of the building.~~

~~1026.5~~ 1026.4 (IFC [B] ~~1026.5~~ 1026.4) Fire separation distance ~~Location~~. Exterior exit stairways and ramps ~~and stairways~~ shall ~~be located in accordance with Section 1027.3.~~ have a fire separation distance of not less than 10 feet. The outermost vertical plane of the exterior stair assembly shall be considered the building face for the fire separation distance measurement.

~~1026.6~~ 1026.5 (IFC [B] ~~1026.6~~ 1026.5) Exterior ramps and stairway protection. Exterior exit stairways and ramps ~~and stairways~~ shall be separated from the interior of the building with fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. Such separation shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories ~~as required in Section 1022.1~~. Openings in such fire barriers shall be limited to those necessary for egress from normally occupied spaces.

Where the sides of the exterior stairway or ramp are exposed to other parts of the building at an angle of less than 180 degrees (3.14 rad), the exterior walls of the building within 10 feet (3048 mm) horizontally of the exterior stairway or ramp exposed sides shall have a fire-resistance rating of not less than 1 hour or the exposed side of the exterior stairway must be a wall constructed as a fire barrier having a fire-resistance rating of not less than 1 hour. Openings within the 1 hour fire-resistive rated exposure protection shall be protected by opening protectives having a fire protection rating of not less than 3/4-hour. The fire rated construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or to the roof line, whichever is lower.

Exceptions:

1. In other than Group R-1 or R-2 occupancies, separation from the interior of the building is not required ~~for occupancies, other than those in Group R-1 or R-2,~~ in buildings that are no more than two stories above grade plane where a level of exit discharge serving such occupancies is the first story above grade plane.
2. Separation from the interior of the building is not required where the exterior exit stairway ~~ramp~~ and ramp ~~stairway~~ is served by an exterior ramp ~~and/~~or balcony that connects two remote exterior stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be a minimum of 50 percent of the height of the enclosing wall, with the top of the openings no less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the interior of the building is not required for an exterior exit stairway ~~ramp~~ and ramp ~~stairway~~ serving ~~located in~~ a building ~~or structure~~ that is permitted to have unenclosed ~~interior~~ stairways in accordance with Section 1022.1.
4. Separation from the interior of the building is not required for exterior exit stairways ~~ramps~~ and ramps ~~stairways~~ connected to open-ended corridors provided that Items 4.1 through 4.4 are met:
   - 4.1. The building, including corridors, exit stairways ~~ramps and~~ or ramps ~~stairs~~, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   - 4.2. The open-ended corridors comply with Section 1018.
   - 4.3. The open-ended corridors are connected on each end to an exterior exit ramp or stairway complying with Section 1026.
   - 4.4. At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior exit stairway ~~ramp~~ and ramp ~~stairway~~ shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

2. Add new text as follows:

707.3.10 Exterior Exit Stairways and ramps. The fire-resistance rating of the fire barrier separating building areas from an exterior exit stairway and ramp shall comply with Section 1026.5.

Reason: This is an attempt to clean up the exterior exit stair provisions. First the majority of exterior exit elements that are designed in accordance with this section are stairs, not ramps therefore Stairway has been placed before Ramp.

Section 1026.1 has been re-titled as General so the title is not a restatement of the overall section title and follows the common code format. The exception for open exterior stairways have been revised to allow exterior exit stairways that are attached to open buildings to not have to meet the provisions in this section since the danger of smoke accumulation in the stairway is not there.

Section 1026.2 changes are all editorial.

Section 1026.4 was deleted and the requirement for the stair to be open to a yard was added to Section 1026.3.

Section 1026.5 Location was renamed separation distance and the 10 fire separation distance based on Section 1027.2 was included in section 1026.5 and the reference to Section 1027.3 was removed. Exterior exit stairs are not part of the exit discharge therefore it is incorrect and confusing to reference the separation requirements on exit discharge requirements. Furthermore a cross reference was added for Section 705.2.

Section 1026.6 was modified to include the fire rated protection requirements for an exterior stair in the exterior stair section and remove the reference to interior exit stairs. These are not interior exit stairs and the protection requirements should be available in the exterior exit stair section specific to exterior exit stairs.

Section 707.3.10 was added in keeping with the organization of Section 707.3 listing as a cross reference all of the locations fire barriers are used.

Cost Impact: This proposal will not increase the cost of construction.

ICCFILENAME:Clements-E5-1026

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Several of the proponents and opponent brought up possible revisions to clarify the text that need to be brought forward at the public comment phase. The proposal needs to clarify if the term “assembly” includes the supporting construction or not. “Essentially open”, while it is currently in code text, leaves too much open for interpretation.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ron Clements, representing Chesterfield County Building Inspection Dept., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 1026
EXTERIOR EXIT STAIRWAYS AND RAMPS

1026.1 (IFC [B] 1026.1) General. Exterior exit stairways and ramps serving as an exit component in the means of egress shall comply with this section.

Exceptions:

1. Exterior exit stairways and ramps in buildings of Group A-5 where all portions of the means of egress are open to the outside air. ~~Exits in buildings of Group A-5 where all portions of the means of egress are essentially open to the outside are not required be comply with this section.~~
2. Stairways in open parking structures that serve only the parking structure are not required to comply with this section.

1026.2 (IFC [B] 1026.2) Occupancy and height limitations. In other than Group I-2 occupancies, exterior exit stairways and ramps shall be permitted as a required exit in buildings not more than six stories in height above grade plane ~~in height~~ or having occupied floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

1026.4 (IFC [B] 1026.4) Fire separation distance. Exterior exit stairways and ramps shall be located in accordance with Section 1027.3 ~~have a fire separation distance of not less than 10 feet. The outermost vertical plane of the exterior stair assembly shall be considered the building face for the fire separation distance measurement~~.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: Section 1026.1, Exception #1 was modified to change "essentially open to the outside" to "where all portions of the means of egress are open to the outside air." Based on floor and committee testimony. Open to the outside air was a term introduced and approved in E38.

In 1026.2 was changed per floor testimony from "more than six stories above grade plane in height" to "more than six stories in height above grade plane"

In 1026.4 the original text was returned based on committee comments that were in opposition to the original proposed language that measured the fire separation distance to the outermost vertical plane of the exterior stair assembly.

Final Action: AS AM AMPC____ D

E133-09/10
1026.6 (IFC [B] 1026.6)

Proposed Change as Submitted

Proponent: Anne VonWeller, Murray City, representing the Utah Chapter of the International Code Council

Revise as follows:

1026.6 (IFC [B] 1026.6) Exterior ramps and stairway protection. Exterior exit ramps and stairways shall be separated from the interior of the building as required in Section 1022.1. Openings shall be limited to those necessary for egress from normally occupied spaces.

Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are no more than two stories above grade plane where a level of exit discharge serving such occupancies is the first story above grade plane.
2. Separation from the interior of the building is not required where the exterior ramp or stairway is served by an exterior ramp or balcony that connects two remote exterior stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be a minimum

of 50 percent of the height of the enclosing wall, with the top of the openings no less than 7 feet (2134 mm) above the top of the balcony.

3. Separation from the interior of the building is not required for an exterior ramp or stairway located in a building or structure that is permitted to have unenclosed interior stairways in accordance with Section 1022.1 <u>or Exceptions 3 and 4 of Section 1016.1.</u>
4. Separation from the interior of the building is not required for exterior ramps or stairways connected to open-ended corridors, provided that Items 4.1 through 4.4 are met:
   - 4.1. The building, including corridors and ramps and stairs, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   - 4.2. The open-ended corridors comply with Section 1018.
   - 4.3. The open-ended corridors are connected on each end to an exterior exit ramp or stairway complying with Section 1026.
   - 4.4. At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior ramp or stairway shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

Reason: In the 2009 Edition a distinction has been made between 'exit' stairways and ramps and 'exit access' stairways and ramps. In the past all of the exceptions for unenclosed stairways and ramps occurred in Section 1022.1. Now some of those exceptions are located in Section 1022.1 and some in Section 1016. This change is to lead user to the new location for the two exceptions relocated to Section 1016.1.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Vonweller-E1-1023.6

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The proposal will keep the exterior exit stairway provisions together in a place that is easier to find. This proposal may need correlation with E5 revisions.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Anne VonWeller, Murray City, representing the Utah Chapter of the International Code Council, requests Disapproval.

Commenter's Reason: The Code Development Committee approved the change with a note that it should be coordinated with E5-09/10. The concern is already addressed by E5-09/10. This comment is submitted by the original proponent to ensure the item is on the final action agenda. If E5-09/10 is approved during the final action this change is not necessary and should be disapproved. However, if E5-09/10 is not approved this public comment will be withdrawn and the approved code change will be included in the 2012 edition.

Final Action: AS AM AMPC____ D

E136-09/10
1027.1 (IFC [B] 1027.1)

Proposed Change as Submitted

Proponent: Sarah A. Rice, CBO, representing self

Revise as follows:

1027.1 (IFC [B] 1027.1) General. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide direct access to grade. The exit discharge shall not reenter a building. The combined use of Exceptions 1 and 2 below shall not exceed 50 percent of the number and capacity of the required exits.

Exceptions:

1. A maximum of 50 percent of the number and capacity of the exit enclosures is permitted to egress through areas on the level of discharge provided all of the following are met:
   1.1. Such exit enclosures egress to a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the exit enclosure.
   1.2. The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the exit enclosure.
   1.3. The egress path from the exit enclosure on the level of exit discharge is protected throughout by an approved automatic sprinkler system. All portions of the level of exit discharge with access to the egress path shall either be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of exits.
2. A maximum of 50 percent of the number and capacity of the exit enclosures is permitted to egress through a vestibule provided all of the following are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating for the exit enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the level of exit discharge by construction providing protection at least the equivalent of approved wired glass in steel frames.
   2.4. The area is used only for means of egress and exits directly to the outside.
3. Stairways in open parking garages complying with Section 1022.1, Exception 4, are permitted to egress through the open parking garage at their levels of exit discharge.
4. Horizontal exits complying with Section 1025 shall not be required to discharge directly to the exterior of the building.
5. <u>The exit discharge for an exit enclosure which terminate in a court without direct access to a public way is permitted to reenter the building provided one of the following are met:</u>
   <u>5.1. An exit passageway which has the same fire-resistance rating as the exit enclosure served, is provided through the building from the court to an exterior wall of the building fronting on a public way; or</u>
   <u>5.2. A covered walkway which is open to the atmosphere at opposite ends is provided through the building to an exterior wall fronting on a public way and which has walls and ceiling of not less than 1 hour fire-resistance-rated-construction and opening protected with opening protectives have not less than a ¾ hour rating.</u>

Reason: Prior to 1997 at least one of the legacy codes allowed exit enclosures to terminate into an open central court surround on all sides by a building. To provide exit discharge from such court, the code permitted an exit passageway. The IBC is silent on this type of design, and a strict reading of Section 1027.1 would prohibit it. The exception proposes two options. The first is the exit passageway. The second is an open 'breezeway' or 'tunnel' which goes from the court to the public way. It has been interpreted that the code allows the approach in 5.2 because it doesn't 're-enter' the building, but simply goes 'under' the building. This proposal codifies that interpretation. Essentially the 5.2 option is a passageway without enclosures at either end. To be consistent with other exit passageways, the passageway allowed here should have the same rating as the vertical exit enclosure served. Only one hour is proposed for the open breezeways as this is consistent with the egress court provisions in Section 1027 and because this is an atmospherically open tunnel, 1 hour should be sufficient to protect the users.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Rice-E2-1027.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is a limited application, which should already be covered by the code text. The base requirement under Exception 5 is a conflict with the definition of exit discharge by saying it can terminate in a court and not a public way. A concern would be if the passageway did not provided a clear line of site to the outside that some type of exit signage would be required. The wording in 5.2 is not clear that the passage goes through the wall to the outside rather than just up to the wall.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ali M. Fattah, P.E., City of San Diego, Development Services Department, representing Sand Diego Area of Chapter of ICC, requests Approved as Modified by this public comment.

Modify the proposal as follows:

1027.1 (IFC [B] 1027.1) General. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide direct access to grade. The exit discharge shall not reenter a building. The combined use of Exceptions 1 and 2 below shall not exceed 50 percent of the number and capacity of the required exits.

Exceptions:

1. A maximum of 50 percent of the number and capacity of exit enclosures is permitted to egress through areas on the level of discharge provided all of the following are met.
   1.1 Such exit enclosures egress to a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the exit enclosure.
   1.2. The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the exit enclosure.
   1.3. The egress path from the exit enclosure on the level of exit discharge is protected throughout by an approved automatic sprinkler system. All portions of the level of exit discharge with access to the egress path shall either be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 03.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of exits exit enclosure.
2. A maximum of 50 percent of the number and capacity of the exit enclosures is permitted to egress through a vestibule provided all of the following are met:
   2.1 The area is used only for means of egress and exits directly to the outside.
   2.2 The vestibule depth from the exterior of the building is not greater than 10 feet (3048 mm) and the vestibule length is not greater than 30 feet (9144 mm).
   2.3 The area is separated from the remainder of the level of exit discharge by a fire barrier having a one hour fire-resistance rating. construction providing protection at least the equivalent of approved wire glass in steel frames Doors and windows in the separation walls shall be rated ¾ hour and shall not exceed the size limits specified in Section 707.6. Duct penetrations shall comply with Section 713.1.1, and other penetrations shall comply with Section 713.3.
   2.4 The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating for the exit enclosure.
3. Stairways in open parking garages complying with Section 1022.1, Exception 4, are permitted to egress through the open parking garage at their levels of exit discharge.
4. Horizontal exits complying with Section 1025 shall not be required to discharge directly to the exterior of the building.

~~5. The exit discharge for an exit enclosure which terminate in a court without direct access to a public way is permitted to reenter the building provided one of the following are met:~~
~~5.1. An exit passageway which has the same fire-resistance rating as the exit enclosure served, is provided through the building from the court to an exterior wall of the building fronting on a public way; or~~
~~5.2. A covered walkway which is open to the atmosphere at opposite ends is provided through the building to an exterior wall fronting on a public way and which has walls and ceiling of not less than 1 hour fire-resistance-rated-construction and opening protected with opening protectives have not less than a ¾ hour rating.~~

<u>5. The exit discharge from an interior occupied court shall be permitted to reenter the building through an exit passageway constructed in accordance with Section 1023.3 and enclosed with a fire-resistance-rating of not less than 1 hour.</u>
<u>6. The exit discharge for an exit enclosure, or exterior exit stairway, which terminates in an interior court without direct access to a public way shall be permitted to reenter the building provided the path of egress travel reenters the building through an exit passageway constructed in accordance with Section 1023 and is enclosed with the same fire-resistance rating as the exit served.</u>

Commenter's Reason: This public comment is submitted to support an omission from the code a provision that exited in more than one legacy code to address interior courts whose occupants need to renter a building to reach the public way. This code is necessary to address egress from interior courts that are occupied or courts through which exit enclosures or exterior exit stairways must pass through the court and renter the building to reach the public way. The public comment deletes the proposed exception 5.2 since: it is not clear does and not address maximum length, will allow communicating openings into it and will thus result in lower protection than that provided by an exit passageway. The exit passageway shall have the same level of protection as the exit enclosure or exterior exit stairway or one-hour when serving occupied courts.

Final Action: AS AM AMPC____ D

E138-09/10
1027.3 (IFC [B] 1027.3)

Proposed Change as Submitted

Proponent: Lawrence Brown, CBO, National Association of Home Builders (NAHB); Eirene Oliphant, MCP, Building Official, representing City of Leawood, KS

Revise as follows:

1027.3 (IFC [B] 1027.3) Exit discharge location. Exterior balconies, stairways and ramps shall be located at least 10 feet (3048 mm) from adjacent lot lines and from other buildings on the same lot unless the adjacent building exterior walls and openings are protected in accordance with Section 705 based on fire separation distance.

> **Exception:** Where serving Group R-3 occupancies, exterior balconies, stairways and ramps shall be permitted to be located 5 feet (1524 mm) minimum from adjacent lot lines and from other buildings on the same lot.

Reason: The added exception will help to coordinate this section with the provisions found in Table 705.8. Footnote "f" of Table 705.8 allows an unlimited amount of unprotected openings with a fire separation distance of 5 feet or greater. It would seem reasonable to allow the exterior stairways, ramps and balconies for a Group R-3 to be located in the 5 to 10 foot range if it is permissible to have an unlimited amount of unprotected openings.

While the 10 foot provision of this section does coordinate with the exterior wall rating required in Table 602 for most Group R-3 construction, permitting an unlimited amount of unprotected openings in that wall effectively eliminates the required protection beyond the 5 foot distance. Changing this section will help to coordinate with many local zoning laws that impose a 5 foot side yard requirement in residential areas. In addition Table R302.1 of the IRC permits walls to be non-rated if over 5 feet.

If the committee and members would consider another possible exception, it may be reasonable to add a second exception that would coordinate with footnote "d" of Table 705.8. This second exception would allow exterior stairs, ramps and balconies to have a minimum of 3 feet of separation provided that the wall had no more than 25 percent of unprotected or protected openings. Possible wording would be:

Exceptions:

2. In Group R-3 occupancies where the exterior wall of the exterior stairway, ramp and balcony comply with footnote "d" of Table705.8, a separation of 3 feet (915 mm) minimum shall be provided from adjacent lot lines and from other buildings on the same lot.

This second exception would not only coordinate with the provisions of Table 705.8 but would seem to correct an inconsistency that occurs within the code. As currently written, the code would allow an "interior" stairway to be located within the 3 to 5 foot range and allow 25 percent of the wall to be an unprotected opening. However, if that opening or an opening on an adjacent side exceeded 35 square feet (Section 1026.3) and the stair then was considered as an "exterior" stair it would need to be located "at least 10 feet (3048 mm) from adjacent lot lines." If the level of protection provided for the wall facing the property line is consistent then the code should not impose a 10 foot requirement on "exterior" stairs while allowing "interior" stairs to be 3 feet from the line.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Brown-E1-1027.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: It would be preferable to close the identified loophole in Section 705.8 rather than allow exit discharge so close to the lot line.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Eirene Oliphant, MCP, City of Leawood, representing Metropolitan Kansas City Chapter of the ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as:

1027.3 Exit discharge location. Exterior balconies, stairways and ramps shall be located at least 10 feet (3048 mm) from adjacent lot lines and from other buildings on the same lot unless the adjacent building exterior walls and openings are protected in accordance with Section 704 based on fire separation distance.

> **Exception:** Where serving R-3 occupancies, exterior balconies, stairways and ramps shall be permitted to be located at least 5 feet (1524 mm) ~~minimum~~ from adjacent lot lines and from other buildings on the same lot.

Commenter's Reason: The request to approve as modified is intended to match the format of the provisions found in Section 1027.3.

When this was presented to the committee for consideration, there was little to no discussion. The committee simply disapproved the code change, stating they wanted the loophole in Table 705.8 to be addressed rather than accept this code change.

Table 705.8 is not where the loophole exists. This proposed added section provides clarity to allow for decks and other exterior means of exit discharge from an R-3 occupancy to be included in the area of allowed unprotected and protected openings. The appropriate place for this to be provided for is in the exit discharge section of the code, as presented in this proposed code change.

Final Action: AS AM AMPC____ D

E142-09/10

1028.1.1.1 (New) [IFC [B] 1028.1.1.1 (New)]

Proposed Change as Submitted

Proponent: Gerard A. Hathaway, RA, New York State Department of State Building Codes Division, representing self.

Add new text as follows:

1028.1.1.1 (IFC [B] 1028.1.1.1) Spaces under grandstands and bleachers. When spaces under grandstands or bleachers are used for purposes other than toilet rooms and ticket booths less than 100 sq.ft. (9.29 m^2), such spaces shall be separated by fire barriers complying with Section 707 and horizontal assemblies complying with Section 712 with not less than 1-hour fire-resistance-rated construction.

Reason: The intent is to provide requirements for buildings under bleachers and grandstands that include spaces such as concessions, storage and ticket booths. The provisions are consistent with what permitted in the legacy codes. The location of this section is chosen for its proximity to the reference to the ICC 300. That way it will not be missed.

The legacy codes included provisions for spaces under seats to be kept free of combustible and flammable materials. Rooms under the bleachers were enclosed in a 1 hour fire-resistant rated construction. None of this information was passed forward into any edition of the IBC.

ICC 300, Section 305 sends you to the building and fire codes for requirements. The IBC does not include any specific provisions for this area except space over 1,000 sq.ft. must be sprinklered in accordance with Section 903.2.1.5.

From an intent point of view, the general stairway provisions (which may be viewed as similar to part of the bleacher system) require that any space under a stairway be enclosed with a 1 hour fire-resistance-rated construction (Section 1009.6.3).

Southern had –
403.6.2.2 When spaces under grandstands or bleachers are used for purposes other than toilet rooms, ticket booths less than 100 sq.ft. (9.29 m^2) in area and open ramps or level exiting facilities, such spaces shall be separated by not less than 1-hour fire resistant construction.

BOCA had –
1013.8 Spaces underneath seats: Spaces underneath grandstand seats shall be kept free of all combustible and flammable materials and shall not be occupied or used for other than exits; except that where enclosed in not less than 1-hour fire resistance rated construction, the code official shall approve the use of such spaces for other purposed, provided that the safety of the public is not endangered.

ICBO had the following provisions (see the 4th paragraph for separation requirements)–
Division 4. Stadiums, reviewing stands and amusement park structures not included within other Group A Occupancies. Specific and general requirements for grandstands, bleachers and reviewing stands are to be found in Chapter 10.

303.2 Construction, Height and Allowable Area.

303.2.2 Special provisions.

303.2.2.3 Division 4 provisions. Grandstands, bleachers or reviewing stands of Type III One-hour, Type IV or Type V One-hour construction shall not exceed 40 feet (12 192 mm) to the highest level of seat boards; 20 feet (6096 mm) in cases where construction is Type III-N or Type V-N; and 12 feet (3658 mm) in cases where construction is with combustible members in the structural frame and located indoors.

Division 4 structures other than Type III-N and Type V-N grandstands, bleachers, reviewing stands and folding and telescoping seating of open skeleton-frame type without roof, cover or enclosed usable space are not limited in area or height.

Erection and structural maintenance shall conform to these special requirements as well as with other applicable provisions of this code.

When the space under a Division 4 Occupancy is used for any purpose, including means of egress, it shall be separated from all parts of such Division 4 Occupancy, including means of egress, by walls, floor and ceiling of not less than one-hour-fire-resistive construction.

EXCEPTIONS:

1. A means of egress under temporary grandstands need not be separated.
2. The underside of continuous steel deck grandstands when erected outdoors need not be fire protected when occupied for public toilets.

The building official may cause Division 4 structures to be reinspected at least once every six months.

Grandstands, bleachers or folding and telescoping seating may have seat boards, toeboards, bearing or base pads and footboards of combustible materials regardless of construction type.

Seating and exiting requirements for reviewing stands, grandstands, bleachers, and folding and telescoping seating are provided under Section 1008.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME:Hathaway-E1-1028.1.1.1

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as following:

1028.1.1.1 (IFC [B] 1028.1.1.1) Spaces under grandstands and bleachers. When spaces under grandstands or bleachers are used for purposes other than ~~toilet rooms and~~ ticket booths less than 100 sq.ft. (9.29 m^2) <u>and toilet rooms</u>, such spaces shall be separated by fire barriers complying with Section 707 and horizontal assemblies complying with Section 712 with not less than 1-hour fire-resistance-rated construction.

Committee Reason: The modification clarifies that the exemption is for toilet rooms of any size and the 100 sq.ft. limit is only applicable to the ticket booths. The proposal identifies information that is missing in the current text to address hazards under bleachers.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David S. Collins, FAIA, The Preview Group, representing the American Institute of Architects requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1028.1.1.1 (IFC [B] 1028.1.1.1) Spaces under grandstands and bleachers. When spaces under grandstands or bleachers are used for purposes other than ticket booths less than 100 sq.ft. (9.29 m^2) and ~~toilet rooms~~ <u>unenclosed means of egress</u>, such spaces shall be separated by fire barriers complying with Section 707 and horizontal assemblies complying with Section 712 with not less than 1-hour fire-resistance-rated construction.

Commenter's Reason: This is a great fix and improvement to the safety of these facilities and the persons using them. However, being a user of a legacy code that did not exempt toilet rooms from this separation I propose to require the same level of protection for them. I am sure that everyone has witnessed the illegal use of tobacco products and other irrational use of ignited materials in public restrooms. Trash cans with towels even the toilet paper itself is often a target for vandalism. The same level of protection afforded other uses beneath an assembly seating area should also be afforded these toilet rooms.

All three legacy codes did allow the space under the grandstands and bleachers to be used for means of egress, such as vomitory exits, as long as they were unenclosed. See the original reason statement for additional information

Final Action: AS AM AMPC____ D

E147-09/10
1028.14.2 (IFC [B] 1028.14.2)

<u>Proposed Change as Submitted</u>

Proponent: Ed Roether, Populous (Formerly HOK Sport Venue Event), representing self

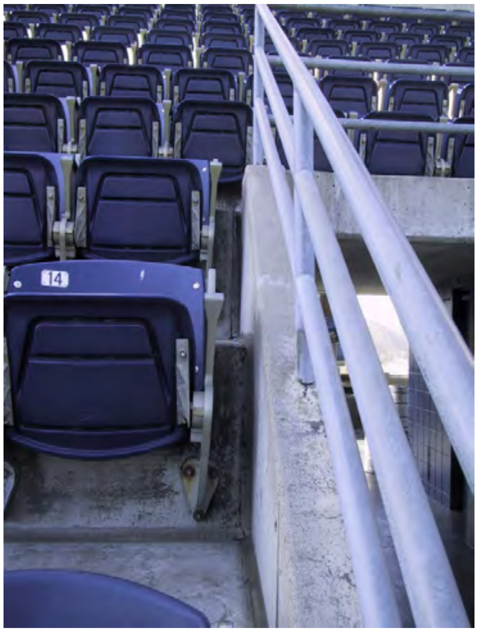
Revise as follows:

1028.14.2 (IFC [B] 1028.14.2) Sightline-constrained guard heights. Unless subject to the requirements of Section 1028.14.3, a fascia or railing system in accordance with the *guard* requirements of Section 1013 and having a minimum height of 26 inches (660 mm) <u>measured vertically above the adjacent walking surfaces, adjacent bench seat or the line connecting the leading edges of the treads</u> shall be provided where the floor or footboard elevation is more than 30 inches (762 mm) above the floor or grade below and the fascia or railing would otherwise interfere with the sightlines of immediately adjacent seating. At *bleachers*, a *guard* must be provided where required by ICC 300.

> <u>**Exception:** The height of the guard shall not be required to be measured vertically above an adjacent automatic or self-rising chair.</u>

Reason: This proposal addresses several things, first it brings clarity to confusion that was created by a change that occurred in the 2009 IBC. The term "seatboard" was replaced with the term "fixed seating" in the 2009 IBC Section 1013.2 on how the height of guards are measured with the stated reason "to clarify the measurement, using common terminology". With respect to assembly seating, the term "fixed seating" does not offer greater clarity, instead it offers significantly more confusion. For example, how do you measure the height of the guard adjacent fixed seats when they are self-rising chairs? (Refer to photographs below.) In assembly seating, fixed seats refers to chairs that are secured to the structure, not that they provide a walking surface. The aisle access way provisions of Section 1028.10 specifically address the clear width between rows of seats where there is automatic or self-rising chairs and chairs with seats that do not move. Therefore, the clarity provided other occupancies unfortunately increased confusion pertaining to assembly seating. Section 1028.14 needs to include how to measure the height of guards so that clarity can be provided assembly seating and still offer other occupancies the clarity needed for them in Section 1013.2. Please note that this proposal does not include any change to Section 1013.2, only to Section 1028.14.

Following are two photographs of self-rising chairs and one of bench seats. The fixed bench seating could serve as a walking surface, however the self-rising chairs are not easily used as a walking surface. 2007 ICC 300 measures vertically above the leading edge of the tread, adjacent walking surface or adjacent bench seat. This proposal maintains how the height of the guard is measured by 1013.2 with the exception of replacing the term "fixed seat" with the term "bench seat" to coordinate with ICC 300 and to enhance clarity that guard height needs to be measured vertically above such seats. Also, the term "bench seat" rather than "seatboard" is commonly used for this type of seating in assembly seating project specifications. An exception was added for self-rising chairs since these seats are not easily used as a walking surface and there is no well defined way to measure these chairs.



Cost Impact: This code change proposal will not increase the cost of construction.

ICCFILENAME:Roether-E9-1028.14.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Using a walking surface measurement is appropriate to get the level of safety we are looking for when using self rising chairs. The proponents and CTC committee should work together to address this issue of guards heights adjacent to different types of seats in assembly venues.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC) requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1028.14.2 (IFC [B] 1028.14.2) Sightline-constrained guard heights. Unless subject to the requirements of Section 1028.14.3, a fascia or railing system in accordance with the *guard* requirements of Section 1013 and having a minimum height of 26 inches (660 mm) ~~measured vertically above the adjacent walking surfaces, adjacent bench seat or the line connecting the leading edges of the treads~~ shall be provided where the floor or footboard elevation is more than 30 inches (762 mm) above the floor or grade below and the fascia or railing would otherwise interfere with the sightlines of immediately adjacent seating. At *bleachers*, a *guard* must be provided where required by ICC 300.

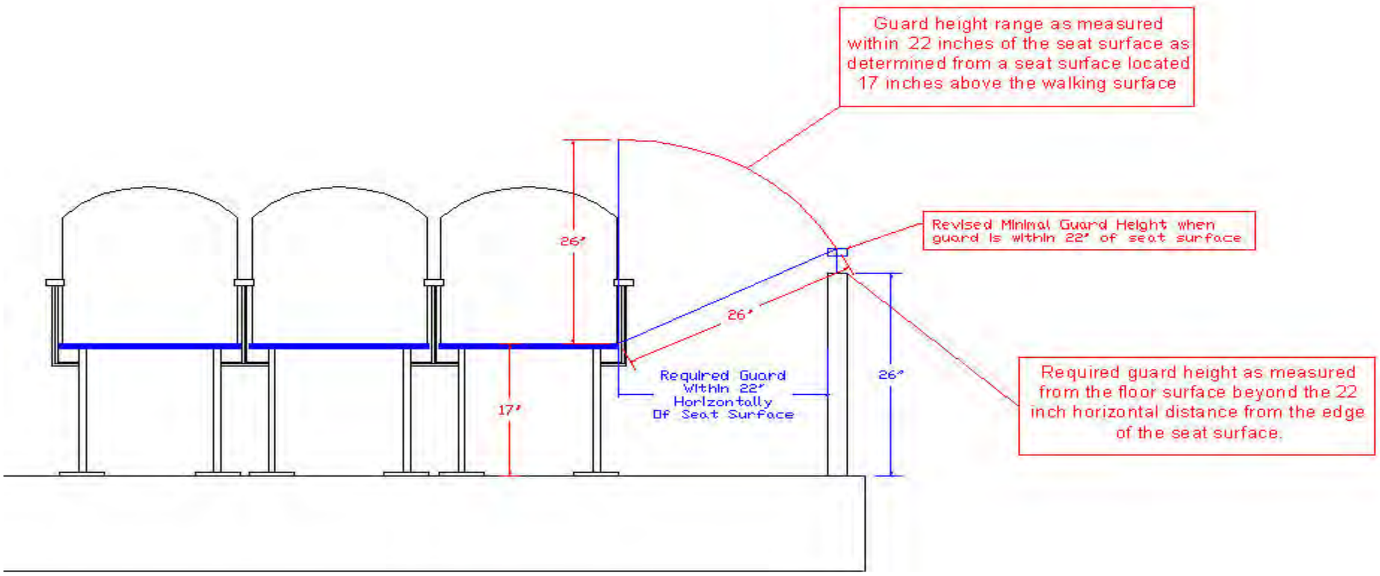
> **Exception:** ~~The height of the guard shall not be required to be measured vertically above an adjacent automatic or self-rising chair.~~ The height of the guard in front of seating shall be measured from the adjacent walking surface.

Commenter's Reason: As noted by the code committee, there was a need to coordinate CTC's proposed E100 and Ed Roether's E147 who is an expert in assembly seating design. This comment is in recognition of that need.,

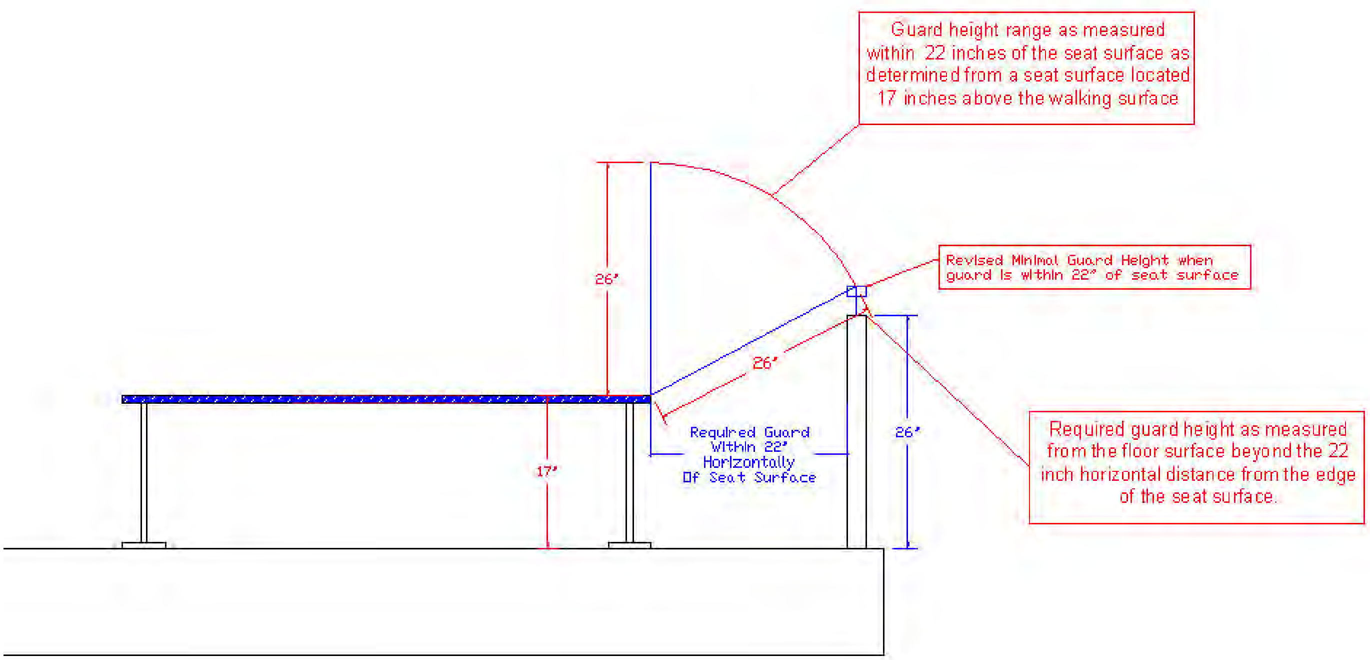
The public comment to this code change, along with the comment to E100, will bring clarity to the required height of guards in assembly seating. Confusion resulted when the term “seatboard” was replaced with “fixed seating” in Section 1013.2. It is recognized that E100 provides the needed clarity to how the height of guards is measured where the line of sight is not a consideration, but line of sight in assembly seating is critical. The revised exception to Section 1028.14.2 addresses line of sight issues. This exception does not alter the height of guards immediately beside or behind seating or other conditions as established in Section 1013.2. The minimum height of 26 inches would be measured in accordance with 1013.2 where the guard would otherwise interfere with the line of sight and the minimum height of 42 inches would be measured in accordance with 1013.2 where there is not interference with line of sight. This comment and that of E100 should be heard together. Please see the illustrations published with the public comment to E100-09/10.

The following illustrate how guards would be measured in assembly seating.

Elevation view of individual seat configuration – guard measurement from Section 1013.2, Item 2 with the 26 inch height from Section 1013.2, Exp. 3 and Section 1028.14.2:



Elevation view of bench seat configuration – guard measurement from Section 1013.2, Item 2 with the 26 inch height from Section 1013.2, Exp. 3 and Section 1028.14.2:



Public Comment 2:

Ed Roether, representing Populous (Formerly HOK Sport Venue Event), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1028.14.2 (IFC [B] 1028.14.2) Sightline-constrained guard heights. Unless subject to the requirements of Section 1028.14.3, a fascia or railing system in accordance with the *guard* requirements of Section 1013 ~~and having a minimum height of 26 inches (660 mm)~~ ~~measured vertically above the adjacent walking surfaces, adjacent bench seat or the line connecting the leading edges of the treads~~ shall be provided where the floor or footboard elevation is more than 30 inches (762 mm) above the floor or grade below. <u>At *bleachers*, a *guard* must be provided where required by ICC 300. Where</u> ~~and~~ the fascia or railing would otherwise interfere with the sightlines of immediately adjacent seating <u>guards shall not be less than 26 inches (660 mm) high and be measured vertically as follows</u>:

1. <u>From the adjacent walking surfaces,</u>
2. <u>From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches measured horizontally of a required guard, the guard height shall provide a minimum 26 inches measured diagonally between the top of the guard and the nearest edge of the seat surface</u>
3. <u>On stairs, from the line connecting the leading edges of the tread nosings, and</u>
4. <u>On ramps, from the ramp surface at the guard.</u>

~~At *bleachers*, a *guard* must be provided where required by ICC 300.~~

Exception: ~~The height of the guard shall not be required to be measured vertically above an adjacent automatic or self-rising chair.~~ <u>The height of the guard in front of seating shall be measured from the adjacent walking surface.</u>

Commenter's Reason: This proposal provides an alternative to the text proposed by CTC for E147-09/10 and matches their proposed text for how to measure guard height in G100-09/10. Assuming the general reference back to the guard requirements in Section 1013 will let designers/code official understand that you use Section 1013.2 for how to measure the guard height, with Section 1013.2, Exp. 3 sending you to Section 1028.14.2 for the actual height, could be considered vague and circuitous. Sections 1028.14.1 and 1028.14.3 specifically state how the guard is to be measured and its height without bouncing you around in a circle. Putting the text here will be more specific for assembly seating. The sentence about bleachers is existing text and is simply relocated for clarity.

Final Action: AS AM AMPC____ D

E150-09/10, PART II
IRC R310.1

NOTE: PART I DID NOT RECEIVE A PUBLIC COMMENT AND ARE ON THE CONSENT AGENDA. PART I IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART II.

<u>*Proposed Change as Submitted*</u>

Proponent: Steven Orlowski, representing National Association of Home Builders

PART II – IRC BUILDING/ENERGY

R310.1 Emergency escape and rescue required. Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) above the floor. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

~~Exception~~ <u>Exceptions</u>:

1. Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m^2).

2. <u>Emergency escape and rescue openings shall not be required in one- and two family dwellings and townhouses that are equipped with an approved automatic sprinkler system in accordance with Section R313 or Section P2904.</u>

Reason: Based on extensive research on the performance of residential smoke alarms, the NFPA 72 technical committee on residential alarms has determined that both ionization and photoelectric smoke alarms provide adequate escape time along the normal path of egress in both fast flaming and slow smoldering fires. In tests conducted by NIST, the results show that when smoke alarms are present and functioning properly, these devices will detect and notify the occupant with enough time to vacate the structure prior to untenable conditions being reached within the dwelling. The purpose for the emergency egress is to provide a secondary means of escape and rescue, in the event that the normal path of egress becomes blocked or conditions are unsustainable.

During the last code development cycle, the sprinkler proponents testified that residential fire sprinklers are effective in 96% of the fires that grow large enough to activate the system. With the recent addition of residential sprinklers, the time for evacuating the structure before conditions become untenable and incapacitate the occupant have been extended. When sprinklers are used in tandem with smoke alarms, the available escape time in a fast flaming fire is increased and occupants are given more time for escape. Proponents also testified that when sprinklers are present it will provide additional time for firefighters to conduct search and rescue, since the fire will be either extinguished or contained.

If homes are required to be equipped with both an active suppression system and alarm system, it is time to start reevaluating the need for some of the passive life safety features in the home that have previously been justified to protect occupants in the event of a fire. While this proposal may raise the eyebrows of many skeptics, the concept of not requiring emergency egress and rescue openings in one- and two- family dwellings equipped with an automatic suppression system is not new since this exception has been permitted in NFPA 101 The Life Safety Code for several years. In addition, the International Building Code has exempted R-1, R-2 and I-1 occupancies from requiring emergency escape and rescue openings when an approved automatic suppressions system is installed.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Orlowski-E1-1029.1

<u>Public Hearing Results</u>

PART II- IRC B/E
Committee Action: **Approved as Submitted**

Committee Reason: This change adds a reasonable exception based on an approved automatic sprinkler system in the dwelling. This creates an incentive to provide a sprinkler system. Also, this may get some retrofits for additions.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jeff Inks, Washington, DC representing Window and Door Manufacturer's Association, requests Disapproval.

Commenter's Reason: WDMA is strongly opposed to the approval of this proposal which was soundly defeated when considered by the Means of Egress Committee for inclusion in the IBC.

Removal of the requirement for EER openings is an unjustified and significant compromise in occupant safety. Characterizing EER openings as redundant, unneeded safety features in homes, if they are equipped with a residential fire sprinkler system is simply irresponsible.

What the proponents are saying is that if you install a sprinkler, there is no need for a back-up emergency escape and rescue which completely disregards the fact that sprinklers are not 100% effective or reliable, ignores the other limitations with the installation and operation of sprinklers in single family homes, such as maintenance, homeowner deactivation or disruption of the system, etc., and it completely disregards every other emergency that may require emergency escape or rescue.

While there is no disputing sprinklers provide an added measure of safety, there are many concerns with trading off EER opening requirements if residential sprinklers are installed making such a trade-off an unjustified compromise in occupant safety.

As noted, among the many concerns are the limits to the reliability of residential fire sprinkler systems which is directly dependent upon proper care and maintenance by the homeowner. While 13-D does require the installer to provide instructions on inspecting, testing, and maintaining the system -- clearly because it is critical to maintaining the operability of the system -- there is no requirement that any maintenance is to be performed and proper maintenance is therefore not likely to happen. NFPA 13-D also requires that damaged or painted sprinkler heads be replaced, but how will that be enforced throughout the life of the home, and what if the sprinkler head is damaged in some way that is not apparent? In addition, removing the EER opening requirements also ignores situations where the system is shut-off or otherwise disabled.

With respect to existing exceptions for other residential type occupancies, it also unreasonable to base this proposal on them. One- and two-family homes are completely different occupancy types operated and maintained very differently from other residential occupancy types where those exceptions are allowed. Removing the EER opening requirement completely ignores that fact.

There are many other concerning questions as well such as, what if the system does fail to operate? What if the occupants are not fully cognizant or physically able to safely egress? The sprinkler system is only intended as an "aid" as stated in NFPA 13-D to give occupants a few additional minutes to escape, but what if that is not enough time? What if the only path for egress is through or close to the fire hazard, or if the path is blocked, or if they are afraid, or are disabled or otherwise incapacitated? What about other non-fire emergencies? And equally important, what if they need to be rescued and rescued quickly? Rescue is another critical function these openings provide and that is also being completely ignored.

Furthermore, the IRC B&E Committee's approval of this proposal is counter to their action to reject RB-186 which does the exact same thing and was heard immediately before E-150. After extensive testimony, the Committee rejected RB-186 stating that "*The committee feels this change sacrifices safety without an appropriate return*." However, the Committee then approved E-150 in a contradictory action to RB-186 without any further testimony (because of the extensive testimony that had already been provided on RB-186) stating "*This change adds a reasonable exception based on an approved automatic sprinkler system in a dwelling*," yet there was no further testimony provided or any discussion by them of their concerns expressed in their decision to disapprove RB-186.

While installing sprinkler systems is an improvement in fire safety, removing the EER opening requirements as a trade off is a huge leap backwards in overall safety. It is an unjustified compromise and we urge disapproval of this proposal.

Public Comment 2:

Gary Lewis, Construction Official, City of Summit, NJ representing self, requests Disapproval.

Commenter's Reason: Code proposals RB186-09/10 and E150-09/10 were heard consecutively by the IRC Building and Energy Committee in Baltimore. Both proposals sought to achieve the same overall result……to eliminate the long-standing requirement to provide emergency escape and rescue windows in dwelling units equipped with automatic fire sprinklers. Testimony provided at the hearing resulted in an overwhelming committee disapproval of RB186 and no assembly action. The opponents mistakenly sat down, far from the testimony microphones, assuming E150 would similarly be disapproved to be consistent with the immediately previous action on RB186. Unfortunately, the committee reversed themselves without any additional testimony and recommended E150-09/10 for approval, resulting in this public comment.

One need only read the IBC Means of Egress Committee's reason for disapproving Part I of this change (similar language in the IBC) to find ample rationale for overturning the committee. To the point, R-5 and R-3 occupancies only require a single means of egress in an occupancy where people sleep. Not discounting the value of early warning or active suppression, the MOE Committee felt a lack of required system maintenance necessitates keeping the redundancy of these windows. Understand that these are escape **and rescue** windows.

The membership needs to understand that without the minimum provisions of R310.1, the *only* minimum size and height threshold for the second-or-third story windows in a dwelling is the 4% (of floor area) natural ventilation provisions, which have never contemplated and value to emergency escape or access. Complicate matters further by adding the sprinkler system cited as the basis for the exception need only provide a water supply for 10 minutes, beyond the time actually required by many fire departments to commence interior attack on upper floors.

Consider a spec dwelling with 11' by 11' non-master bedrooms. 4% of the floor area is 4.84 square feet. In a corner room, if the minimum openable area is divided over 2 windows, I can achieve my minimum required ventilation through the use of a WDH 24210 by Anderson or similar, which provides a healthy 25"+ of width but a mere 14" in clear height, not to mention I can locate it 5 feet or more above the floor. 14" just will not allow an emergency responder in gear to pass through. Not to mention the difficulty in clearing the glass if the dwelling happens to be in a windborne debris region with required impact-resistant glazing.

If the fire service were able to say that they could never foresee having to enter a dwelling unit from other than the ground-level entry to effect search and rescue or fire operations, I would be less concerned. I do not believe, however, that is the case.

Responding to the argument that this exception is allowed in the IBC, that exception is only in place for occupancies equipped with NFPA 13 or 13R sprinkler systems, not 13D or P2904.

In conclusion, there is no correlation between the additional protection afforded by limited dwelling system sprinklers and the need for a second path in (or out) of a dwelling unit.

Public Comment 3:

Tim Pate with the Colorado Chapter of ICC; Brad Emerick, representing Fire Marshal's Association of Colorado, requests Disapproval.

Commenter's Reason: This public comment will ask the membership to overturn the Committee and ultimately disapprove E150 Part II which will match the action that the Means of Egress Committee did to E150 Part I.

It's acknowledged that an NFPA 13D sprinkler system "…aids in the detection and control of residential fires and thus provides improved protection against injury, life loss, and property damage", but is primarily "…expected to prevent flashover (total involvement) in the room of fire origin, where sprinklered, and to improve the chance for occupants to escape or be evacuated." But to escape or be evacuated, means of egress/access have to be provided. Until enough data is compiled on the effectiveness of 13D systems installed on a broad scale, by various trades, and maintained by homeowners, it's premature to allow escape routes to be compromised – especially from basements. Enough data is starting to be accumulated on smoke alarms, which have been required for some time, to now identify the weaknesses of the associated code provisions, the devices themselves, and the importance of maintenance (e.g., children sleeping through notification, ionization technology in smoldering fires, device expiration, etc.). Had egress systems been compromised in anticipation of the benefits of smoke alarms, many of the people for whom the system worked would have been put at risk. The same cautionary approach should be taken with respect to 13D sprinkler systems.

In addition to occupant egress, rescue/escape windows often provide the only means for a fire department to put a hose stream directly on a basement fire.

And finally, from the discussion on E150, Part 1:

"…There is no alert element on an NFPA13D system, and while smoke detectors are good at detection, they are not always the best at alerting. In a person's home the occupants may be sleeping, intoxicated or unable to evacuate without assistance – this can cause delayed evacuation, thus the real need for the emergency escape windows…"

Public Comment 4:

Julie Ruth, New Lenox, IL representing American Architectural Manufacturers Association, requests Disapproval.

Commenter's Reason: E150, Part II adds an exception to the Emergency Escape and Rescue Opening requirements of the IRC for one and two family homes that are equipped with an automatic sprinkler system. Upon first glance this appears to simply be an extension of the long standing exception to Emergency Escape and Rescue Openings in sprinklered buildings that has existed in the IBC since its first edition, and which existed in some of the ICC legacy codes.

The proposed exception to the IRC, however, is not exactly the same as the exception to Section 1029.1 that exists in the 2009 IBC. The exception in the 2009 IBC is only for Group R and I-1 occupancies that are equipped with an NFPA 13 or NFPA 13R fire suppression system. The proposed exception to Section R310.1 relies upon a NFPA 13D sprinkler system, or a system that complies with Section P2904 of the IRC.

The provisions of NFPA 13D, including its requirements for water supply and discharge, type of sprinkler heads and maximum number of operating ones, connection to the fire department, alarms, pumps, pressure valves, listing of components, installation and ongoing maintenance of the system, are not equivalent to those of NFPA 13 or NFPA 13R. An NFPA 13D system does not provide the same level of coverage as a 13 or 13R system does and it is not subject to the same level of maintenance inspections. Also, the NFPA 13D system relies upon a water reservoir and pump that is to be provided within the home and which is only required to have a 10 minute water supply, as opposed to the 30 minute water supply required for a NFPA 13 or 13R system. Single family homes are not required to be provided with the same level of emergency back-up systems as are required for other occupancies, municipalities or other agencies responsible for fire protection. In situations such as natural disasters where power or water systems are disrupted the fire suppression system may not deploy. Most R3 buildings for example are not equipped with back-up power or water storage tanks as required for other occupancies. Therefore, it would be inappropriate to expand the existing IBC exception, which relies upon a NFPA 13 or a3R system, into the IRC with reliance upon a NFPA 13D system.

It should also be noted that escaping fire is only one reason people have for egressing from their home through a window. There may be other causes that are just as significant from a life safety standpoint, such as the need to escape from an intruder into the home. Elderly or incapacitated individuals experiencing a health-related emergency may need to leave the home by the closest route possible, and therefore require an alternate egress path provided by a window. This is also true if the home becomes full of other toxic fumes or gases, such as carbon monoxide. Providing a fire suppression system does not address these other concerns. In some cases burglary assault prevention advocates have advised home occupants to use the EERO as a means of escaping danger in their own home. They should be able to continue to rely on this passive exit path or rescue opening. Adding an exception for buildings equipped with an NFPA 13D system could create a scenario where a passive exit path or rescue opening is not provided, or any exterior windows in a sleeping room may even be covered with security bars or grills that would specifically prevent escape or egress through that opening.

The inappropriateness of expanding the existing IBC exception to buildings equipped with other sprinkler systems was demonstrated by the IBC Means of Egress Committee's Disapproval of Part I of E150, which would have added a 13D system to the current exception. Disapproval of E150, Part II would be consistent with the IBC MOE committee's action on Part I.

Final Action: AS AM AMPC____ D

NOTE: PART I REPRODUCED FOR INFORMATIONAL PURPOSES ONLY- SEE ABOVE.

E150-09/10, PART I – IBC MEANS OF EGRESS
1029.1 (IFC [B] 1029.1)

Proponent: Steven Orlowski, representing National Association of Home Builders

PART I – IBC MEANS OF EGRESS

Revise as follows:

1029.1 (IFC [B] 1029.1) General. In addition to the means of egress required by this chapter, provisions shall be made for emergency escape and rescue in Group R and I-1 occupancies. Basements and sleeping rooms below the fourth story above grade plane shall have at least one exterior emergency escape and rescue opening in accordance with this section. Where basements contain one or more sleeping rooms, emergency escape and rescue openings shall be required in each sleeping room, but shall not be required in adjoining areas of the basement. Such openings shall open directly into a public way or to a yard or court that opens to a public way.

Exceptions:

1. In ~~other than Group R-3 occupancies,~~ <u>Group R</u> buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1<u>,</u> ~~or~~ 903.3.1.2 <u>or 903.3.1.3</u>.
2. In other than Group R-3 occupancies, sleeping rooms provided with a door to a fire-resistance-rated corridor having access to two remote exits in opposite directions.
3. The emergency escape and rescue opening is permitted to open onto a balcony within an atrium in accordance with the requirements of Section 404, provided the balcony provides access to an exit and the dwelling unit or sleeping unit has a means of egress that is not open to the atrium.
4. Basements with a ceiling height of less than 80 inches (2032 mm) shall not be required to have emergency escape and rescue windows.
5. High-rise buildings in accordance with Section 403.
6. Emergency escape and rescue openings are not required from basements or sleeping rooms that have an exit door or exit access door that opens directly into a public way or to a yard, court or exterior exit balcony that opens to a public way.
7. Basements without habitable spaces and having no more than 200 square feet (18.6m^2) in floor area shall not be required to have emergency escape windows.

Reason: Based on extensive research on the performance of residential smoke alarms, the NFPA 72 technical committee on residential alarms has determined that both ionization and photoelectric smoke alarms provide adequate escape time along the normal path of egress in both fast flaming and slow smoldering fires. In tests conducted by NIST, the results show that when smoke alarms are present and functioning properly, these devices will detect and notify the occupant with enough time to vacate the structure prior to untenable conditions being reached within the dwelling. The purpose for the emergency egress is to provide a secondary means of escape and rescue, in the event that the normal path of egress becomes blocked or conditions are unsustainable.

During the last code development cycle, the sprinkler proponents testified that residential fire sprinklers are effective in 96% of the fires that grow large enough to activate the system. With the recent addition of residential sprinklers, the time for evacuating the structure before conditions become untenable and incapacitate the occupant have been extended. When sprinklers are used in tandem with smoke alarms, the available escape time in a fast flaming fire is increased and occupants are given more time for escape. Proponents also testified that when sprinklers are present it will provide additional time for firefighters to conduct search and rescue, since the fire will be either extinguished or contained.

If homes are required to be equipped with both an active suppression system and alarm system, it is time to start reevaluating the need for some of the passive life safety features in the home that have previously been justified to protect occupants in the event of a fire. While this proposal may raise the eyebrows of many skeptics, the concept of not requiring emergency egress and rescue openings in one- and two-family dwellings equipped with an automatic suppression system is not new since this exception has been permitted in NFPA 101 The Life Safety Code for several years. In addition, the International Building Code has exempted R-1, R-2 and I-1 occupancies from requiring emergency escape and rescue openings when an approved automatic suppressions system is installed.

Cost Impact: The code change proposal will not increase the cost of construction.

PART I IBC MEANS OF EGRESS
Committee Action: **Disapproved**

Committee Reason: Group R-3 is unique in that it is only required to have one means of egress, therefore the redundancy of the emergency escape window is needed. Early suppression and early detection saves lives, but there are no maintenance requirements for a NFPA13D system, therefore, there is a concern that the chance of these systems to be out of service is high enough that removal of the requirement for a secondary exit through the emergency escape window is not warranted. There is no alert element on an NFPA13D system, and while smoke detectors are good at detection, they are not always the best at alerting. In a person's home the may be sleeping, intoxicated or unable to evacuate without assistance – this can cause delayed evacuation, thus the real need for the emergency escape windows. One of the opponent indicated that not having emergency escape windows in group homes may be a violation of federal law – that needs to be investigated. There needs to be more information on the entry rescue issues brought up by the fire service, including their use in non-fire emergencies.

Assembly Action: **None**

E151-09/10, PART III
IBC [P] 2902.4, IPC 403.4

NOTE: PARTS I, II AND IV DID NOT RECEIVE A PUBLIC COMMENT AND ARE ON THE CONSENT AGENDA. PART I, II AND IV ARE REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART III.

Proposed Change as Submitted

PART III – IPC

Revise 2902.4 to match IPC 403.4 as follows:

SECTION [P] 2902 (IPC 403.4)
MINIMUM PLUMBING FACILITIES

[P] 2902.4 Signage. ~~A legible sign designating the sex shall be provided in a readily visible location near the entrance to each toilet facility~~. Required public facilities shall be designated by a legible sign for each sex. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1110 ~~ICC A117.1~~.

IPC 403.4 Signage. Required *public* facilities shall be designated by a legible sign for each sex. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1110 of the *International Building Code.*

Reason:
Part III – IPC – 2902.4 (IPC 403.4) – The reference to the signage requirements in Chapter 11 will help a user locate all the provisions for accessible signage associated with toilet rooms and in addition will pick up the ICC A117.1 references. The signage requirements in Chapter 29 should match the Plumbing Code requirements.

ICCFILENAME:Wiehle-E8-1101.2

Public Hearing Results

PART III- IPC
Committee Action: **Approved as Submitted**

Committee Reason: The revisions clarify the applicable technical requirements in ICC A117.1 for signage at toilet rooms.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence Brown, CBO, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[P] 2902.4 Signage. Required public facilities shall be ~~designated by~~ provided with a ~~legible~~ sign ~~for each~~ designating the sex. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1110.

IPC 403.4 Signage. Required *public* facilities shall be ~~designated by~~ provided with a ~~legible~~ sign ~~for each~~ designating the sex. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1110 of the *International Building Code*.

Commenter's Reason: This modification is proposed as the IPC and IBC do not always require a separate toilet facility for each sex, as shown below in the Exceptions to Section 2902.2. As Section 2902.4 (above) only addresses the signs themselves, is it more appropriate that sign itself have the correct designation for the sex, or for a facility that can be used by either sex. This modification achieves this intent.

[P] 2902.2 Separate facilities. Where plumbing fixtures are required, separate facilities shall be provided for each sex.

Exceptions:

1. Separate facilities shall not be required for *dwelling units* and *sleeping units*.
2. Separate facilities shall not be required in structures or tenant spaces with a total *occupant load*, including both employees and customers of 15 or less.
3. Separate facilities shall not be required in mercantile occupancies in which the maximum *occupant load* is 50 or less.

Final Action: AS AM AMPC____ D

NOTE: PART I, II, AND III REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE.

E151-09/10, PART I-IBC MEANS OF EGRESS
406.2.2, 1007.9 (IFC [B] 1007.9), 1011.3 (IFC [B] 1011.3), 1022.8 (IFC [B] 1022.8), 1104.4, 1106.7, 1108.2.2, 1108.2.3, 1108.4.1.1, 1108.4.1.2, 1108.4.1.4, 1108.4.1.5, 1109.1, 1109.2.1.1, 1109.2.2, 1109.2.3, 1109.3, 1109.4, 1109.6, 1109.8, 1109.13, [P] 2902.4, 3001.3, 3411.6, E104.3, E105.1, E105.2.1, E105.2.2, E105.3, E105.4, E105.6, E106.2, E106.3, E106.4, E106.4.9, E106.5, E107.2, E109.2.1, E109.2.2.1, E109.2.6, E109.2.8, E110.4

PART I – IBC MEANS OF EGRESS

Revise as follows:

1101.2 Design. Buildings and facilities shall be designed and constructed to be accessible in accordance with this code and ICC A117.1.

SECTION 1102
DEFINITIONS

1102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

ACCESSIBLE UNIT. A dwelling unit or sleeping unit that complies with this code and the provisions for Accessible units in ICC A117.1.

TYPE A UNIT. A dwelling unit or sleeping unit designed and constructed for accessibility in accordance with this code and the provisions for Type A units in ICC A117.1.

TYPE B UNIT. A dwelling unit or sleeping unit designed and constructed for accessibility in accordance with this code and the provisions for Type B units in ICC A117.1, consistent with the design and construction requirements of the federal Fair Housing Act.

1104.4 Multilevel buildings and facilities. At least one accessible route shall connect each accessible level, including mezzanines, in multilevel buildings and facilities.

Exceptions:

1. An accessible route is not required to stories and mezzanines that have an aggregate area of not more than 3,000 square feet (278.7 m^2) and are located above and below accessible levels. This exception shall not apply to:
   1.1. Multiple tenant facilities of Group M occupancies containing five or more tenant spaces;
   1.2. Levels containing offices of health care providers (Group B or I); or
   1.3. Passenger transportation facilities and airports (Group A-3 or B).

2. Levels that do not contain accessible elements or other spaces as determined by Section 1107 or 1108 are not required to be served by an accessible route from an accessible level.
3. In air traffic control towers, an accessible route is not required to serve the cab and the floor immediately below the cab.
4. Where a two-story building or facility has one story with an occupant load of five or fewer persons that does not contain public use space, that story shall not be required to be connected by an accessible route to the story above or below.
5. Vertical access to elevated employee work stations within a courtroom is not required at the time of initial construction, provided a ramp, lift or elevator ~~complying with ICC A117.1~~ can be installed without requiring reconfiguration or extension of the courtroom or extension of the electrical system.

1106.7 Passenger loading zones. Passenger loading zones shall be <u>accessible</u> ~~designed and constructed in accordance with ICC A117.1~~.

1107.2 Design. Dwelling units and sleeping units that are required to be Accessible units, Type A units and Type B units shall comply with the applicable portions of Chapter 10 of ICC A117.1. Units required to be Type A units are permitted to be designed and constructed as Accessible units. Units required to be Type B units are permitted to be designed and constructed as Accessible units or as Type A units.

1108.2.2 Wheelchair spaces. In theaters, bleachers, grandstands, stadiums, arenas and other fixed seating assembly areas, accessible wheelchair spaces ~~complying with ICC A117.1~~ shall be provided in accordance with Sections 1108.2.2.1 through 1108.2.2.4.

1108.2.3 Companion seats. At least one companion seat ~~complying with ICC A117.1~~ shall be provided for each wheelchair space required by Sections 1108.2.2.1 through 1108.2.2.3.

1108.4.1.1 Jury box. A wheelchair space ~~complying with ICC A117.1~~ shall be provided within the jury box.

Exception: Adjacent companion seating is not required.

1108.4.1.2 Gallery seating. Wheelchair spaces ~~complying with ICC A117.1~~ shall be provided in accordance with Table 1108.2.2.1. Designated aisle seats shall be provided in accordance with Section 1108.2.5.

1108.4.1.4 Employee work stations. The judge's bench, clerk's station, bailiff's station, deputy clerk's station and court reporter's station shall be located on an accessible route. The vertical access to elevated employee work stations within a courtroom is not required at the time of initial construction, provided a ramp, lift or elevator ~~complying with ICC A117.1~~ can be installed without requiring reconfiguration or extension of the courtroom or extension of the electrical system.

1108.4.1.5 Other work stations. The litigant's and counsel stations, including the lectern, shall be accessible ~~in accordance with ICC A117.1~~.

1109.1 General. Accessible building features and facilities shall be provided in accordance with Sections 1109.2 through 1109.14.

Exception: <u>Accessible units,</u> Type A units and Type B units shall comply <u>with Chapter 10 of</u> ICC A117.1.

1109.2 Toilet and bathing facilities. Each toilet room and bathing room shall be *accessible*. Where a floor level is not required to be connected by an *accessible route*, the only toilet rooms or bathing rooms provided within the facility shall not be located on the inaccessible floor. At least one of each type of fixture, element, control or dispenser in each *accessible* toilet room and bathing room shall be *accessible*.

Exceptions:

1. In toilet rooms or bathing rooms accessed only through a private office, not for *common* or *public use* and intended for use by a single occupant, any of the following alternatives are allowed:
   1.1. Doors are permitted to swing into the clear floor space, provided the door swing can be reversed to meet the requirements in ICC A117.1;
   1.2. The height requirements for the water closet in ICC A117.1 are not applicable;
   1.3. Grab bars are not required to be installed in a toilet room, provided that reinforcement has been installed in the walls and located so as to permit the installation of such grab bars; and
   1.4. The requirement for height, knee and toe clearance shall not apply to a lavatory.
2. This section is not applicable to toilet and bathing rooms that serve *dwelling units* or *sleeping unit*s that are not required to be *accessible* by Section 1107.
3. Where multiple single-user toilet rooms or bathing rooms are clustered at a single location, at least 50 percent but not less than one room for each use at each cluster shall be *accessible*.
4. Where no more than one urinal is provided in a toilet room or bathing room, the urinal is not required to be *accessible*.
5. Toilet rooms that are part of critical care or intensive care patient sleeping rooms are not required to be *accessible*.

1109.2.1.1 Standard. Family or assisted-use toilet and bathing rooms shall comply with Sections 1109.2.1.2 through 1109.2.1.7 ~~and ICC A117.1~~.

1109.2.2 Water closet compartment. Where water closet compartments are provided in a toilet room or bathing facility, at least one wheelchair-accessible compartment shall be provided. Where the combined total water closet compartments and urinals provided in a toilet room or bathing facility is six or more, at least one ambulatory-accessible water closet compartment shall be provided in addition to the wheelchair-accessible compartment. ~~Wheelchair-accessible and ambulatory-accessible compartments shall comply with ICC A117.1.~~

1109.2.3 Lavatories. Where lavatories are provided, at least 5 percent, but not less than one, shall be *accessible*. Where the total lavatories provided in a toilet room or bathing facility is six or more, at least one lavatory with enhanced reach ranges ~~in accordance with ICC A117.1~~, shall be provided.

1109.3 Sinks. Where sinks are provided, at least 5 percent but not less than one provided in accessible spaces shall <u>be accessible</u> ~~comply with ICC A117.1~~.
Exception: Mop or service sinks are not required to be accessible.

1109.4 Kitchens and kitchenettes. Where kitchens and kitchenettes are provided in accessible spaces or rooms, they shall be accessible ~~in accordance with ICC A117.1~~.

1109.6 Elevators. Passenger elevators on an accessible route shall be accessible and comply with ~~Section 3001.3~~ Chapter 30.

1109.8 Storage. Where fixed or built-in storage elements such as cabinets, shelves, medicine cabinets, closets and drawers are provided in required accessible spaces, at least one of each type shall contain accessible storage space ~~complying with ICC A117.1~~.

1109.13 Fuel-dispensing systems. Fuel-dispensing systems shall be accessible ~~comply with ICC A117.1~~.

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

406.2.2 Clear height. The clear height of each floor level in vehicle and pedestrian traffic areas shall not be less than 7 feet (2134 mm). Vehicle and pedestrian areas accommodating van-accessible parking shall comply with ~~required by~~ Section 1106.5 ~~shall conform to ICC A117.1.~~

SECTION 1007 (IFC [B] 1007)
ACCESSIBLE MEANS OF EGRESS

1007.9 (IFC [B] 1007.9) Signage. Signage indicating special accessibility provisions shall be provided as shown:

1. Each door providing access to an *area of refuge* from an adjacent floor area shall be identified by a sign stating: AREA OF REFUGE.
2. Each door providing access to an exterior area for assisted rescue shall be identified by a sign stating: EXTERIOR AREA FOR ASSISTED RESCUE.

Signage shall comply with the ICC A117.1 requirements for visual characters and include the International Symbol of Accessibility. Where exit sign illumination is required by Section 1011.2, the signs shall be illuminated. Additionally, raised character and braille ~~tactile~~ signage complying with ICC A117.1 shall be located at each door to an *area of refuge* and exterior area for assisted rescue in accordance with Section 1011.3.

SECTION 1010 (IFC [B] 1010)
RAMPS

1010.1 (IFC [B] 1010.1) Scope. The provisions of this section shall apply to ramps used as a component of a means of egress.

Exceptions:

1. Other than ramps that are part of the accessible routes providing access in accordance with Sections 1108.2 through 1108.2.4 and 1108.2.6, ramped aisles within assembly rooms or spaces shall conform with the provisions in Section 1028.11.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian exit access shall not be required to comply with Sections 1010.3 through 1010.9 when they are not an accessible route serving accessible parking spaces, other required accessible elements or part of an accessible means of egress.

1010.6.5 (IFC [B] 1010.6.5) Doorways. Where doorways are located adjacent to a ramp landing, maneuvering clearances required by ICC A117.1 are permitted to overlap the required landing area.

1010.9 (IFC [B] 1010.9) Edge protection. Edge protection complying with Section 1010.9.1 or 1010.9.2 shall be provided on each side of ramp runs and at each side of ramp landings.

Exceptions:

1. Edge protection is not required on ramps that are not required to have handrails, provided they have flared sides that comply with the ICC A117.1 curb ramp provisions.
2. Edge protection is not required on the sides of ramp landings serving an adjoining ramp run or stairway.
3. Edge protection is not required on the sides of ramp landings having a vertical drop off of not more than ½ inch (12.7 mm) within 10 inches (254 mm) horizontally of the required landing area.
4. In assembly spaces with fixed seating, edge protection is not required on the sides of ramps where the ramps provide access to the adjacent seating and aisle accessways.

SECTION 1011(IFC [B] 1011)
EXIT SIGNS

1011.3 (IFC [B] 1011.3) ~~Tactile~~ Raised character and Braille exit signs. A ~~tactile~~ sign stating EXIT in raised characters and Braille and complying with ICC A117.1 shall be provided adjacent to each door to an area of refuge, an exterior area for assisted rescue, an exit stairway, an exit ramp, an exit passageway and the exit discharge.

SECTION 1022 (IFC [B] 1022)
EXIT ENCLOSURES

1022.8 (IFC [B] 1022.8) Floor identification signs. A sign shall be provided at each floor landing in exit enclosures connecting more than three stories designating the floor level, the terminus of the top and bottom of the exit enclosure and the identification of the stair or ramp. The signage shall also state the story of, and the direction to, the exit discharge and the availability of roof access from the enclosure for the fire department. The sign shall be located 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions. In addition, floor level identification signs in ~~tactile~~ raised characters and Braille complying with ICC A117.1 shall be located at each floor level landing adjacent to the door leading from the enclosure into the corridor to identify the floor level.

CHAPTER 30
ELEVATORS AND CONVEYING SYSTEMS

3001.3 Accessibility. Passenger elevators required to be accessible ~~by Chapter 11 shall conform to ICC A117.1~~ or serve as part of an accessible means of egress shall comply with Section 1107 and 1109.6.

3008.13.1 Design and installation. The two-way communication system shall include audible and visible signals and shall be designed and installed in accordance with the requirements in ICC A117.1.

3008.13.2 Instructions. Instructions for the use of the two-way communication system along with the location of the station shall be permanently located adjacent to each station. Signage shall comply with the ICC A117.1 requirements for visual characters.

SECTION 3411 (IEBC 310)
ACCESSIBILITY FOR EXISTING BUILDINGS

3411.6 (IEBC 310.6) Alterations. A building, facility or element that is altered shall comply with the applicable provisions in Chapter 11 of this code ~~and ICC A117.1~~, unless technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent technically feasible.

Exceptions:

1. The altered element or space is not required to be on an accessible route, unless required by Section 3411.7.
2. Accessible means of egress required by Chapter 10 are not required to be provided in existing buildings and facilities.
3. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit ~~and shall comply with the applicable provisions in Chapter 11 and ICC A117.1~~.

3411.8.2 (IEBC 310.8.2) Elevators. Altered elements of existing elevators shall comply with ASME A17.1 and ICC A117.1. Such elements shall also be altered in elevators programmed to respond to the same hall call control as the altered elevator.

3411.8.3 (IEBC 310.8.3) Platform lifts. Platform (wheelchair) lifts complying with ICC A117.1 and installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route.

APPENDIX E
SUPPLEMENTARY ACCESSIBILITY REQUIREMENTS

E101.2 Design. Technical requirements for items herein shall comply with this code and ICC A117.1.

SECTION E104
SPECIAL OCCUPANCIES

E104.2 Accessible beds. In rooms or spaces having more than 25 beds, 5 percent of the beds shall have a clear floor space complying with ICC A117.1.

E104.2.1 Sleeping areas. A clear floor space complying with ICC A117.1 shall be provided on both sides of the accessible bed. The clear floor space shall be positioned for parallel approach to the side of the bed.

Exception: This requirement shall not apply where a single clear floor space complying with ICC A117.1 positioned for parallel approach is provided between two beds.

E104.3 Communication features. Accessible communication features ~~complying with ICC A117.1~~ shall be provided in accordance with Sections E104.3.1 through E104.3.4.

E104.3.4 Notification devices. Visual notification devices shall be provided to alert room occupants of incoming telephone calls and a door knock or bell. Notification devices shall not be connected to visual alarm signal appliances. Permanently installed telephones shall have volume controls and an electrical outlet complying with ICC A117.1 located within 48 inches (1219 mm) of the telephone to facilitate the use of a TTY.

SECTION E105
OTHER FEATURES AND FACILITIES

E105.1 Portable toilets and bathing rooms. Where multiple single-user portable toilet or bathing units are clustered at a single location, at least 5 percent, but not less than one toilet unit or bathing unit at each cluster, shall be accessible ~~comply with ICC A117.1~~. Signs containing the International Symbol of Accessibility ~~and complying with ICC A117.1~~ shall identify accessible portable toilets and bathing units.

Exception: Portable toilet units provided for use exclusively by construction personnel on a construction site.

E105.2.1Washing machines. Where three or fewer washing machines are provided, at least one shall be accessible ~~comply with ICC A117.1~~. Where more than three washing machines are provided, at least two shall be accessible ~~comply with ICC A117.1~~.

E105.2.2 Clothes dryers. Where three or fewer clothes dryers are provided, at least one shall be accessible ~~comply with ICC A117.1~~. Where more than three clothes dryers are provided, at least two shall be accessible ~~comply with ICC A117.1~~.

E105.3 Depositories, vending machines, change machines and similar equipment. Where provided, at least one of each type of depository, vending machine, change machine and similar equipment shall be accessible ~~comply with ICC A117.1~~.

Exception: Drive-up-only depositories are not required to comply with this section.

E105.4 Mailboxes. Where mailboxes are provided in an interior location, at least 5 percent, but not less than one, of each type shall be accessible ~~comply with ICC A117.1~~. In residential and institutional facilities, where mailboxes are provided for each dwelling unit or sleeping unit, mailboxes be accessible ~~complying with ICC A117.1~~ shall be provided for each unit required to be an Accessible unit.

E105.6 Two-way communication systems. Where two-way communication systems are provided to gain admittance to a building or facility or to restricted areas within a building or facility, the system shall be accessible ~~comply with ICC A117.1~~.

SECTION E106
TELEPHONES

E106.2 Wheelchair-accessible telephones. Where public telephones are provided, wheelchair-accessible telephones ~~complying with ICC A117.1~~ shall be provided in accordance with Table E106.2.

Exception: Drive-up-only public telephones are not required to be accessible.

E106.3 Volume controls. All public telephones provided shall have accessible volume control ~~complying with ICC A117.1~~.

E106.4 TTYs. TTYs ~~complying with ICC A117.1~~ shall be provided in accordance with Sections E106.4.1 through E106.4.9.

E106.4.9 Signs. Public TTYs shall be identified by the International Symbol of TTY ~~complying with ICC A117.1~~. Directional signs indicating the location of the nearest public TTY shall be provided at banks of public pay telephones not containing a public TTY. Additionally, where signs provide direction to public pay telephones, they shall also provide direction to public TTYs. Such signs shall comply with visual signage requirements in ICC A117.1 and shall include the International Symbol of TTY.

E106.5 Shelves for portable TTYs. Where a bank of telephones in the interior of a building consists of three or more public pay telephones, at least one public pay telephone at the bank shall be provided with a shelf and an electrical outlet ~~in accordance with ICC A117.1~~.

Exceptions:

1. In secured areas of detention and correctional facilities, if shelves and outlets are prohibited for purposes of security or safety shelves and outlets for TTYs are not required to be provided.
2. The shelf and electrical outlet shall not be required at a bank of telephones with a TTY.

SECTION E107
SIGNAGE

E107.1 Signs. Required accessible portable toilets and bathing facilities shall be identified by the International Symbol of Accessibility.

E107.2 Designations. Interior and exterior signs identifying permanent rooms and spaces shall be ~~tactile~~ raised characters and braille. Where pictograms are provided as designations of interior rooms and spaces, the pictograms shall have ~~tactile~~ raised character and braille text descriptors. ~~Signs required to provide tactile characters and pictograms shall comply with ICC A117.1~~.

Exceptions:

1. Exterior signs that are not located at the door to the space they serve are not required to comply.
2. Building directories, menus, seat and row designations in assembly areas, occupant names, building addresses and company names and logos are not required to comply.
3. Signs in parking facilities are not required to comply.
4. Temporary (seven days or less) signs are not required to comply.
5. In detention and correctional facilities, signs not located in public areas are not required to comply.

E107.3 Directional and informational signs. Signs that provide direction to, or information about, permanent interior spaces of the site and facilities shall contain visual characters complying with ICC A117.1.

Exception: Building directories, personnel names, company or occupant names and logos, menus and temporary (seven days or less) signs are not required to comply with ICC A117.1.

SECTION E108
BUS STOPS

E108.3 Bus shelters. Where provided, new or replaced bus shelters shall provide a minimum clear floor or ground space complying with ICC A117.1, Section 305, entirely within the shelter. Such shelters shall be connected by an accessible route to the boarding area required by Section E108.2.

E108.4 Signs. New bus route identification signs shall have finish and contrast complying with ICC A117.1. Additionally, to the maximum extent practicable, new bus route identification signs shall provide visual characters complying with ICC A117.1.

Exception: Bus schedules, timetables and maps that are posted at the bus stop or bus bay are not required to meet this requirement.

SECTION E109
TRANSPORTATION FACILITIES AND STATIONS

E109.2.1 Station entrances. Where different entrances to a station serve different transportation fixed routes or groups of fixed routes, at least one entrance serving each group or route shall comply with Section 1104 ~~and ICC A117.1~~.

E109.2.2.1 ~~Tactile~~ Raised character and braille signs. Where signs are provided at entrances to stations identifying the station or the entrance, or both, at least one sign at each entrance shall be ~~tactile~~ raised characters and braille. A minimum of one ~~tactile~~ raised character and braille sign identifying the specific station shall be provided on each platform or boarding area. Such signs shall be placed in uniform locations at entrances and on platforms or boarding areas within the transit system to the maximum extent practicable. ~~Tactile signs shall comply with ICC A117.1~~.

Exceptions:

1. Where the station has no defined entrance but signs are provided, the ~~tactile~~ raised character and braille signs shall be placed in a central location.
2. Signs are not required to be ~~tactile~~ raised character and braille where audible signs are remotely transmitted to hand-held receivers, or are user or proximity actuated.

E109.2.2.2 Identification signs. Stations covered by this section shall have identification signs containing visual characters complying with ICC A117.1. Signs shall be clearly visible and within the sightlines of a standing or sitting passenger from within the train on both sides when not obstructed by another train.

E109.2.2.3 Informational signs. Lists of stations, routes and destinations served by the station which are located on boarding areas, platforms or mezzanines shall provide visual characters complying with ICC A117.1 Signs covered by this provision shall, to the maximum extent practicable, be placed in uniform locations within the transit system.

E109.2.3 Fare machines. Self-service fare vending, collection and adjustment machines shall comply with ICC A117.1, Section 707. Where self-service fare vending, collection or adjustment machines are provided for the use of the general public, at least one accessible machine of each type provided shall be provided at each accessible point of entry and exit.

E109.2.5 TTYs. Where a public pay telephone is provided in a transit facility (as defined by the Department of Transportation) at least one public TTY complying with ICC A117.1, Section 704.4, shall be provided in the station. In addition, where one or more public pay telephones serve a particular entrance to a transportation facility, at least one TTY telephone complying with ICC A117.1, Section 704.4, shall be provided to serve that entrance.

E109.2.6 Track crossings. Where a circulation path serving boarding platforms crosses tracks, an accessible route ~~complying with ICC A117.1~~ shall be provided.

Exception: Openings for wheel flanges shall be permitted to be 21/2 inches (64 mm) maximum.

E109.2.8 Clocks. Where clocks are provided for use by the general public, the clock face shall be uncluttered so that its elements are clearly visible. Hands, numerals and digits shall contrast with the background either light-on-dark or dark-on-light. Where clocks are mounted overhead, numerals and digits shall comply with visual character requirements ~~ICC A117.1, Section 703.2~~.

SECTION E110
AIRPORTS

E110.2 TTYs. Where public pay telephones are provided, at least one TTY shall be provided in compliance with ICC A117.1, Section 704.4. Additionally, if four or more public pay telephones are located in a main terminal outside the security areas, a concourse within the security areas or a baggage claim area in a terminal, at least one public TTY complying with ICC A117.1, Section 704.4, shall also be provided in each such location.

E110.4 Clocks. Where clocks are provided for use by the general public, the clock face shall be uncluttered so that its elements are clearly visible. Hands, numerals and digits shall contrast with their background either light-on-dark or dark-on-light. Where clocks are mounted overhead, numerals and digits shall comply with visual character requirements ~~ICC A117.1, Section 703.2~~.

Reason:
PART I-IBC
Section 1101.2 establishes ICC A117.1 as the standard for accessible design for Chapter 11. Section E101.2 establishes ICC A117.1 as the standard for accessible design for Appendix E. It is unnecessary to repeat this throughout Chapter 11 or Appendix E unless the specific text is an exception to the standard (Ex: Section 1109.2 Ex. 1) or a specific item within the standard (Ex: Section 1002.1, Definitions for Accessible Unit, Type A unit and Type B unit) . Providing the reference in a haphazard manner within the chapter only serves to create confusion. This is an editorial issue and the editorial committee should verify that there are not other occurrences of this in the chapter. The text provided shows all of the location where ICC A117.1 is currently referenced.

1109.1 – The revisions is correlative with the 2003 A117.1 including Accessible Units in Chapter 10 which only included Type A and Type B units in the 1998 edition. The definition for Accessible units was correlated and approved with the new edition, but this exception was missed.

1109.6 – the reference to Section 3001.3 is only a reference to ICC A117.1, which is not needed since it is already called out in Section 1101.2. All elevators have to comply with Chapter 30 for safety.

406.2.2 – the reference to Section 1106.5 for accessible parking automatically gets ICC A117.1.

1007.9 – ICC A117.1 has changed 'tactile' requirements for signage to 'raised characters and braille'. This revision would correlate with the standard.

1011.3 – ICC A117.1 has changed 'tactile' requirements for signage to 'raised characters and braille'. This revision would correlate with the standard.

3411.6 (IEBC 310.6) - The reference to IBC Chapter 11 already gets the ICC A117.1.

Changes for 'tactile characters' to 'raised characters and braille' is consistent with revisions to the 2009 edition in A117.1.

PART I - IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Modify the proposal as follows (editorial correction):

3001.3 Accessibility. Passenger elevators required to be accessible or serve as part of an accessible means of egress shall comply with ~~Section 1107~~ Sections 1007 and 1109.6.

E105.4 Mailboxes. Where mailboxes are provided in an interior location, at least 5 percent, but not less than one, of each type shall be accessible. In residential and institutional facilities, where mailboxes are provided for each dwelling unit or sleeping unit, accessible mailboxes ~~be accessible~~ shall be provided for each unit required to be an Accessible unit.

(Portions of proposal not shown remain unchanged.)

Committee Reason: The selective deletions of the reference to ICC A117.1 remove redundant text. Revisions in terminology for tactile signage coordinate with revisions in the 2009 edition of ICC A117.1.

Assembly Action: **None**

E151-09/10, PART II-IFC
IFC 907.5.2.3.4 (IBC [F] 907.5.2.3.4)

PART II – IFC

Revise as follows:

SECTION [F] 907 (IFC 907)
FIRE ALARM AND DETECTION SYSTEMS

[F] 907.5.2.3.4 (IFC 907.5.2.3.4) Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, all dwelling units and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with Chapter 10 of ICC A117.1.

Reason: Part II – IFC - 907.5.2.3.4 – in this situation, the more specific reference would clarify to users where the alarm requirements for dwelling units are found. This would be consistent with the definitions of Accessible units, Type A units and Type B units.

PART II- IFC
Committee Action: **Approved as Submitted**

Committee Reason: The revisions clarify the applicable technical requirements in ICC A117.1 for visible alarms in dwelling units.

Assembly Action: **None**

E151-09/10, PART IV-IEBC
IEBC 605.1

PART IV – IEBC

SECTION 605
ACCESSIBILITY

605.1 General. A building, facility or element that is altered shall comply with the applicable provisions in Sections 605.1.1 through 605.1.14, Chapter 11 of the International Building Code ~~and ICC A117.1~~ unless it is technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent that is technically feasible. A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

Exceptions:

1. The altered element or space is not required to be on an accessible route unless required by Section 605.2.
2. Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in existing buildings and facilities.
3. Type B dwelling or sleeping units required by Section 1107 of the International Building Code are not required to be provided in existing buildings and facilities.
4. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provisions for Type B dwelling units ~~and shall comply with the applicable provisions in Chapter 11 of the International Building Code and ICC A117.1~~.

605.1.2 Elevators. Altered elements of existing elevators shall comply with ASME A17.1 and ICC A117.1. Such elements shall also be altered in elevators programmed to respond to the same hall call control as the altered elevator.

605.1.3 Platform lifts. Platform (wheelchair) lifts complying with ICC A117.1 and installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route.

Reason: Part IV – IEBC – 605.1 – The reference to IBC Chapter 11 already gets the ICC A117.1.

PART IV- IEBC
Committee Action: **Approved as Submitted**

Committee Reason: The selective deletions of the reference to ICC A117.1 remove redundant text.

Assembly Action: **None**

E152-09/10, Part I

1102.1, 1104.2, 1104.3, 1109.7, 1109.14, 1110 (New), 3411.8, 3411.8.15 (New), 3411.8.16 (New) [IEBC [B] 310.8, 310.8.15 (New), 310.8.16 (New)

Proposed Change as Submitted

Proponent: Marsha K. Mazz, U.S. Architectural and Transportation Barriers Compliance Board (Access Board)

PART I – IBC MEANS OF EGRESS

1. Add new definitions as follows:

1102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

AMUSEMENT RIDE. A system that moves persons through a fixed course within a defined area for the purpose of amusement.

AMUSEMENT RIDE SEAT. A seat that is built-in or mechanically fastened to an amusement ride intended to be occupied by one or more passengers.

AREA OF SPORT ACTIVITY. That portion of a room or space where the play or practice of a sport occurs.

BOARDING PIER. A portion of a pier where a boat is temporarily secured for the purpose of embarking or disembarking.

BOAT LAUNCH RAMP. A sloped surface designed for launching and retrieving trailered boats and other water craft to and from a body of water.

BOAT SLIP. That portion of a pier, main pier, finger pier, or float where a boat is moored for the purpose of berthing, embarking, or disembarking.

GANGWAY. A variable-sloped pedestrian walkway that links a fixed structure or land with a floating structure. Gangways which connect to vessels are not included.

GOLF CAR PASSAGE. A continuous passage on which a motorized golf car can operate.

PLAY AREA. A portion of a site containing play components designed and constructed for children.

PLAY COMPONENT. An element intended to generate specific opportunities for play, socialization, or learning. Play components may be manufactured or natural, and may be stand alone or part of a composite play structure.

TEEING GROUND. In golf, the starting place for the hole to be played.

TRANSFER DEVICE. Equipment designed to facilitate the transfer of a person from a wheelchair or other mobility device to and from an amusement ride seat.

2. Revise as follows:

1104.2 Within a site. At least one accessible route shall connect accessible buildings, accessible facilities, accessible elements and accessible spaces that are on the same site.

Exceptions:

1. An accessible route is not required between accessible buildings, accessible facilities, accessible elements and accessible spaces that have, as the only means of access between them, a vehicular way not providing for pedestrian access.
2. An accessible route to recreational facilities is not required when exempted under Sections 1110.4 or 1110.6

1104.3 Connected spaces. When a building or portion of a building is required to be accessible, an accessible route shall be provided to each portion of the building, to accessible building entrances connecting accessible pedestrian walkways and the public way.

Exceptions:

1. In assembly areas with fixed seating, an accessible route shall not be required to serve levels where wheelchair spaces are not provided.
2. In Group I-2 facilities, doors to sleeping units shall be exempted from the requirements for maneuvering clearance at the room side provided the door is a minimum of 44 inches (1118 mm) in width.
3. <u>An accessible route to recreational facilities is not required when exempted under Sections 1110.4 or 1110.6</u>

1109.7 Lifts. Platform (wheelchair) lifts are permitted to be a part of a required accessible route in new construction where indicated in Items 1 through ~~10~~ <u>11</u>. Platform (wheelchair) lifts shall be installed in accordance with ASME A18.1.

1. An accessible route to a performing area and speaker platforms in Group A occupancies.
2. An accessible route to wheelchair spaces required to comply with the wheelchair space dispersion requirements of Sections 1108.2.2 through 1108.2.6.
3. An accessible route to spaces that are not open to the general public with an occupant load of not more than five.
4. An accessible route within a dwelling or sleeping unit.
5. An accessible route to wheelchair seating spaces located in outdoor dining terraces in Group A-5 occupancies where the means of egress from the dining terraces to a public way are open to the outdoors.
6. An accessible route to jury boxes and witness stands; raised courtroom stations including judges' benches, clerks' stations, bailiffs' stations, deputy clerks' stations and court reporters' stations; and to depressed areas such as the well of the court.
7. An accessible route to load and unload areas serving amusement rides.
8. An accessible route to play components or soft contained play structures.
9. An accessible route to team or player seating areas serving areas of sport activity.
10. An accessible route where existing exterior site constraints make use of a ramp or elevator infeasible.
11. <u>Platform lifts shall be permitted to be used instead of gangways that are part of accessible routes serving recreational boating facilities and fishing piers and platforms.</u>

<u>SECTION 1110</u>
<u>RECREATIONAL FACILITIES</u>

<u>1110.1</u> ~~1109.14~~ Recreational and sports facilities. Recreational and sports facilities shall be provided with accessible features in accordance with Sections <u>1110.2</u> ~~1109.14.1~~ through <u>1110.6</u> ~~1109.14.4~~.

<u>1110.2</u> ~~1109.14.1~~ Facilities serving <u>Type B units in</u> a single building. In Group R-2 and R-3 occupancies where recreational facilities are provided serving a single building containing ~~Type A units or~~ Type B units, 25 percent, but not less than one, of each type of recreational facility shall be accessible. Every recreational facility of each type on a site shall be considered to determine the total number of each type that is required to be accessible.

<u>1110.3</u> ~~1109.14.2~~ Facilities serving <u>Type B units in</u> multiple buildings. In Group R-2 and R-3 occupancies on a single site where multiple buildings containing ~~Type A units or~~ Type B units are served by recreational facilities, 25 percent, but not less than one, of each type of recreational facility serving each building shall be accessible. The total number of each type of recreational facility that is required to be accessible shall be determined by considering every recreational facility of each type serving each building on the site.

<u>**1110.4 Facilities serving Accessible and Type A units.** In Group R-2 and R-3 occupancies where recreational facilities are provided serving Accessible or Type A units, every recreational facility of each type serving Accessible or Type A units shall be accessible.</u>

<u>1110.5</u> ~~1109.14.3~~ Other occupancies. All recreational facilities not falling within the purview of Section <u>1110.2 through 1110.4</u> ~~1109.14.1~~ ~~or 1109.14.2~~ shall <u>comply with ICC A117.1 and be located on an accessible route</u> ~~be accessible~~. <u>Each area of sports activity shall be served by an accessible route. Accessible route shall also comply with Section 1110.5.1 through 1110.5.3.</u>

Exception: Areas of sport activity shall not be required to comply with ICC A117.1.

1110.5.1 Protruding objects. Protruding objects shall comply with the requirements of Sections 1003.3.

Exception: Within play areas, protruding objects on circulation paths shall not be required to comply with 1003.3 provided that ground level accessible routes provide vertical clearance in compliance with 1003.3.1.

1110.5.2 Floor surface. Walking surfaces of the accessible route shall comply with ICC ANSI A117.1.

Exception: Within animal containment areas, floor and ground surfaces shall not be required to be stable, firm, and slip resistant.

1110.5.3 Changes in Level. Where changes in level are permitted in floor or ground surfaces, they shall comply with ICC A117.1 for changes in level.

Exception: Animal containment areas shall not be required to comply with ICC A117.1.

1110.6 **~~1109.14.4~~ Recreational and sports facilities exceptions.** Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

1110.6.1 **~~1108.2.2.4~~ Team or player seating.** At least one wheelchair space shall be provided in team or player seating areas serving areas of sport activity.

Exception: Wheelchair spaces shall not be required in team or player seating areas serving bowling lanes that are not required to be located on an accessible route in accordance with Section ~~1109.14.4.1~~ 1110.6.2.

1110.6.2 **~~1109.14.4.1~~ Bowling lanes.** An accessible route shall be provided to at least 5 percent, but no less than one, of each type of bowling lane.

1110.6.3 **~~1109.14.4.2~~ Court sports.** In court sports, at least one accessible route shall directly connect both sides of the court.

1110.6.4 **~~1109.14.4.3~~ Raised boxing or wrestling rings.** Raised boxing or wrestling rings are not required to be accessible or to be on an accessible route.

1110.6.5 **~~1109.14.4.4~~ Raised refereeing, judging and scoring areas.** Raised structures used solely for refereeing, judging or scoring a sport are not required to be accessible or to be on an accessible route.

1110.6.6 Swimming pools, wading pools and spas. Swimming pools, wading pools, and spas shall comply with ICC A117.1.

1110.6.6.1 **~~1109.14.4.5~~ Raised diving boards and diving platforms.** Raised diving boards and diving platforms are not required to be accessible or to be on an accessible route.

1110.6.6.2 Water Slides. Water slides are not be required to be accessible or to be on an accessible route.

1110.6.7 Amusement Rides. Amusement rides shall comply with Section 1110.6.7.1 through 1110.6.7.3.

Exception: Mobile or portable amusement rides shall not be required to be accessible.

1110.6.7.1 Load and Unload Areas. Load and unload areas serving amusement rides shall comply with ICC A117.1.

1110.6.7.2 Minimum Number. Amusement rides shall provide at least one wheelchair space, or at least one amusement ride seat designed for transfer, or at least one transfer device.

Exceptions:

1. Amusement rides that are controlled or operated by the rider shall not be required to comply with this section.

2. Amusement rides designed primarily for children, where children are assisted on and off the ride by an adult, shall not be required to comply with this section.
3. Amusement rides that do not provide amusement ride seats shall not be required to comply with this section.

1110.6.7.3 Amusement Rides. Accessible amusement rides shall be on an accessible routes in accordance with Section 1110.6.7.3.1 and 1110.6.7.3.2.

1110.6.7.3.1 Load and Unload Areas. Load and unload areas shall be on an accessible route. Where load and unload areas have more than one loading or unloading position, at least one loading and unloading position shall be on an accessible route.

1110.6.7.3.2 Wheelchair Spaces, Ride Seats Designed for Transfer, and Transfer Devices. When amusement rides are in the load and unload position, wheelchair spaces, amusement ride seats designed for transfer and transfer devices shall be on an accessible route.

1110.6.8 Recreational Boating Facilities. Boat slips required to be accessible by Section 1110.6.8.1 and 1110.6.8.2 and boarding piers at boat launch ramps required to be accessible by Section 1110.6.8.3 shall be on an accessible route.

1110.6.8.1 Boat Slips. Boat slips complying with ICC A117.1 shall be provided in accordance with Table 1110.6.8.1. Where the number of boat slips is not identified, each 40 feet (12 m) of boat slip edge provided along the perimeter of the pier shall be counted as one boat slip for the purpose of this section.

TABLE 1110.6.8.1
BOAT SLIPS

Total Number of Boating Slips Provided in Facility	Minimum Number of Required Accessible Boating Slips
1 to 25	1
26 to 50	2
51 to 100	3
101 to 150	4
151 to 300	5
301 to 400	6
401 to 500	7
501 to 600	8
601 to 700	9
701 to 800	10
801 to 900	11
901 to 1000	12
1001 and over	12, plus 1 for every 100, or fraction thereof, over 1000

1110.6.8.2 Dispersion. Accessible boat slips shall be dispersed throughout the various types of boat slips provided. Where the minimum number of accessible boat slips 1 has been met, no further dispersion shall be required.

1110.6.8.3 Boarding Piers at Boat Launch Ramps. Where boarding piers are provided at boat launch ramps, at least 5 percent, but no fewer than one, of the boarding piers shall comply with ICC A117.1.

1110.6.9 Exercise Machines and Equipment. At least one of each type of exercise machines and equipment shall comply with ICC A117.1 and shall be on an accessible route.

1110.6.10 Fishing Piers and Platforms. Fishing piers and platforms shall comply with ICC A117.1 and be on an accessible route.

1110.6.11 Golf Facilities. Golf facilities shall comply with 1110.6.11.1 through 1110.6.11.3.

1110.6.11.1 Golf Courses. Golf courses shall comply with 1110.6.11.1.1 through 1110.6.11.1.3.

1110.6.11.1.1 Teeing Grounds. Where one teeing ground is provided for a hole, the teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where two teeing grounds are provided for a hole, the forward teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where three or more teeing grounds are provided for a hole, at least two teeing grounds, including the forward teeing ground, shall be designed and constructed so that a golf car can enter and exit each teeing ground.

1110.6.11.1.2 Putting Greens. Putting greens shall be designed and constructed so that a golf car can enter and exit the putting green.

1110.6.11.1.3 Weather Shelters. Where provided, weather shelters shall be designed and constructed so that a golf car can enter and exit the weather shelter and shall comply with ICC A117.1.

1110.6.11.2 Practice Putting Greens, Practice Teeing Grounds, and Teeing Stations at Driving Ranges. At least 5 percent, but no fewer than one, of practice putting greens, practice teeing grounds, and teeing stations at driving ranges shall be designed and constructed so that a golf car can enter and exit the practice putting greens, practice teeing grounds, and teeing stations at driving ranges.

1110.6.11.3 Golf Facilities. At least one accessible route shall connect accessible elements and spaces within the boundary of the golf course. In addition, accessible routes serving golf car rental areas; bag drop areas; course weather shelters; course toilet rooms; and practice putting greens, practice teeing grounds, and teeing stations at driving ranges complying with Section 1110.6.11.2 shall comply with ICC A117.1.

> **Exception:** Golf car passages complying with ICC A117.1 shall be permitted to be used for all or part of accessible routes required by this section.

1110.6.12 Miniature golf facilities. Miniature golf facilities shall comply with 1110.6.12.1 through 1110.6.12.3.

1110.6.12.1 Minimum Number. At least 50 percent of holes on miniature golf courses shall comply with ICC A117.1.

1110.6.12.2 Miniature Golf Course Configuration. Miniature golf courses shall be configured so that the holes complying with ICC A117.1 are consecutive. Miniature golf courses shall provide an accessible route from the last hole complying with ICC A117.1 to the course entrance or exit without requiring travel through any other holes on the course.

> **Exception:** One break in the sequence of consecutive holes shall be permitted provided that the last hole on the miniature golf course is the last hole in the sequence.

1110.6.12.3 Miniature Golf Facilities. Holes required to comply with 1110.6.12.1, including the start of play, shall be on an accessible route.

1110.6.13 Play Areas. Play areas shall comply with ICC A117.1.

1110.6.14 Shooting Facilities with Firing Positions. Where shooting facilities with firing positions are designed and constructed at a site, at least 5 percent, but no fewer than one, of each type of firing position shall comply with ICC A117.1.

1110.6.15 Animal Containment Areas. Animal containment areas that are not for public use are not required to be accessible or to be on an accessible route.

3411.8 (IEBC 310.8) Scoping for alterations. The provisions of Sections 3411.8.1 through ~~3411.8.14~~ 3411.8.16 shall apply to *alterations* to existing buildings and facilities.

3411.8.15 (IEBC 310.8.15) Existing Amusement Rides. Where existing amusement rides are altered, the alteration shall comply with Section 3411.8.15.1 and 3411.8.15.2.

3411.8.15.1 (IEBC 310.8.15.1) Load and Unload Areas. Where load and unload areas serving existing amusement rides are newly designed and constructed, the load and unload areas shall comply with ICC A117.1.

3411.8.15.2 (IEBC 310.8.15.2) Minimum Number. Where the structural or operational characteristics of an amusement ride are altered to the extent that the amusement ride's performance differs from that specified by the manufacturer or the original design, the amusement ride shall comply with requirements for new construction in Section 1110.6.7.

3411.8.16 (IEBC 310.8) Teeing Grounds. When golf courses are being altered, teeing grounds shall comply with Section 1110.6.11.1.1**.**

> **Exception:** In existing golf courses, the forward teeing ground shall not be required to be one of the teeing grounds on a hole designed and constructed so that a golf car can enter and exit the teeing ground where compliance is not feasible due to terrain.

Reason: ICC A117.1-2009 will include a new Chapter 11 which contains accessibility requirements for recreational facilities including: amusement rides, recreational boating and fishing facilities, exercise machines and equipment, golf and miniature golf facilities, play areas, swimming and wading pools and shooting facilities. The new requirements in ICC A117.1 and in this proposal are drawn directly from the U.S. Access Board's Americans with Disabilities Act (ADA) Accessibility Guidelines for Recreation Facilities originally published in the *Federal Register* on September 3, 2002. These guidelines and the previously issued guidelines for Play Areas (October 2000) were both later incorporated into the Access Board's 2004 ADA and Architectural Barriers Act (ABA) Accessibility Guidelines. Together with new Chapter 11 of the ICC A117.1, the proposal is consistent with the aforementioned Federal guidelines and will afford adults and children with disabilities a reasonable level of access to recreation and play.

Amusement Rides: This proposal addresses access to amusement rides for persons with disabilities, including those who use wheelchairs. Specifications require provision of either a wheelchair space on the ride or a ride seat or device designed for transfer to the ride. Access at loading and unloading areas is also addressed. Specific criteria for wheelchair spaces, ride seats designed for transfer, and transfer devices is included in ICC ANSI A117.1. Certain exceptions are provided in proposed IBC Sections 1110.6.7 for rides that are: set up temporarily, such as at a traveling carnival, designed primarily for children, controlled or operated by the rider, or not equipped with seats.

Boating Facilities: Boating facilities, such as piers and docks provided at marinas to serve recreational vessels, are covered by this proposal which addresses the minimum number of accessible boat slips required to be accessible. This number is based on a table according to the total amount of boat slips provided at a facility. The dynamic interface between land and water presents unique and significant challenges in providing access to floating facilities. Therefore, new Chapter 11 in ICC ANSI A117.1 – 2009 for gangways connecting floating facilities take these constraints into account by modifying requirements for accessible routes and ramps with exceptions to criteria for maximum rise and slope, handrail extensions, and level landings.

Fishing Piers and Platforms: ICC ANSI A117.1 contains new provisions addressing railings and edge protection located on fishing piers and platforms. Railings, guardrails, and handrails are not required by this accessibility standard. However, where they are provided, a portion (at least 25%) cannot be more than 34 inches high so that the railings do not obstruct fishing for people using wheelchairs. An exception permits the use of a guard complying with the International Building Code where required or voluntarily provided. Edge protection at least 2 inches high is also addressed to prevent the wheels of mobility aids from slipping over the edge.

Golf : Access to golf courses is typically achieved through the use of golf cars. An exception to proposed 1110.6.11.3 permits golf car passages in lieu of accessible routes throughout golf courses. To comply, courses must be designed so that golf cars can access teeing grounds and putting greens. Modified accessible routes are required to serve practice putting greens and driving ranges since they often are not located within the boundary of a course. Technical specifications are provided for golf car passages, accessible routes, teeing grounds, putting greens, and weather shelters in ICC ANSI A117.1.

Miniature Golf: At least half of the holes on a miniature golf course must be served by an accessible route. Specifications for accessible routes take into account design conventions for miniature golf courses, such as carpeted surfaces and curbs. All level areas of an accessible hole where a ball may come to rest must be within the reach of golf clubs (36 inches) from accessible routes.

Play Areas: Requirements in ICC A117.1 comprise a subsection of the new chapter on recreation facilities. They cover the number of play components required to be accessible, accessible surfacing in play areas, ramp access and transfer system access to elevated structures, and access to soft contained play structures. The guidelines address play areas typically provided at schools, parks, child care facilities (except those based in the operator's home, which are exempted by ICC ANSI A117.1 Section 1108), and other facilities.

Exercise Equipment and Machines, Bowling Lanes, and Shooting Facilities: Provisions for exercise equipment, bowling lanes, and shooting facilities are addressed in this proposal. The accessibility standards do not affect the design of exercise equipment and machines, but instead require one of each type to be on an accessible route and to provide transfer space for persons using wheelchairs. Access is also required to a portion (at least 5%) of bowling lanes and shooting facilities.

Swimming Pools and Wading Pools: Specifications are provided for various means of providing pool access, including pool lifts, sloped entries, transfer walls, transfer systems, and stairs. Access to swimming pools can be achieved by sloped entries or pool lifts. For larger pools (those with 300 or more linear feet of pool wall), a secondary means of access is proposed. Stairs, transfer systems, or transfer walls can be used instead of lifts or sloped entries for this secondary means of access. This is a reasonable provision in light of the fact that nationally recognized safety standards require two means of exit from such larger swimming pools. Specific provisions are also provided for wading pools, wave action pools and other types of pools where user access is limited to one area.

Cost Impact: This code change will increase the cost of construction. However, because these changes are harmonized with the U.S. Access Board's ADA and ABA Accessibility Guidelines, costs associated with compliance cannot be avoided once the U.S. Department of Justice adopts the guidelines as enforceable standards under the Americans with Disabilities Act. The guidelines have already been adopted as enforceable standards under the Architectural Barriers Act applicable to federally funded facilities.

ICCFILENAME:Mazz-E2-1102.1

Public Hearing Results

PART I - IBC MEANS OF EGRESS
Committee Action: **Disapproved**

Committee Reason: The technical provisions in the 2009 edition of ICC A117.1 need to be published before these scoping provisions are included in the IBC. Some of the items in these provisions are outside the scope of the code official's typical purview and should be located in Appendix E (i.e., golf courses, boating piers, amusement rides).

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

1102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

AREA OF SPORT ACTIVITY. That portion of a room or space where the play or practice of a sport occurs.

1104.2 Within a site. At least one accessible route shall connect accessible buildings, accessible facilities, accessible elements and accessible spaces that are on the same site.

Exceptions:

1. An accessible route is not required between accessible buildings, accessible facilities, accessible elements and accessible spaces that have, as the only means of access between them, a vehicular way not providing for pedestrian access.
2. An accessible route to recreational facilities is not required when exempted under Sections 1110.4 or 1110.6

1104.3 Connected spaces. When a building or portion of a building is required to be accessible, an accessible route shall be provided to each portion of the building, to accessible building entrances connecting accessible pedestrian walkways and the public way.

Exceptions:

1. In assembly areas with fixed seating, an accessible route shall not be required to serve levels where wheelchair spaces are not provided.
2. In Group I-2 facilities, doors to sleeping units shall be exempted from the requirements for maneuvering clearance at the room side provided the door is a minimum of 44 inches (1118 mm) in width.
3. An accessible route to recreational facilities is not required when exempted under Sections 1110.4 or 1110.6

SECTION 1110
RECREATIONAL FACILITIES

1110.1 ~~1109.14~~ Recreational and sports facilities. Recreational and sports facilities shall be provided with accessible features in accordance with Sections 1110.2 ~~1109.14.1~~ through 1110.6 ~~1109.14.4~~.

1110.2 ~~1109.14.1~~ Facilities serving Type B units in a single building. In Group R-2 and R-3 occupancies where recreational facilities are provided serving a single building containing ~~Type A units or~~ Type B units, 25 percent, but not less than one, of each type of recreational facility shall be accessible. Every recreational facility of each type on a site shall be considered to determine the total number of each type that is required to be accessible.

1110.3 ~~1109.14.2~~ Facilities serving Type B units in multiple buildings. In Group R-2 and R-3 occupancies on a single site where multiple buildings containing ~~Type A units or~~ Type B units are served by recreational facilities, 25 percent, but not less than one, of each type of recreational facility serving each building shall be accessible. The total number of each type of recreational facility that is required to be accessible shall be determined by considering every recreational facility of each type serving each building on the site.

1110.4 Facilities serving Accessible and Type A units. In Group R-2 and R-3 occupancies where recreational facilities are provided serving Accessible or Type A units, every recreational facility of each type serving Accessible or Type A units shall be accessible.

1110.5 ~~1109.14.3~~ Other occupancies. All recreational facilities not falling within the purview of Section 1110.2 through 1110.4 ~~1109.14.1 or 1109.14.2~~ shall comply with ICC A117.1 and be located on an accessible route ~~be accessible~~. Each area of sports activity shall be served by an accessible route. Accessible routes also shall comply with Section 1110.5.1 through 1110.5.3.

Exception: Areas of sport activity shall not be required to comply with ICC A117.1.

1110.5.1 Protruding objects. Protruding objects shall comply with the requirements of Sections 1003.3.

1110.5.2 Floor surface. Walking surfaces of the accessible route shall comply with ICC ANSI A117.1.

Exception: Within animal containment areas, floor and ground surfaces shall not be required to be stable, firm, and slip resistant.

1110.5.3 Changes in Level. Where changes in level are permitted in floor or ground surfaces, they shall comply with ICC A117.1 for changes in level.

Exception: Animal containment areas shall not be required to comply with ICC A117.1.

1110.6 ~~**1109.14.4**~~ **Recreational and sports facilities exceptions.** Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

1110.6.1 ~~**1108.2.2.4**~~ **Team or player seating.** At least one wheelchair space shall be provided in team or player seating areas serving areas of sport activity.

> **Exception:** Wheelchair spaces shall not be required in team or player seating areas serving bowling lanes that are not required to be located on an accessible route in accordance with Section ~~1109.14.4.1~~ 1110.6.2.

1110.6.2 ~~**1109.14.4.1**~~ **Bowling lanes.** An accessible route shall be provided to at least 5 percent, but no less than one, of each type of bowling lane.

1110.6.3 ~~**1109.14.4.2**~~ **Court sports.** In court sports, at least one accessible route shall directly connect both sides of the court.

1110.6.4 ~~**1109.14.4.3**~~ **Raised boxing or wrestling rings.** Raised boxing or wrestling rings are not required to be accessible or to be on an accessible route.

1110.6.5 ~~**1109.14.4.4**~~ **Raised refereeing, judging and scoring areas.** Raised structures used solely for refereeing, judging or scoring a sport are not required to be accessible or to be on an accessible route.

1110.6.6 ~~**1109.14.4.5**~~ **Raised diving boards and diving platforms.** Raised diving boards and diving platforms are not required to be accessible or to be on an accessible route.

1110.6.7 Animal Containment Areas. Animal containment areas that are not for public use are not required to be accessible or to be on an accessible route.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. The intent of this public comment is to move existing recreational facilities to a separate section, Section 1110, *Recreational Facilities* instead of being a part of Section 1109, *Other Features and Facilities*. This proposal will relocate current Section 1109.14 to a new Section 1110 and will harmonize exceptions with those found in the U.S. Access Board's *ADA and ABA Accessibility Guidelines*. This public comment is not dependent on the new technical provisions for recreational facilities found in the 2010 edition of ICC A117.1.

Public Comment 2:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

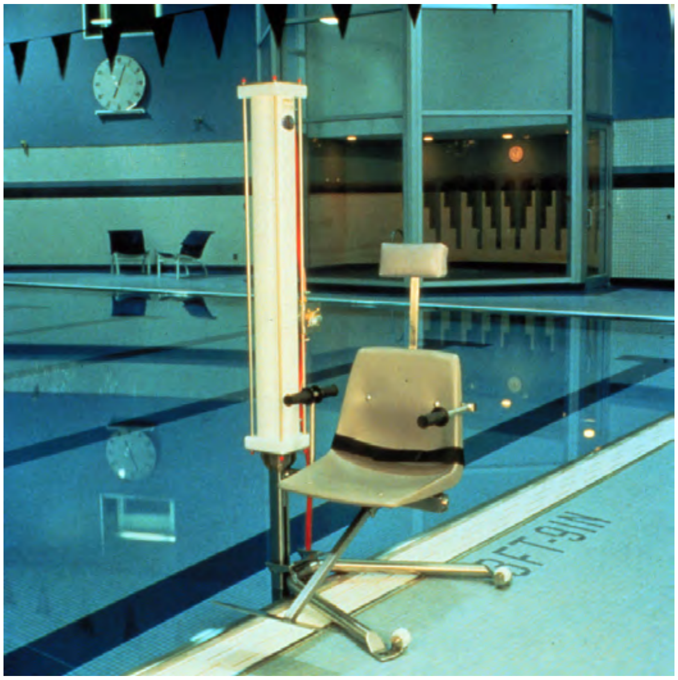
SECTION 1110
RECREATIONAL FACILITIES

1110.6.6 Swimming pools, wading pools and spas. Swimming pools, wading pools, and spas shall comply with ICC A117.1.

1110.6.6.1 ~~**1109.14.4.5**~~ **Raised diving boards and diving platforms.** Raised diving boards and diving platforms are not required to be accessible or to be on an accessible route.

1110.6.6.2 Water Slides. Water slides are not be required to be accessible or to be on an accessible route.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This proposal contains scoping provisions for swimming pools that will harmonize the building code with the Access Board's *ADA and ABA Accessibility Guidelines*. The ICC standards commonly reference the IBC Chapter 11 for accessibility requirements. It is important to have provisions for the accessibility for pools in IBC as the ICC develops their new safety standards for pool construction.



Public Comment 3:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

1. Add new definitions as follows:

1102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

<u>**PLAY AREA.** A portion of a site containing play components designed and constructed for children.</u>

2. Revise as follows:

<u>**SECTION 1110**</u>
<u>**RECREATIONAL FACILITIES**</u>

<u>**1110.6.13 Play Areas.** Play areas shall comply with ICC A117.1.</u>

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This proposal contains scoping provisions for play areas that will harmonize the building code with the Access Board's *ADA and ABA Accessibility Guidelines*. In disapproving this proposal, the committee questioned whether playgrounds are subject to the building code. Section 402.12 addresses "structures intended as children's playgrounds" and Section 105.2 exempts "swings and other playground equipment accessory to detached one- and two-family dwellings" from permits. To the extent that children's play facilities are covered by the IBC, they should be accessible to children with disabilities. These scoping requirements are reasonable and are the result of recommendations from a regulatory negotiation committee the Access Board established for this purpose that included ASTM Public Playground, Soft Contained Play, and Playground Surfacing Systems Committees manufacturers of play equipment, landscape architects, government associations, elementary school associations, and organizations representing people with disabilities. Since the Access Board's guidelines were published in late 2000, manufacturers offer play equipment complying with these scoping and technical criteria.

Public Comment 4:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

1. Add new definitions as follows:

1102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

AMUSEMENT RIDE. A system that moves persons through a fixed course within a defined area for the purpose of amusement.

AMUSEMENT RIDE SEAT. A seat that is built-in or mechanically fastened to an amusement ride intended to be occupied by one or more passengers.

TRANSFER DEVICE. Equipment designed to facilitate the transfer of a person from a wheelchair or other mobility device to and from an amusement ride seat.

2. Revise as follows:

SECTION 1110
RECREATIONAL FACILITIES

1110.6 ~~1109.14.4~~ Recreational and sports facilities exceptions. Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

1110.6.7 Amusement Rides. Amusement rides shall comply with Section 1110.6.7.1 through 1110.6.7.3.

Exception: Mobile or portable amusement rides shall not be required to be accessible.

1110.6.7.1 Load and Unload Areas. Load and unload areas serving amusement rides shall comply with ICC A117.1.

1110.6.7.2 Minimum Number. Amusement rides shall provide at least one wheelchair space, or at least one amusement ride seat designed for transfer, or at least one transfer device.

Exceptions:

1. Amusement rides that are controlled or operated by the rider shall not be required to comply with this section.
2. Amusement rides designed primarily for children, where children are assisted on and off the ride by an adult, shall not be required to comply with this section.
3. Amusement rides that do not provide amusement ride seats shall not be required to comply with this section.

1110.6.7.3 Amusement Rides. Accessible amusement rides shall be on an accessible routes in accordance with Section 1110.6.7.3.1 and 1110.6.7.3.2.

1110.6.7.3.1 Load and Unload Areas. Load and unload areas shall be on an accessible route. Where load and unload areas have more than one loading or unloading position, at least one loading and unloading position shall be on an accessible route.

1110.6.7.3.2 Wheelchair Spaces, Ride Seats Designed for Transfer, and Transfer Devices. When amusement rides are in the load and unload position, wheelchair spaces, amusement ride seats designed for transfer and transfer devices shall be on an accessible route.

3411.8 (IEBC 310.8) Scoping for alterations. The provisions of Sections 3411.8.1 through ~~3411.8.14~~ 3411.8.15 shall apply to *alterations* to existing buildings and facilities.

3411.8.15 (IEBC 310.8.15) Existing Amusement Rides. Where existing amusement rides are altered, the alteration shall comply with Section 3411.8.15.1 and 3411.8.15.2.

3411.8.15.1 (IEBC 310.8.15.1) Load and Unload Areas. Where load and unload areas serving existing amusement rides are newly designed and constructed, the load and unload areas shall comply with ICC A117.1.

3411.8.15.2 (IEBC 310.8.15.2) Minimum Number. Where the structural or operational characteristics of an amusement ride are altered to the extent that the amusement ride's performance differs from that specified by the manufacturer or the original design, the amusement ride shall comply with requirements for new construction in Section 1110.6.7.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This public comment contains scoping provisions for amusement rides that will harmonize the building code with the Access Board's *ADA and ABA Accessibility Guidelines*. To the extent that amusement rides are subject to the code, they should be accessible and usable by individuals with disabilities. These scoping provisions are flexible permitting latitude in terms of the method of access e.g. transfer seat, roll-on seat or transfer device to lift the rider. Mobile and portable rides are exempted in Section 1106.7. Rides without seats, those designed for children who are assisted onto the ride and those rides controlled by the user are also exempt.

Staff Note: E152-09/10, Part 2, Public Comment #1 was submitted with as part of this public comment. Information in E152-09/10, Part 2 is consistent with the provisions for IBC Chapter 34 and IEBC Chapter 3 proposed in this public comments. The proposals were split in order to follow ICC rules for voting on proposals that affect multiple part code changes.

Public Comment 5:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

Add new definitions as follows:

1102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

BOARDING PIER. A portion of a pier where a boat is temporarily secured for the purpose of embarking or disembarking.

BOAT LAUNCH RAMP. A sloped surface designed for launching and retrieving trailered boats and other water craft to and from a body of water.

BOAT SLIP. That portion of a pier, main pier, finger pier, or float where a boat is moored for the purpose of berthing, embarking, or disembarking.

GANGWAY. A variable-sloped pedestrian walkway that links a fixed structure or land with a floating structure. Gangways which connect to vessels are not included.

2. Revise as follows:

1109.7 Lifts. Platform (wheelchair) lifts are permitted to be a part of a required accessible route in new construction where indicated in Items 1 through ~~10~~ 11. Platform (wheelchair) lifts shall be installed in accordance with ASME A18.1.

1. An accessible route to a performing area and speaker platforms in Group A occupancies.
2. An accessible route to wheelchair spaces required to comply with the wheelchair space dispersion requirements of Sections 1108.2.2 through 1108.2.6.
3. An accessible route to spaces that are not open to the general public with an occupant load of not more than five.
4. An accessible route within a dwelling or sleeping unit.
5. An accessible route to wheelchair seating spaces located in outdoor dining terraces in Group A-5 occupancies where the means of egress from the dining terraces to a public way are open to the outdoors.
6. An accessible route to jury boxes and witness stands; raised courtroom stations including judges' benches, clerks' stations, bailiffs' stations, deputy clerks' stations and court reporters' stations; and to depressed areas such as the well of the court.
7. An accessible route to load and unload areas serving amusement rides.
8. An accessible route to play components or soft contained play structures.
9. An accessible route to team or player seating areas serving areas of sport activity.
10. An accessible route where existing exterior site constraints make use of a ramp or elevator infeasible.
11. To substitute for gangways that are required to be accessible routes serving recreational boating facilities and fishing piers and platforms.

SECTION 1110
RECREATIONAL FACILITIES

1110.6 ~~**1109.14.4**~~ **Recreational and sports facilities exceptions.** Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

1110.6.8 Recreational Boating Facilities. Boat slips required to be accessible by Section 1110.6.8.1 and 1110.6.8.2 and boarding piers at boat launch ramps required to be accessible by Section 1110.6.8.3 shall be on an accessible route.

1110.6.8.1 Boat Slips. Boat slips complying with ICC A117.1 shall be provided in accordance with Table 1110.6.8.1. Where the number of boat slips is not identified, each 40 feet (12 m) of boat slip edge provided along the perimeter of the pier shall be counted as one boat slip for the purpose of this section.

TABLE 1110.6.8.1
BOAT SLIPS

Total Number of Boating Slips Provided in Facility	Minimum Number of Required Accessible Boating Slips
1 to 25	1
26 to 50	2
51 to 100	3
101 to 150	4
151 to 300	5
301 to 400	6
401 to 500	7
501 to 600	8
601 to 700	9
701 to 800	10
801 to 900	11
901 to 1000	12
1001 and over	12, plus 1 for every 100, or fraction thereof, over 1000

1110.6.8.2 Dispersion. Accessible boat slips shall be dispersed throughout the various types of boat slips provided. Where the minimum number of accessible boat slips 1 has been met, no further dispersion shall be required.

1110.6.8.3 Boarding Piers at Boat Launch Ramps. Where boarding piers are provided at boat launch ramps, at least 5 percent, but no fewer than one, of the boarding piers shall comply with ICC A117.1.

1110.6.9 Fishing Piers and Platforms. Fishing piers and platforms shall comply with ICC A117.1 and be on an accessible route.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This public comment contains scoping provisions for boating and fishing piers that will harmonize the building code with the Access Board's *ADA and ABA Accessibility Guidelines*. It is common for boating and fishing piers to be constructed as part of waterfront development that is subject to the building code. Where such development is not subject to a permit, the provisions will not apply. However, it is reasonable for individuals with disabilities to be provided access where code requirements are applicable. If a guard is provided or required, it is not required to be lowered for fishermen with disabilities.

Public Comment 6:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

1. Add new definitions as follows:

1102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

GOLF CAR PASSAGE. A continuous passage on which a motorized golf car can operate.

TEEING GROUND. In golf, the starting place for the hole to be played.

2. Revise as follows:

SECTION 1110
RECREATIONAL FACILITIES

1110.6 ~~1109.14.4~~ **Recreational and sports facilities exceptions.** Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

1110.6.11 Golf Facilities. Golf facilities shall comply with 1110.6.11.1 through 1110.6.11.3.

1110.6.11.1 Golf Courses. Golf courses shall comply with 1110.6.11.1.1 through 1110.6.11.1.3.

1110.6.11.1.1 Teeing Grounds. Where one teeing ground is provided for a hole, the teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where two teeing grounds are provided for a hole, the forward teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where three or more teeing grounds are provided for a hole, at least two teeing grounds, including the forward teeing ground, shall be designed and constructed so that a golf car can enter and exit each teeing ground.

1110.6.11.1.2 Putting Greens. Putting greens shall be designed and constructed so that a golf car can enter and exit the putting green.

1110.6.11.1.3 Weather Shelters. Where provided, weather shelters shall be designed and constructed so that a golf car can enter and exit the weather shelter and shall comply with ICC A117.1.

1110.6.11.2 Practice Putting Greens, Practice Teeing Grounds, and Teeing Stations at Driving Ranges. At least 5 percent, but no fewer than one, of practice putting greens, practice teeing grounds, and teeing stations at driving ranges shall be designed and constructed so that a golf car can enter and exit the practice putting greens, practice teeing grounds, and teeing stations at driving ranges.

1110.6.11.3 Golf Facilities. At least one accessible route shall connect accessible elements and spaces within the boundary of the golf course. In addition, accessible routes serving golf car rental areas; bag drop areas; course weather shelters; course toilet rooms; and practice putting greens, practice teeing grounds, and teeing stations at driving ranges complying with Section 1110.6.11.2 shall comply with ICC A117.1.

> **Exception:** Golf car passages complying with ICC A117.1 shall be permitted to be used for all or part of accessible routes required by this section.

3411.8 (IEBC 310.8) Scoping for alterations. The provisions of Sections 3411.8.1 through ~~3411.8.14~~ 3411.8.16 shall apply to *alterations* to existing buildings and facilities.

3411.8.16 (IEBC 310.8) Teeing Grounds. When golf courses are being altered, teeing grounds shall comply with Section 1110.6.11.1.1**.**

> **Exception:** In existing golf courses, the forward teeing ground shall not be required to be one of the teeing grounds on a hole designed and constructed so that a golf car can enter and exit the teeing ground where compliance is not feasible due to terrain.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This proposal contains scoping provisions for golf facilities that will harmonize the building code with the Access Board's *ADA and ABA Accessibility Guidelines*. Where a golf course is subject to the building code, this will ensure that people with disabilities are not excluded from the recreational and business opportunities on the course. Please note that a passage sufficiently wide for a golf car substitutes for an accessible route. Today, golfers with disabilities use accessible golf cars, also known as single-rider carts, that are designed to have little impact on the greens and are operated with one-handed controls. Golfers sit in the swivel seats and position to hit the ball from a seated position.

Staff Note: E152-09/10, Part 2, Public Comment #2 was submitted as part of this public comment. Information in E152-09/10, Part 2 is consistent with the provisions for IBC Chapter 34 and IEBC Chapter 3 proposed in this public comments. The proposals were split in order to follow ICC rules for voting on proposals that affect multiple part code changes.

Public Comment 7:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

SECTION 1110
RECREATIONAL FACILITIES

1110.6.12 Miniature golf facilities. Miniature golf facilities shall comply with 1110.6.12.1 through 1110.6.12.3.

1110.6.12.1 Minimum Number. At least 50 percent of holes on miniature golf courses shall comply with ICC A117.1.

1110.6.12.2 Miniature Golf Course Configuration. Miniature golf courses shall be configured so that the holes complying with ICC A117.1 are consecutive. Miniature golf courses shall provide an accessible route from the last hole complying with ICC A117.1 to the course entrance or exit without requiring travel through any other holes on the course.

> **Exception:** One break in the sequence of consecutive holes shall be permitted provided that the last hole on the miniature golf course is the last hole in the sequence.

1110.6.12.3 Miniature Golf Facilities. Holes required to comply with 1110.6.12.1, including the start of play, shall be on an accessible route.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This proposal contains scoping provisions for miniature golf facilities that will harmonize the building code with the Access Board's *ADA and ABA Accessibility Guidelines*. Today, miniature golf facilities are likely to be structures comprised of components and materials that are subject to the IBC. To the extent that such facilities are subject to the IBC, they should be accessible to individuals with disabilities.

Public Comment 8:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

SECTION 1110
RECREATIONAL FACILITIES

1110.6.9 Exercise Machines and Equipment. At least one of each type of exercise machines and equipment shall comply with ICC A117.1 and shall be on an accessible route.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This proposal contains scoping provisions for exercise machines and equipment that will harmonize the building code with the Access Board's *ADA and ABA Accessibility Guidelines*. The technical criteria do not require the equipment and machines to be accessible; they merely require clearances around the machines so that individuals with disabilities can use them.

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Public Comment 9:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

SECTION 1110
RECREATIONAL FACILITIES

1110.6.14 Shooting Facilities with Firing Positions. Where shooting facilities with firing positions are designed and constructed at a site, at least 5 percent, but no fewer than one, of each type of firing position shall comply with ICC A117.1.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This proposal contains scoping provisions for shooting facilities with firing positions that will harmonize the building code with the Access Board's *ADA and ABA Accessibility Guidelines*.

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Public Comment 10:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

E102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

AMUSEMENT RIDE. A system that moves persons through a fixed course within a defined area for the purpose of amusement.

AMUSEMENT RIDE SEAT. A seat that is built-in or mechanically fastened to an amusement ride intended to be occupied by one or more passengers.

TRANSFER DEVICE. Equipment designed to facilitate the transfer of a person from a wheelchair or other mobility device to and from an amusement ride seat.

2. Revise as follows:

SECTION E111
RECREATIONAL FACILITIES

E111.1 Recreational and sports facilities exceptions. Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

E111.2 Amusement Rides. Amusement rides shall comply with Section E111.2.1 through E111.2.3.

Exception: Mobile or portable amusement rides shall not be required to be accessible.

E111.2.1 Load and Unload Areas. Load and unload areas serving amusement rides shall comply with ICC A117.1.

E111.2.2 Minimum Number. Amusement rides shall provide at least one wheelchair space, or at least one amusement ride seat designed for transfer, or at least one transfer device.

Exceptions:

1. Amusement rides that are controlled or operated by the rider shall not be required to comply with this section.
2. Amusement rides designed primarily for children, where children are assisted on and off the ride by an adult, shall not be required to comply with this section.
3. Amusement rides that do not provide amusement ride seats shall not be required to comply with this section.

E111.2.3 Amusement Rides. Accessible amusement rides shall be on an accessible routes in accordance with Section E111.2.3.1 and E111.2.3.2.

E111.2.3.1 Load and Unload Areas. Load and unload areas shall be on an accessible route. Where load and unload areas have more than one loading or unloading position, at least one loading and unloading position shall be on an accessible route.

E111.2.3.2 Wheelchair Spaces, Ride Seats Designed for Transfer, and Transfer Devices. When amusement rides are in the load and unload position, wheelchair spaces, amusement ride seats designed for transfer and transfer devices shall be on an accessible route.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This portion deals with Amusement Rides. If the committee does not wish to have the text in the body of the code, this public comments places amusement rides in *Appendix E, Supplementary Accessibility Requirements*. The appendix can be adopted by states that wish to match the *2004 ADA/ABA Accessibility Guidelines*.

Staff Note: E152-09/10, Part 2, Public Comment #3 was submitted as part of this public comment. The proposals were split in order to follow ICC rules for voting on proposals that affect multiple part code changes.

Public Comment 11:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

E102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

BOARDING PIER. A portion of a pier where a boat is temporarily secured for the purpose of embarking or disembarking.

BOAT LAUNCH RAMP. A sloped surface designed for launching and retrieving trailered boats and other water craft to and from a body of water.

BOAT SLIP. That portion of a pier, main pier, finger pier, or float where a boat is moored for the purpose of berthing, embarking, or disembarking.

GANGWAY. A variable-sloped pedestrian walkway that links a fixed structure or land with a floating structure. Gangways which connect to vessels are not included.

2. Add as follows:

E104.2 Lifts. Platform lifts shall be permitted to be used instead of gangways that are part of accessible routes serving recreational boating facilities and fishing piers and platforms. Platform (wheelchair) lifts shall be installed in accordance with ASME A18.1.

SECTION E111
RECREATIONAL FACILITIES

E111.1 Recreational and sports facilities exceptions. Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

E111.2 Recreational Boating Facilities. Boat slips required to be accessible by Section E111.2.1 and E111.2.2 and boarding piers at boat launch ramps required to be accessible by Section E111.2.3 shall be on an accessible route.

E111.2.1 Boat Slips. Boat slips complying with ICC A117.1 shall be provided in accordance with Table E111.2.1. Where the number of boat slips is not identified, each 40 feet (12 m) of boat slip edge provided along the perimeter of the pier shall be counted as one boat slip for the purpose of this section.

TABLE E111.2.1
BOAT SLIPS

Total Number of Boating Slips Provided in Facility	Minimum Number of Required Accessible Boating Slips
1 to 25	1
26 to 50	2
51 to 100	3
101 to 150	4
151 to 300	5
301 to 400	6
401 to 500	7
501 to 600	8
601 to 700	9
701 to 800	10
801 to 900	11
901 to 1000	12
1001 and over	12, plus 1 for every 100, or fraction thereof, over 1000

E111.2.2 Dispersion. Accessible boat slips shall be dispersed throughout the various types of boat slips provided. Where the minimum number of accessible boat slips 1 has been met, no further dispersion shall be required.

E111.2.3 Boarding Piers at Boat Launch Ramps. Where boarding piers are provided at boat launch ramps, at least 5 percent, but no fewer than one, of the boarding piers shall comply with ICC A117.1.

E111.2.4 Fishing Piers and Platforms. Fishing piers and platforms shall comply with ICC A117.1 and be on an accessible route.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This portion deals with boat and fishing pier facilities. If the members do not wish to have the text in the body of the code, this public comments places boat and fishing pier facilities in *Appendix E, Supplementary Accessibility Requirements*. The appendix can be adopted by states that wish to match the *2004 ADA/ABA Accessibility Guidelines*.

Public Comment 12:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

1. Add new definitions as follows:

E102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

GOLF CAR PASSAGE. A continuous passage on which a motorized golf car can operate.

TEEING GROUND. In golf, the starting place for the hole to be played.

2. Revise as follows:

SECTION E111
RECREATIONAL FACILITIES

E111.1 Recreational and sports facilities exceptions. Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

E111.2 Golf Facilities. Golf facilities shall comply with E111.2.1 through E111.2.3.

E111.2.1 Golf Courses. Golf courses shall comply with E111.2.1.1 through E111.2.1.3.

E111.2.1.1 Teeing Grounds. Where one teeing ground is provided for a hole, the teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where two teeing grounds are provided for a hole, the forward teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where three or more teeing grounds are provided for a hole, at least two teeing grounds, including the forward teeing ground, shall be designed and constructed so that a golf car can enter and exit each teeing ground.

E111.2.1.2 Putting Greens. Putting greens shall be designed and constructed so that a golf car can enter and exit the putting green.

E111.2.1.3 Weather Shelters. Where provided, weather shelters shall be designed and constructed so that a golf car can enter and exit the weather shelter and shall comply with ICC A117.1.

E111.2.2 Practice Putting Greens, Practice Teeing Grounds, and Teeing Stations at Driving Ranges. At least 5 percent, but no fewer than one, of practice putting greens, practice teeing grounds, and teeing stations at driving ranges shall be designed and constructed so that a golf car can enter and exit the practice putting greens, practice teeing grounds, and teeing stations at driving ranges.

E111.2.3 Golf Facilities. At least one accessible route shall connect accessible elements and spaces within the boundary of the golf course. In addition, accessible routes serving golf car rental areas; bag drop areas; course weather shelters; course toilet rooms; and practice putting greens, practice teeing grounds, and teeing stations at driving ranges complying with Section E111.2.2 shall comply with ICC A117.1.

> **Exception:** Golf car passages complying with ICC A117.1 shall be permitted to be used for all or part of accessible routes required by this section.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This portion deals with constructed portion of golf facilities. If the members do not wish to have the text in the body of the code, this public comments places golf facilities in *Appendix E, Supplementary Accessibility Requirements*. The appendix can be adopted by states that wish to match the *2004 ADA/ABA Accessibility Guidelines*.

Staff Note: E152-09/10, Part 2, Public Comment #4 was submitted as part of this public comment. The proposals were split in order to follow ICC rules for voting on proposals that affect multiple part code changes.

Public Comment 13:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

SECTION E111
RECREATIONAL FACILITIES

E111.1 Recreational and sports facilities exceptions. Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.

E111.2 Miniature golf facilities. Miniature golf facilities shall comply with E111.2.1 through E111.2.3.

E111.2.1 Minimum Number. At least 50 percent of holes on miniature golf courses shall comply with ICC A117.1.

E111.2.2 Miniature Golf Course Configuration. Miniature golf courses shall be configured so that the holes complying with ICC A117.1 are consecutive. Miniature golf courses shall provide an accessible route from the last hole complying with ICC A117.1 to the course entrance or exit without requiring travel through any other holes on the course.

> **Exception:** One break in the sequence of consecutive holes shall be permitted provided that the last hole on the miniature golf course is the last hole in the sequence.

E111.2.3 Miniature Golf Facilities. Holes required to comply with E111.2.1, including the start of play, shall be on an accessible route.

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This portion deals with constructed portion of miniature golf facilities. If the members do not wish to have the text in the body of the code, this public comments places miniature golf facilities in *Appendix E, Supplementary Accessibility Requirements*. The appendix can be adopted by states that wish to match the *2004 ADA/ABA Accessibility Guidelines*.

Public Comment 14:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

<u>SECTION E111</u>
<u>RECREATIONAL FACILITIES</u>

<u>**E111.1 Recreational and sports facilities exceptions.** Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.</u>

<u>**E111.2 Exercise Machines and Equipment.** At least one of each type of exercise machines and equipment shall comply with ICC A117.1 and shall be on an accessible route.</u>

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This portion deals with routes to exercise machines and equipment. If the members do not wish to have the text in the body of the code, this public comments places exercise machines and equipment in *Appendix E, Supplementary Accessibility Requirements*. The appendix can be adopted by states that wish to match the *2004 ADA/ABA Accessibility Guidelines*.

Public Comment 15:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved as Modified by this public comment.

Replace the proposal with the following:

<u>SECTION E111</u>
<u>RECREATIONAL FACILITIES</u>

<u>**E111.1 Recreational and sports facilities exceptions.** Recreational and sports facilities required to be accessible shall be exempt from this chapter to the extent specified in this section.</u>

<u>**E111.2 Shooting Facilities with Firing Positions.** Where shooting facilities with firing positions are designed and constructed at a site, at least 5 percent, but no fewer than one, of each type of firing position shall comply with ICC A117.1.</u>

Commenter's Reason: This code change has been divided into parts so that the membership can look at each type of recreational facilities on it's own merit. This portion deals with shooting facilities. If the members do not wish to have the text in the body of the code, this public comments places shooting facilities in *Appendix E, Supplementary Accessibility Requirements*. The appendix can be adopted by states that wish to match the *2004 ADA/ABA Accessibility Guidelines*.

Public Comment 16:

Lawrence Brown, representing National Association of Home Builders (NAHB) requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1110.3 Facilities serving Type B units in multiple buildings. In Group R-2 and R-3 occupancies on a single site where multiple buildings containing <u>primarily</u> Type B units are served by recreational facilities, 25 percent, but not less than one, of each type of recreational facility serving each building shall be accessible. The total number of each type of recreational facility that is required to be accessible shall be determined by considering every recreational facility of each type serving each building on the site.

1110.4 Facilities serving Accessible and Type A units. In Group R-2 and R-3 occupancies where <u>buildings containing</u> <u>primarily</u> ~~recreational facilities are provided serving~~ Accessible or Type A units <u>are served by recreational facilities</u>, every recreational facility of each type serving Accessible or Type A units shall be accessible.

Commenter's Reason: This modification correlates the terminology for the application of recreational facilities for the different types of units required to be accessible. It also levels the playing field for when federally mandated Fair Housing units are provided. The original proposed scoping for recreational facilities far exceeds the requirements already contained in IBC Section 1109.14 and the requirements of the Federal Fair Housing Act (both shown below). The proposed change seems to be intended to nullify the 25 percent rule for Type B units (Fair Housing Units) as these multifamily buildings will also be required to contain Accessible and Type A units in addition to the Type B units. In other words, one could never use the 25 percent rule – it would be nullified by proposed Section 1110.4. In addition, there is no Federal mandate under the Americans with Disabilities Act (ADA) to provide any type of accessible housing to the public. This seems to be an attempt by the federal government to mandate accessibility requirements without going through the federal rule making process. If it is intended that the Access Board will be adding this type of provision to the requirements of the Americans with Disabilities Act, then this type of requirements should not be included in the I-Codes until such time as they are enacted into Federal law.

<u>FAIR HOUSING ACT DESIGN MANUAL – Chapter 1</u>

Accessible Site Facilities on Accessible Routes
Where multiple recreational facilities of the same type are provided at the same location on the site (e.g., tennis courts), not all but a "sufficient" number of the facilities must be accessible to ensure an equitable opportunity for use by people with disabilities. Whenever only one of a type of recreational facility is provided at a particular location on the site, it must be accessible and connected by an accessible route to the covered dwelling units.

2009 IBC
1109.14 Recreational and sports facilities. Recreational and sports facilities shall be provided with *accessible* features in accordance with Sections 1109.14.1 through 1109.14.4.

1109.14.1 Facilities serving a single building. In Group R-2 and R-3 occupancies where recreational facilities are provided serving a single building containing *Type A units* or *Type B units*, 25 percent, but not less than one, of each type of recreational facility shall be *accessible*. Every recreational facility of each type on a site shall be considered to determine the total number of each type that is required to be *accessible*.

1109.14.2 Facilities serving multiple buildings. In Group R-2 and R-3 occupancies on a single *site* where multiple buildings containing *Type A units* or *Type B units* are served by recreational facilities, 25 percent, but not less than one, of each type of recreational facility serving each building shall be *accessible*. The total number of each type of recreational facility that is required to be *accessible* shall be determined by considering every recreational facility of each type serving each building on the site.

Final Action: AS AM AMPC____ D

E152-09/10, Part II
IEBC 605.1, 605.1.15 (New), 605.1.16 (New)

Proposed Change as Submitted

Proponent: Marsha K. Mazz, U.S. Architectural and Transportation Barriers Compliance Board (Access Board)

PART II – IEBC

605.1 General. A building, facility or element that is altered shall comply with the applicable provisions in Sections 605.1.1 through ~~605.1.14~~ 605.2.16, Chapter 11 of the *International Building Code* and ICC A117.1 unless it is *technically infeasible*. Where compliance with this section is *technically infeasible*, the *alteration* shall provide access to the maximum extent that is technically feasible.

A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

Exceptions:

1. The altered element or space is not required to be on an accessible route unless required by Section 605.2.
2. Accessible means of egress required by Chapter 10 of the *International Building Code* are not required to be provided in existing buildings and facilities.
3. Type B dwelling or sleeping units required by Section 1107 of the *International Building Code* are not required to be provided in existing buildings and facilities.
4. The *alteration* to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provisions for Type B dwelling units and shall comply with the applicable provisions in Chapter 11 of the *International Building Code* and ICC A117.1.

605.1.15 Existing Amusement Rides. Where existing amusement rides are altered, the alteration shall comply with Section 605.1.15.1 and 605.1.15.2.

605.1.15.1 Load and Unload Areas. Where load and unload areas serving existing amusement rides are newly designed and constructed, the load and unload areas shall comply with ICC A117.1.

605.1.15.2 Minimum Number. Where the structural or operational characteristics of an amusement ride are altered to the extent that the amusement ride's performance differs from that specified by the manufacturer or the original design, the amusement ride shall comply with requirements for new construction in Section 1110.6.7.

605.1.16 Teeing Grounds. When golf courses are being altered, teeing grounds shall comply with Section 1110.6.11.1.1.

Exception: <u>In existing golf courses, the forward teeing ground shall not be required to be one of the teeing grounds on a hole designed and constructed so that a golf car can enter and exit the teeing ground where compliance is not feasible due to terrain.</u>

Reason: ICC A117.1-2009 will include a new Chapter 11 which contains accessibility requirements for recreational facilities including: amusement rides, recreational boating and fishing facilities, exercise machines and equipment, golf and miniature golf facilities, play areas, swimming and wading pools and shooting facilities. The new requirements in ICC A117.1 and in this proposal are drawn directly from the U.S. Access Board's Americans with Disabilities Act (ADA) Accessibility Guidelines for Recreation Facilities originally published in the *Federal Register* on September 3, 2002. These guidelines and the previously issued guidelines for Play Areas (October 2000) were both later incorporated into the Access Board's 2004 ADA and Architectural Barriers Act (ABA) Accessibility Guidelines. Together with new Chapter 11 of the ICC A117.1, the proposal is consistent with the aforementioned Federal guidelines and will afford adults and children with disabilities a reasonable level of access to recreation and play.

Amusement Rides: This proposal addresses access to amusement rides for persons with disabilities, including those who use wheelchairs. Specifications require provision of either a wheelchair space on the ride or a ride seat or device designed for transfer to the ride. Access at loading and unloading areas is also addressed. Specific criteria for wheelchair spaces, ride seats designed for transfer, and transfer devices is included in ICC ANSI A117.1. Certain exceptions are provided in proposed IBC Sections 1110.6.7 for rides that are: set up temporarily, such as at a traveling carnival, designed primarily for children, controlled or operated by the rider, or not equipped with seats.

Boating Facilities: Boating facilities, such as piers and docks provided at marinas to serve recreational vessels, are covered by this proposal which addresses the minimum number of accessible boat slips required to be accessible. This number is based on a table according to the total amount of boat slips provided at a facility. The dynamic interface between land and water presents unique and significant challenges in providing access to floating facilities. Therefore, new Chapter 11 in ICC ANSI A117.1 – 2009 for gangways connecting floating facilities take these constraints into account by modifying requirements for accessible routes and ramps with exceptions to criteria for maximum rise and slope, handrail extensions, and level landings.

Fishing Piers and Platforms: ICC ANSI A117.1 contains new provisions addressing railings and edge protection located on fishing piers and platforms. Railings, guardrails, and handrails are not required by this accessibility standard. However, where they are provided, a portion (at least 25%) cannot be more than 34 inches high so that the railings do not obstruct fishing for people using wheelchairs. An exception permits the use of a guard complying with the International Building Code where required or voluntarily provided. Edge protection at least 2 inches high is also addressed to prevent the wheels of mobility aids from slipping over the edge.

Golf : Access to golf courses is typically achieved through the use of golf cars. An exception to proposed 1110.6.11.3 permits golf car passages in lieu of accessible routes throughout golf courses. To comply, courses must be designed so that golf cars can access teeing grounds and putting greens. Modified accessible routes are required to serve practice putting greens and driving ranges since they often are not located within the boundary of a course. Technical specifications are provided for golf car passages, accessible routes, teeing grounds, putting greens, and weather shelters in ICC ANSI A117.1.

Miniature Golf: At least half of the holes on a miniature golf course must be served by an accessible route. Specifications for accessible routes take into account design conventions for miniature golf courses, such as carpeted surfaces and curbs. All level areas of an accessible hole where a ball may come to rest must be within the reach of golf clubs (36 inches) from accessible routes.

Play Areas: Requirements in ICC A117.1 comprise a subsection of the new chapter on recreation facilities. They cover the number of play components required to be accessible, accessible surfacing in play areas, ramp access and transfer system access to elevated structures, and access to soft contained play structures. The guidelines address play areas typically provided at schools, parks, child care facilities (except those based in the operator's home, which are exempted by ICC ANSI A117.1 Section 1108), and other facilities.

Exercise Equipment and Machines, Bowling Lanes, and Shooting Facilities: Provisions for exercise equipment, bowling lanes, and shooting facilities are addressed in this proposal. The accessibility standards do not affect the design of exercise equipment and machines, but instead require one of each type to be on an accessible route and to provide transfer space for persons using wheelchairs. Access is also required to a portion (at least 5%) of bowling lanes and shooting facilities.

Swimming Pools and Wading Pools: Specifications are provided for various means of providing pool access, including pool lifts, sloped entries, transfer walls, transfer systems, and stairs. Access to swimming pools can be achieved by sloped entries or pool lifts. For larger pools (those with 300 or more linear feet of pool wall), a secondary means of access is proposed. Stairs, transfer systems, or transfer walls can be used instead of lifts or sloped entries for this secondary means of access. This is a reasonable provision in light of the fact that nationally recognized safety standards require two means of exit from such larger swimming pools. Specific provisions are also provided for wading pools, wave action pools and other types of pools where user access is limited to one area.

Cost Impact: This code change will increase the cost of construction. However, because these changes are harmonized with the U.S. Access Board's ADA and ABA Accessibility Guidelines, costs associated with compliance cannot be avoided once the U.S. Department of Justice adopts the guidelines as enforceable standards under the Americans with Disabilities Act. The guidelines have already been adopted as enforceable standards under the Architectural Barriers Act applicable to federally funded facilities.

ICCFILENAME:Mazz-E2-1102.1

<u>Public Hearing Results</u>

PART II- IEBC
Committee Action: Disapproved

Committee Reason: Part II was disapproved based on the committee's actions to Part I of E152-09/10.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved

Replace the proposal with the following:

605.1.15 Existing Amusement Rides. Where existing amusement rides are altered, the alteration shall comply with Section 605.1.15.1 and 605.1.15.2.

605.1.15.1 Load and Unload Areas. Where load and unload areas serving existing amusement rides are newly designed and constructed, the load and unload areas shall comply with ICC A117.1.

605.1.15.2 Minimum Number. Where the structural or operational characteristics of an amusement ride are altered to the extent that the amusement ride's performance differs from that specified by the manufacturer or the original design, the amusement ride shall comply with requirements for new construction in the *International Building Code,* Section 1110.6.7.

Commenter's Reason: See E152-09/10, Part I, Public comment #4. The intent of this public comment is to match the provisions for existing building proposed for IBC Chapter 34 and IEBC Chapter 3. This way the provisions for existing buildings will be consistent between Chapter 3 and 6 of the IEBC.

Staff Note: E152-09/10, Part 1, Public Comment #4 was submitted including these provisions. The proposals were split in order to follow ICC rules for voting on proposals that affect multiple part code changes.

Public Comment 2:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved

Replace the proposal with the following:

PART II – IEBC

605.1.16 Teeing Grounds. When golf courses are being altered, teeing grounds shall comply with the *International Building Code*, Section 1110.6.11.1.1**.**

> **Exception:** In existing golf courses, the forward teeing ground shall not be required to be one of the teeing grounds on a hole designed and constructed so that a golf car can enter and exit the teeing ground where compliance is not feasible due to terrain.

Commenter's Reason: See E152-09/10, Part I, Public comment #6. The intent of this public comment is to match the provisions for existing building proposed for IBC Chapter 34 and IEBC Chapter 3. This way the provisions for existing buildings will be consistent between Chapter 3 and 6 of the IEBC.

Staff Note: E152-09/10, Part 1, Public Comment #6 was submitted including these provisions. The proposals were split in order to follow ICC rules for voting on proposals that affect multiple part code changes.

Public Comment 3:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved

Replace the proposal with the following:

SECTION B104
RECREATIONAL FACILITIES

B104.1 Recreational and sports facilities exceptions. Existing recreational and sports facilities required to be accessible shall be exempt from accessibility to the extent specified in this section.

B104.2 Existing Amusement Rides. Where existing amusement rides are altered, the alteration shall comply with Section B104.2.1 and B104.2.2.

B104.2.1 Load and Unload Areas. Where load and unload areas serving existing amusement rides are newly designed and constructed, the load and unload areas shall comply with ICC A117.1.

<u>**B104.2.2 Minimum Number.** Where the structural or operational characteristics of an amusement ride are altered to the extent that the amusement ride's performance differs from that specified by the manufacturer or the original design, the amusement ride shall comply with requirements for new construction in the *International Building Code*, Appendix E111.2.2.</u>

Commenter's Reason: See E152-09/10, Part I, Public comment #10. IBC Appendix E contains supplementary accessibility requirements and IEBC Appendix B contains supplemenetary accessibility requirements for existing buildings. If the membership votes to place amusement ride requirements in Appendix E, this public comment is needed for consistency.

Staff Note: E152-09/10, Part 1, Public Comment #10 was submitted including these provisions. The proposals were split in order to follow ICC rules for voting on proposals that affect multiple part code changes.

Public Comment 4:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approved

Replace the proposal with the following:

<u>**SECTION B104**</u>
<u>**RECREATIONAL FACILITIES**</u>

<u>**B104.1 Recreational and sports facilities exceptions.** Existing recreational and sports facilities required to be accessible shall be exempt from accessibility to the extent specified in this section.</u>

<u>**B104.2 Teeing Grounds.** When golf courses are being altered, teeing grounds shall comply with the *International Building Code*, Appendix E111.2.1.1</u>**.**

> <u>**Exception:** In existing golf courses, the forward teeing ground shall not be required to be one of the teeing grounds on a hole designed and constructed so that a golf car can enter and exit the teeing ground where compliance is not feasible due to terrain.</u>

Commenter's Reason: See E152-09/10, Part I, Public comment #12. IBC Appendix E contains supplementary accessibility requirements and IEBC Appendix B contains supplemenetary accessibility requirements for existing buildings. If the membership votes to place golf course requirements in Appendix E, this public comment is needed for consistency.

Staff Note: E152-09/10, Part 1, Public Comment #12 was submitted including these provisions. The proposals were split in order to follow ICC rules for voting on proposals that affect multiple part code changes.

Final Action: AS AM AMPC____ D

E156-09/10, Part I
1102.1, 1107.2, 1107.6, 1107.6.2.2, 1107.6.3, 3411.1 (IEBC 310.1)

<u>Proposed Change as Submitted</u>

Proponent: Mark J. Mazz, AIA, representing self

PART I – IBC MEANS OF EGRESS

1. Add new definitions as follows:

1102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

<u>**PUBLIC RIGHT OF WAY.** Public land or property, usually in interconnected corridors, that is acquired for or devoted to transportation purposes.</u>

<u>**TYPE C (Visitable) UNIT.** A dwelling unit designed and constructed for accessibility in accordance with this code and the provisions for Type C units in ICC A117.1.</u>

2. Revise as follows:

1107.2 Design. Dwelling units and sleeping units that are required to be Accessible units, Type A units<u>,</u> ~~and~~ Type B units<u>, and Type C units</u> shall comply with the applicable portions of Chapter 10 of ICC A117.1. Units required to be

Type A units are permitted to be designed and constructed as Accessible units. Units required to be Type B units are permitted to be designed and constructed as Accessible units or as Type A units. Units required to be Type C (Visitable) units are permitted to be designed and constructed as Accessible units, as Type A units, or as Type B units.

1107.6 Group R. Accessible units, Type A units, ~~and~~ Type B Units, and Type C (Visitable) units shall be provided in Group R occupancies in accordance with Sections 1107.6.1 through 1107.6.4.

1107.6.2.2 Group R-2 other than apartment houses, monasteries and convents. In Group R-2 occupancies, other than apartment houses, monasteries and convents, Accessible units, ~~and~~ Type B units, and Type C units shall be provided in accordance with Sections 1107.6.2.2.1 through ~~1107.6.2.2.2~~ 1107.6.2.2.3.

1107.6.2.2.3 Type C units. Where there are 6 or more dwelling units in a development site, at least 50 percent shall be a Type C unit. All R-2 units on a development site shall be considered to determine the total number of units and the required number of Type C units.

Exceptions: The following units are not required to be Type C units or be considered to determine the total number of units:

1. Units above other units.
2. Units without garages where the slope between the finish ground level at all unit entrances to all points along the property lines that border a public right of way are no greater than 8.33 percent.

1107.6.3 Group R-3. Type B units and Type C units shall be provided in Group R-3 occupancies in accordance with Sections 1107.6.3.1 and 1107.6.3.2.

1107.6.3.1 Type B units. In Group R-3 occupancies where there are four or more dwelling units intended to be occupied as a residence in a single structure, every dwelling unit intended to be occupied as a residence shall be a Type B unit.

Exception: The number of Type B units is permitted to be reduced in accordance with Section 1107.7.

1107.6.3.2 Type C units. In Group R-3 occupancies, where there are 6 or more dwelling units in a development site, at least 50 percent shall be a Type C unit. All R-3 units on a development site shall be considered to determine the total number of units and the required number of Type C units.

Exceptions: The following units are not required to be Type C units or be considered to determine the total number of units

1. Units above other units.
2. Units without garages where the slope between the finish ground level at all unit entrances to all points along the property lines that border a public right of way are no greater than 8.33 percent.

1107.7.5 Design flood elevation. The required number of Type A units, Type B units, and Type C units shall not apply to a site in accordance with 1107.7.5.1 through 1107.7.5.2.

1107.7.5.1 Type A units and Type B units. The required number of Type A units and Type B units shall not apply to a site where the required elevation of the lowest floor or the lowest horizontal structural building members of nonelevator buildings are at or above the design flood elevation resulting in:

1. A difference in elevation between the minimum required floor elevation at the primary entrances and vehicular and pedestrian arrival points within 50 feet (15 240 mm) exceeding 30 inches (762 mm), and
2. A slope exceeding 10 percent between the minimum required floor elevation at the primary entrances and vehicular and pedestrian arrival points within 50 feet (15.24 m).

Where no such arrival points are within 50 feet (15.24 m) of the primary entrances, the closest arrival points shall be used.

1107.7.5.2 Type C units. The required number of Type C dwelling units shall not apply to a site where the required elevation of the lowest floor or the lowest horizontal structural building members are at or above the design flood elevation resulting in:

1. <u>A difference in elevation between the minimum required floor elevation at all unit entrances and the ground elevation at the entrance exceeds 30 inches (762 mm), or</u>
2. <u>A slope exceeding 8.33 percent between the minimum required floor elevation at all unit entrances to all points along the property lines that border a public right of way.</u>

3411.1 (IEBC 310.1) Scope. The provisions of Sections 3411.1 through 3411.9 apply to maintenance, change of occupancy, additions and alterations to existing buildings, including those identified as historic buildings.

Exception<u>s</u>:

1. Type B dwelling or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities being altered or undergoing a change of occupancy.
2. <u>Type C dwelling required by Section 1107 of this code are not required to be provided in additions or in existing buildings and facilities being altered or undergoing a change of occupancy.</u>

(Renumber subsequent sections)

Reason: Type C dwelling units have been added to the technical requirements in 2009 ICC/A117.1. The intent of this proposal is to scope Type C dwelling units for buildings that fall below the threshold of the Fair Housing Act Accessibility Guidelines.

1. There is a correlative change being proposed for the IBC, IRC and IEBC.
2. Type C (Visitable) units require significantly less accessibility than Type B units do. Type C units require one zero-step entrance on a circulation path (not necessarily an accessible route) from a garage, driveway, sidewalk, or street. The entrance does not have to be the front door. Therefore, an attached garage, with a floor that slopes away from a connecting door that has no step can satisfy the zero-step entrance requirement. Interior requirements for Type C units apply only to the entry level and are equally as lax as the exterior requirements.
3. Jurisdictions across the Country are adding Visitability requirements to their local codes. Neither the technical provisions nor the scoping provisions are consistent. To address the technical provisions, ICC A117.1 created Type C (Visitable) units. This proposed change to the Building Code is to make the scoping provisions consistent.
4. Because of site constraints, individual dwelling units, in-fill units, and small developments may have difficulty with providing a zero-step entrance. Therefore, this proposal limits applicability to developments with 6 or more dwelling units.
5. Other site issues, such as trees, preserving natural terrain, and local design guidelines, when coupled with zero-step entrances may increase construction costs by more than a few hundred dollars. In lieu of listing a series of exceptions, this proposal applies to only half the R-2 and R-3 dwelling units.
6. The technical requirements for Type C units are a subset of the Accessible, Type A, and Type B unit technical requirements. Therefore, requiring those units to comply with Type C units is redundant.
7. Stacked townhomes are becoming popular. The proposal only addresses the units nearest the ground. Upper unit is exempted from compliance. Lower units are exempted when the entrance level is significantly below ground.
8. Providing a zero-step entrance is more expensive on a small lot where the unit does not have a garage, particularly on sites with steeper slopes. Therefore, this proposal exempts units where the difference in grade elevation at all the entrances and the elevation along property lines that are along the public right of way slopes more than 8.33%.
9. Modifying existing structures will cost, on average, more than a few hundred dollars. Therefore, existing structures and additions are exempted.

Cost Impact: $100 to $400 per dwelling unit. See "Increasing Home Access: Designing for Visitability" by the AARP Public Policy Institute. http://assets.aarp.org/rgcenter/il/2008_14_access.pdf

ICCFILENAME:Mazz Mark-E1-1102.1

<u>Public Hearing Results</u>

PART I IBC MEANS OF EGRESS
Committee Action: Disapproved

Committee Reason: This proposal is too far reaching for just visitability. It is easy to retrofit existing one and two step entries. There is a big concern about water infiltration and a stepped entry is needed to address that.

Justification was not provided for the 50% requirement for number of units. It is unclear how this will effect construction of individual units – perhaps requiring every unit to meet Type C unit requirements. If there are Type A and Type B units on the site, there should be an allowance for consideration of those units counting towards the percentage required to meet Type C units, similar to what is currently in Section 1107.2.

There needs to be exceptions for units that are a level above grade, in flood plains, on steep sites, etc. There are areas of the country where putting in a basement might hit rock and blasting down to get the zero level entry would be too costly – these types of issues should be considered when determining percentages.
Adding another type of unit is confusing. Perhaps these minimal accessibility requirements should be incorporated into the International Residential Code.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mark J. Mazz, representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1008.1.1 Size of doors. The minimum width of each door opening shall be sufficient for the *occupant load* thereof and shall provide a clear width of 32 inches (813 mm). Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a clear opening width of 32 inches (813 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. *Means of egress* doors in a Group I-2 occupancy used for the movement of beds shall provide a clear width not less than 411/2 inches (1054 mm). The height of door openings shall not be less than 80 inches (2032 mm).

Exceptions:

1. The minimum and maximum width shall not apply to door openings that are not part of the required *means of egress* in Group R-2 and R-3 occupancies.
2. Door openings to resident sleeping units in Group I-3 occupancies shall have a clear width of not less than 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93m2) in area shall not be limited by the minimum width.
4. Width of door leaves in revolving doors that comply with Section 1008.1.4.1 shall not be limited.
5. Door openings within a dwelling unit or sleeping unit shall not be less than 78 inches (1981 mm) in height.
6. Exterior door openings in dwelling units and sleeping units, other than the required *exit* door, shall not be less than 76 inches (1930 mm) in height.
7. In other than Group R-1 occupancies, the minimum widths shall not apply to interior egress doors within a dwelling unit or sleeping unit that is not required to ~~be an *Accessible unit*, *Type A unit* or *Type B unit*~~ comply with Section 1107.
8. Door openings required to be accessible within Type B units shall have a minimum clear width of 31.75 inches (806 mm).

1107.6.2 Group R-2. *Accessible units*, *Type A units* and *Type B units* shall be provided in Group R-2 occupancies in accordance with Sections 1107.6.2.1 and 1107.6.2.2. All other dwelling units and sleeping units shall comply with Section 1107.6.2.3.

1107.6.2.2 Group R-2 other than apartment houses, monasteries and convents. In Group R-2 occupancies, other than apartment houses, monasteries and convents, *Accessible units* and *Type B units* shall be provided in accordance with Sections 1107.6.2.2.1 and 1107.6.2.2.~~2~~3.

1107.6.2.2.1 Accessible units. *Accessible dwelling units* and *sleeping unit*s shall be provided in accordance with Table 1107.6.1.1.

1107.6.2.2.2 Type B units. Where there are four or more *dwelling units* or *sleeping unit*s *intended to be occupied as a residence* in a single structure, every *dwelling unit* and every *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.

Exception: The number of *Type B units* is permitted to be reduced in accordance with Section 1107.7.

1107.6.2.2.3 Other Dwelling units and Sleeping Units. Dwelling units and sleeping units that are not Accessible units or Type B units shall comply with Sections 1107.6.2.3.1 through 1107.6.2.3.2.

Exceptions:

1. Dwelling units with no habitable space on the entry level to the structure that is nearest finish grade are not required to comply with this section.
2. Units without garages are not required to comply with this section when the slope between the finish ground level at all entrances to the nearest point along a property line that borders a public right of way is greater than 10 percent.
3. The number of *dwelling units* is permitted to be reduced in accordance with Section 1107.7.

1107.6.2.2.3.1 Landings. At least one entrance door to each dwelling unit shall have a landing exterior to the unit that is not more than 11/2 inches (38 mm below the top of the threshold.

1107.6.2.2.3.2 Circulation path. A circulation path from the entrance door complying with Section 1107.6.2.2.3.1 to a garage, parking space, or public right of way shall not have any abrupt vertical changes in level greater than ½ inch (13 mm).

1107.6.3 Group R-3. ~~In~~ Group R-3 occupancies, where there are four or more *dwelling units* or *sleeping unit*s *intended to be occupied as a residence* in a single structure ~~every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.~~, shall comply with Section 1107.6.3.1. Where there are three or fewer dwelling units or sleeping units in a single structure, the dwelling units shall comply with Section 1107.6.3.2.

~~**1107.6.3 Group R-3.**~~ **1107.6.3.1. Type B Units.** Every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.

Exception: The number of *Type B units* is permitted to be reduced in accordance with Section 1107.7.

1107.6.3.2 Other dwelling units and sleeping units. Dwelling units that are not Type B units shall comply with Sections 1107.6.3.2.1 and 1107.6.3.2.2.

Exceptions:

1. Dwelling units with no habitable space on the entry level to the structure that is nearest finish grade are not required to comply with this section.
2. Units without garages are not required to comply with this section when the slope between the finish ground level at all entrances to the nearest point along a property line that borders a public right of way is greater than 10 percent.
3. The number of *dwelling units* is permitted to be reduced in accordance with Section 1107.7.

1107.6.3.2.1 Landings. At least one entrance door to each dwelling unit shall have a landing exterior to the unit that is not more than 11/2 inches (38 mm) below the top of the threshold.

1107.6.3.2.2 Circulation path. A circulation path from the entrance door complying with Section 1107.6.3.2.1 to a garage, parking space, or public right of way shall not have any abrupt vertical changes in greater than ½ inch (13 mm).

1107.7 General exceptions. Where specifically permitted by Section 1107.5 or 1107.6, the required number of *Type A units* and *Type B units* is permitted to be reduced in accordance with Sections 1107.7.1 through 1107.7.5. Where specifically permitted by Section Section 1107.6.2.2.3 and 1107.6.3.2 the required number of *dwelling units* is permitted to be reduced in accordance with Sections 1107.7.6.

1107.7.5 Design flood elevation for Type A and B units. The required number of *Type A units* and *Type B units* shall not apply to a site where the required elevation of the lowest floor or the lowest horizontal structural building members of nonelevator buildings are at or above the *design flood elevation* resulting in:

1. A difference in elevation between the minimum required floor elevation at the primary entrances and vehicular and pedestrian arrival points within 50 feet (15 240 mm) exceeding 30 inches (762 mm), and
2. A slope exceeding 10 percent between the minimum required floor elevation at the primary entrances and vehicular and pedestrian arrival points within 50 feet (15.24 m).

Where no such arrival points are within 50 feet (15.24 m) of the primary entrances, the closest arrival points shall be used.

1107.7.6 Design flood elevation for other dwelling units and sleeping units. The required number of *dwelling units* specified in Section 1107.6.2.2.3 and 1107.6.3.2 shall not apply to a *site* where the required elevation of the lowest floor or the lowest horizontal structural building members are at or above the *design flood elevation* resulting in:

1. A difference in elevation between the minimum required floor elevation at all unit entrances and the ground elevation at the entrance exceeds 30 inches (762 mm), or
2. A slope exceeding 10 percent between the minimum required floor elevation at all unit entrances to the nearest points along a property line~~s~~ that borders a public right of way.

Revise as follows:

3411.1 (IEBC 310.1) Scope. The provisions of Sections 3411.1 through 3411.9 apply to maintenance, change of occupancy, additions and alterations to existing buildings, including those identified as historic buildings.

Exceptions:

1. Type B dwelling or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities being altered or undergoing a change of occupancy.
2. Dwelling units required by Sections 1107.6.2.2.3 and 1107.6.3.2 of this code are not required to be provided in additions or in existing buildings and facilities being altered or undergoing a change of occupancy.

Commenter's Reason: The modifications to this proposal address the Committee's concerns.

1. There is a correlative change being proposed for the IBC, IRC and IEBC.
2. Significant modifications were made to this proposal. Therefore, the underlines and strikeouts are to the IBC 2009 text, not the original Proposal text.
3. The proposed modifications delete references to ICC A117.1 Type C units. Some persons thought that Type C units required significantly more accessibility than it does. Another person expressed concern that by referencing Type C, additional accessible features would quickly creep into the Model Codes. Another concern was that some of the Type C technical requirements may be hard to achieve in many situations. Therefore, to make clear the intent of this Visitability proposal, all references to the Type C unit are deleted.
4. The Committee said that applying the requirements to only 50% of the dwelling units in a development site was more appropriately a zoning issue, not a building code issue. The proposed modifications remove those provisions and substitute more broadly written exceptions.
5. Units above or below the entry level and units with split foyers are exempted. Townhouses above garages without habitable space on the entry level are exempted. The slope exemptions are based on finish grade, not undisturbed grade. Therefore, the designer and the builder have some ability to exempt difficult sites.
6. Even though research shows that Visitability adds only $100 to $400 to the cost of a home, several persons expressed concerns about the cost. The proposed modifications strip out all the requirements except zero-step entrance and wider doors on the entry level. The proposed modifications remove the requirement for the entry level to have at least one habitable space and any powder requirements. Outside the dwelling unit, the proposed modifications removed the technical requirements for the circulation path except that no steps are permitted. Ramps are not required.

7. One person speaking in opposition worried that the Visitability provisions would apply to dwelling units above other units and to units below grade. That was never the intent. The exceptions are written more broadly to exclude any unit that does not have habitable space on the entry level to the structure.
8. There was some concern about water intrusion. This should never be an issue when the zero-step entrance is in the garage or under an overhang. Proper detailing can minimize the risk of water intrusion where the entrance door has no overhead protection. I have designed such entrances before.
9. "Of the homes built since 2000, 25% to 60% will have at least one resident with a severe, long-term mobility impairment at some point during the useful life of the structure." ("Aging and Disability: Implications for the Housing Industry and Housing Policy in the United States," Journal of the American Planning Association, Summer 2008) Therefore, the ICC should incorporate minimal accessibility into all new housing.
10. At least 11 jurisdictions have created visitability ordinances across the Country. Some require the electrical panels to be within reach. Others require 42" wide corridors. All these jurisdictions implement an arduous waiver process for exemptions. Many other jurisdictions are looking toward visitability legislation. US Representative Schakowsky from Chicago has proposed legislation in Congress to make it illegal to build new homes without Visitability features. We need to get in front of this trend so that unique waiver processes are eliminated and visitability remains a code issue and not a law or civil right.

Cost Impact: None

Final Action: AS AM AMPC____ D

E156-09/10, Part II
IEBC 605.1

Proposed Change as Submitted

Proponent: Mark J. Mazz, AIA, representing self

PART II - IEBC

Revise as follows:

605.1 General. A building, facility or element that is altered shall comply with the applicable provisions in Sections 605.1.1 through 605.1.14, Chapter 11 of the International Building Code and ICC A117.1 unless it is technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent that is technically feasible.

A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

Exceptions:

1. The altered element or space is not required to be on an accessible route unless required by Section 605.2.
2. Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in existing buildings and facilities.
3. Type B dwelling or sleeping units required by Section 1107 of the International Building Code are not required to be provided in existing buildings and facilities.
4. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provisions for Type B dwelling units and shall comply with the applicable provisions in Chapter 11 of the International Building Code and ICC A117.1.
5. <u>Type C dwelling required by Section 1107 of the International Building Code are not required to be provided in additions or in existing buildings and facilities being altered or undergoing a change of occupancy.</u>

Reason: Type C dwelling units have been added to the technical requirements in 2009 ICC/A117.1. The intent of this proposal is to scope Type C dwelling units for buildings that fall below the threshold of the Fair Housing Act Accessibility Guidelines.

1. There is a correlative change being proposed for the IBC, IRC and IEBC.
2. Type C (Visitable) units require significantly less accessibility than Type B units do. Type C units require one zero-step entrance on a circulation path (not necessarily an accessible route) from a garage, driveway, sidewalk, or street. The entrance does not have to be the front door. Therefore, an attached garage, with a floor that slopes away from a connecting door that has no step can satisfy the zero-step entrance requirement. Interior requirements for Type C units apply only to the entry level and are equally as lax as the exterior requirements.
3. Jurisdictions across the Country are adding Visitability requirements to their local codes. Neither the technical provisions nor the scoping provisions are consistent. To address the technical provisions, ICC A117.1 created Type C (Visitable) units. This proposed change to the Building Code is to make the scoping provisions consistent.
4. Because of site constraints, individual dwelling units, in-fill units, and small developments may have difficulty with providing a zero-step entrance. Therefore, this proposal limits applicability to developments with 6 or more dwelling units.
5. Other site issues, such as trees, preserving natural terrain, and local design guidelines, when coupled with zero-step entrances may increase construction costs by more than a few hundred dollars. In lieu of listing a series of exceptions, this proposal applies to only half the R-2 and R-3 dwelling units.
6. The technical requirements for Type C units are a subset of the Accessible, Type A, and Type B unit technical requirements. Therefore, requiring those units to comply with Type C units is redundant.
7. Stacked townhomes are becoming popular. The proposal only addresses the units nearest the ground. Upper unit is exempted from compliance. Lower units are exempted when the entrance level is significantly below ground.
8. Providing a zero-step entrance is more expensive on a small lot where the unit does not have a garage, particularly on sites with steeper slopes. Therefore, this proposal exempts units where the difference in grade elevation at all the entrances and the elevation along property lines that are along the public right of way slopes more than 8.33%.
9. Modifying existing structures will cost, on average, more than a few hundred dollars. Therefore, existing structures and additions are exempted.

Cost Impact: $100 to $400 per dwelling unit. See "Increasing Home Access: Designing for Visitability" by the AARP Public Policy Institute. http://assets.aarp.org/rgcenter/il/2008_14_access.pdf

ICCFILENAME:Mazz Mark-E1-1102.1

Public Hearing Results

PART II- IEBC
Committee Action: Disapproved

Committee Reason: The proposal was disapproved for consistency with the committee action on E156-09/10 Part I.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mark J. Mazz, representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART II - IEBC

CHAPTER 6
ALTERATION – LEVEL I

605.1 General. A building, facility or element that is altered shall comply with the applicable provisions in Sections 605.1.1 through 605.1.14, Chapter 11 of the International Building Code and ICC A117.1 unless it is technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent that is technically feasible.

A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

Exceptions:

1. The altered element or space is not required to be on an accessible route unless required by Section 605.2.
2. Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in existing buildings and facilities.
3. Type B dwelling or sleeping units required by Section 1107 of the International Building Code are not required to be provided in existing buildings and facilities.
4. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provisions for Type B dwelling units and shall comply with the applicable provisions in Chapter 11 of the International Building Code and ICC A117.1.

5. Dwelling units required by Sections 1107.6.2.2.3 and 1107.6.3.2 of the International Building Code are not required to be provided in additions or in existing buildings and facilities being altered or undergoing a change of occupancy.

Commenter's Reason: See E156-09/10, Part I. This is the same language as proposed for IBC Chapter 34 and IEBC Chapter 3 proposed in the public comment to Part I.

Final Action: AS AM AMPC____ D

E156-09/10, Part III
IRC R202, R320.2 (New)

Proposed Change as Submitted

Proponent: Mark J. Mazz, AIA, representing self

PART III – IRC BUILDING/ENERGY

Add new text as follows:

SECTION R202
DEFINITIONS

PUBLIC RIGHT OF WAY. Public land or property, usually in interconnected corridors, that is acquired for or devoted to transportation purposes.

TYPE C (Visitable) UNIT. A dwelling unit designed and constructed for accessibility in accordance with this code and the provisions for Type C units in ICC A117.1.

R320.2 Visitable (Type C) units. Where there are 6 or more dwelling in a development site, at least 50 percent shall be a Type C unit. All units on a development site shall be considered to determine the total number of units and the required number of Type C units.

Exceptions:

1. Type C units shall be permitted to be designed and constructed as Accessible units, Type A units, or Type B units in accordance with Chapter 11 of the International Building Code.
2. The following units are not required to meet Type C unit requirements or be considered to determine the total number of units:
   2.1 Units above other units.
   2.2 Units without garages where the slope between the finish ground level at all unit entrances to all points along the property lines that border a public right of way are no greater than 8.33 percent.
3. Type C dwelling are not required to be provided in additions or in existing buildings and facilities being altered or undergoing a change of occupancy.
4. The required number of Type C units shall not apply to a site where the required elevation of the lowest floor or the lowest horizontal structural building members are at or above the design flood elevation resulting in:
   4.1 A difference in elevation between the minimum required floor elevation at all unit entrances and the ground elevation at the entrance exceeds 30 inches (762 mm), or
   4.2 A slope exceeding 8.33 percent between the minimum required floor elevation at all unit entrances to all points along the property lines that border a public right of way.

Reason: Type C dwelling units have been added to the technical requirements in 2009 ICC/A117.1. The intent of this proposal is to scope Type C dwelling units for buildings that fall below the threshold of the Fair Housing Act Accessibility Guidelines.

1. There is a correlative change being proposed for the IBC, IRC and IEBC.
2. Type C (Visitable) units require significantly less accessibility than Type B units do. Type C units require one zero-step entrance on a circulation path (not necessarily an accessible route) from a garage, driveway, sidewalk, or street. The entrance does not have to be the front door. Therefore, an attached garage, with a floor that slopes away from a connecting door that has no step can satisfy the zero-step entrance requirement. Interior requirements for Type C units apply only to the entry level and are equally as lax as the exterior requirements.

3. Jurisdictions across the Country are adding Visitability requirements to their local codes. Neither the technical provisions nor the scoping provisions are consistent. To address the technical provisions, ICC A117.1 created Type C (Visitable) units. This proposed change to the Building Code is to make the scoping provisions consistent.
4. Because of site constraints, individual dwelling units, in-fill units, and small developments may have difficulty with providing a zero-step entrance. Therefore, this proposal limits applicability to developments with 6 or more dwelling units.
5. Other site issues, such as trees, preserving natural terrain, and local design guidelines, when coupled with zero-step entrances may increase construction costs by more than a few hundred dollars. In lieu of listing a series of exceptions, this proposal applies to only half the R-2 and R-3 dwelling units.
6. The technical requirements for Type C units are a subset of the Accessible, Type A, and Type B unit technical requirements. Therefore, requiring those units to comply with Type C units is redundant.
7. Stacked townhomes are becoming popular. The proposal only addresses the units nearest the ground. Upper unit is exempted from compliance. Lower units are exempted when the entrance level is significantly below ground.
8. Providing a zero-step entrance is more expensive on a small lot where the unit does not have a garage, particularly on sites with steeper slopes. Therefore, this proposal exempts units where the difference in grade elevation at all the entrances and the elevation along property lines that are along the public right of way slopes more than 8.33%.
9. Modifying existing structures will cost, on average, more than a few hundred dollars. Therefore, existing structures and additions are exempted.

Cost Impact: $100 to $400 per dwelling unit. See "Increasing Home Access: Designing for Visitability" by the AARP Public Policy Institute. http://assets.aarp.org/rgcenter/il/2008_14_access.pdf

ICCFILENAME:Mazz Mark-E1-1102.1

Public Hearing Results

PART III- IRC B/E
Committee Action: **Disapproved**

Committee Reason: The committee supports the need for visitability but is concerned about the zoning, particularly the number of units in a development. The committee suggests that it would be better if the technical requirements were placed into the code in the appropriate sections then all homes would comply and there would not be a need for Type C. There are difficulties with the definitions and they contain technical requirements.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mark J. Mazz, representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

PART III – IRC

R320.1 **~~Scope.~~** **Four or more dwelling or sleeping units.** Where there are four or more *dwelling* units or sleeping units in a single structure, the provisions of Chapter 11 of the *International Building Code* for Group R-3 shall apply.

R320.2 Three or fewer dwelling units. Where there are three or fewer dwelling units in a single structure, the dwelling units shall comply with 320.2.1 through 320.2.3.

Exceptions:

1. Dwelling units with no habitable space on the entry level are not required to comply with section.
2. Units without garages are not required to comply when the slope between the finish ground level at all entrances to the nearest point along a property line that borders a public right of way is greater than 10 percent.
3. Additions, existing buildings and facilities being altered, and buildings and facilities undergoing a change of occupancy are not required to comply with this section.
4. Section R320.2 shall not apply to a *site* where the required elevation of the lowest floor or the lowest horizontal structural building members are at or above the *design flood elevation* resulting in:
   4.1. A difference in elevation between the minimum required floor elevation at all unit entrances and the ground elevation at the entrance exceeds 30 inches (762 mm), or
   4.2. A slope exceeding 10 percent between the minimum required floor elevation at all unit entrances to the nearest point along a property lines that border a public right of way.

R320.2.1 Landings. At least one entrance door to each dwelling unit shall provide a minimum clear width or 32 inches (813 mm) and have a landing exterior to the unit that is not more than 11/2 inches (38 mm) lower than the top of the threshold.

R320.2.2 Circulation path. A circulation path from the entrance door complying with Section R320.2.1 to a garage, parking space, or public right of way shall be free of any abrupt vertical changes in level that are more than ½ inch (13 mm).

R320.3 Door width. On the entry level, interior doors on the circulation path shall provide a minimum clear width of 31 3/4" inches when measured between the face of the door and the stop.

R311.2 Egress door. At least one egress door shall be provided for each *dwelling* unit. The egress door shall be side-hinged, and shall provide a minimum clear width of 32 inches (813 mm) when measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The minimum clear height of the door opening shall not be less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions unless required by Section 320.2. Egress doors shall be readily openable from inside the *dwelling* without the use of a key or special knowledge or effort.

Commenter's Reason: See E156-09/10, Part I. The revision to Section 311.2 is so there is not a conflict for door width in the IRC.

Final Action: AS AM AMPC____ D

E179-09/10

1108.5 (New), Chapter 35

Proposed Change as Submitted

Proponent: Marsha K. Mazz, U.S. Architectural and Transportation Barriers Compliance Board (Access Board)

1. Add new text as follows:

1108.5 Classroom acoustics. Classrooms in Group E occupancies shall meet the acoustical performance criteria in ANSI/ASA S12.60, Part 1.

> **Exception:** Relocatable classrooms shall be permitted to comply with ANSI/ASA S12.60, Part 2.

2. Add new standard to Chapter 35 as follows:

American National Standards Institute (ANSI)
ANSI/ASA S12.60-2010/Part 1 Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Permanent, Site-Built Schools
ANSI/ASA S12.60-2009/Part 2 Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Relocatable Classroom Factors.

Reason: This code change proposes to reference two new standards: ANSI/ASA S12.60-2010/Part 1 Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools and ANSI/ASA S12.60-200X/Part 2 Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Relocatable Classroom Factors.

Acoustical performance is an important consideration in the design of classrooms. The proposed standard sets specific criteria for maximum background noise (35 decibels) and reverberation time (0.6 to 0.7 seconds) for unoccupied classrooms. Research indicates that levels of background noise and reverberation little noticed by adults, who are mature and skillful listeners, adversely affect learning environments for young children, whose neurological development is incomplete until late adolescence.[1] Amplification cannot remedy poor classroom acoustics because they amplify both wanted and unwanted sound. This code change will remove educational barrier for children who have hearing loss and those who use cochlear implants. In addition, children who have temporary hearing loss, who may comprise up to 15% of the school age population according to the Centers for Disease Control (CDC), will also benefit, as will children who have speech impairments or learning disabilities and those whose home language is different. Without improvements to the listening environment, children of all backgrounds, ages, and abilities are at risk of educational delay and failure.

Background: In 1998, the U.S. Access Board joined with the **Acoustical Society of America** (ASA) to support the development of a classroom acoustics standard. This resulted in the publication of the first ANSI/ASA S12.60-2002 (R 2009) Acoustical Performance Criteria, Design Requirements and Guidelines for Schools which was reaffirmed in 2009. The standard is now being reformatted to make it more easily interpreted and enforced. Additionally, it will include a new Part 2 to better address relocatable classrooms with support from the Modular Building Institute. We understand that the new editions will be published in 2009 (Part 2) and 2010 (Part 1) in time for consideration at the Final Action Hearings.

Supporting Data: In a large study of students in London and Munich schools, classroom noise levels were related to standardized achievement scores showing that higher noise levels resulted in poorer standardized test scores.[2, 3] Similar scores were reported by Armstrong International.

Bibliography

1. Ponton, C., Eggermont, J., Kwong, B. & Don, M. (2000) Maturation of human central auditory system activity: Evidence from multi-channel evoked potentials, Clinical Neurophysiology 111, 220 – 236.

2. Shield. B and Dockrell J (2008) The effects of environmental and classroom noise on the academic attainments of primary school children, J. Acoust. Soc. Am. Volume 123, 133-144
3. Hygge, S, Evans, G W. & Bullinger, M (2002) A Prospective Study of Some Effects of Aircraft Noise on Cognitive Performance in Schoolchildren. Psychological Science 13 (5), 469-474.

Cost Impact: This code change will increase the cost of construction. Evidence obtained from the State of Connecticut where the ANSI/ASA S12.60-2002 is applicable under state law is that cost increases have been nominal even for modular construction. Data from the UK where a similar standard has been applicable over the past five years indicates an average increase of 1.5% in new school construction. We anticipate that any costs attributable to this code change would be offset by the increased availability of Federal funds through the American Recovery and Reinvestment Act. A funding bill has passed in the U.S. House of Representatives which will support school sustainability improvements, specifically including improvements to acoustical environments.

Analysis: A review of the standards proposed for inclusion in the code, ANSI/ASA S12.60-2010/Part 1 and ANSI/ASA S12.60/Part 2, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME:Mazz-E4-1108.5

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.2.1, 3.6.2.4, 3.6.3.1.

Committee Action: Disapproved

Committee Reason: The proposed reference standard had not yet completed its revision to put requirements into mandatory language. The current standard is not in mandatory language.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Marsha K. Mazz, representing U.S. Architectural and Transportation Barriers Compliance Board (Access Board) requests Approval as Modified by this Public Comment.

1108.5 Classroom acoustics. ~~Classrooms in~~ Group E occupancies shall meet the acoustical performance criteria in ANSI/ASA S12.60, Part 1.

Exception: Relocatable classrooms shall be permitted to comply with ANSI/ASA S12.60, Part 2.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The committee disapproved this proposal because the proposed reference standard had not yet completed its revision to put the requirements in mandatory language. We anticipate that the new standards will be available by the Final Action Hearings in Dallas. The modification deletes the reference to "classrooms" in Group E occupancies because the proposed standards address which educational spaces in Group E occupancies must comply. For example, the standard exempts certain educational spaces that cannot comply because of their unique nature e.g. shops and swimming pools.

Public Comment 2:

Mr. William Ryan, representing M. Space Holdings LLC, requests Disapproval.

Commenter's Reason: I wish to support the committee action for disapproval and add the following information. Our company is a supplier of commercial modular buildings in Connecticut. We have supplied classroom buildings in compliance with ASA 12.60-2002. I object to the cost impact language in the proponent's reason which states "Evidence obtained from the State of Connecticut where the ANSI/ASA S12.60-2002 is applicable under state law is that cost increases have been nominal even for modular construction." Our experience is that costs increase by over 30% on the three classroom building which we provided.

Final Action: AS AM AMPC____ D

E187-09/10
1109.6, 1109.6.1 (New), 1109.6.2 (New)

Proposed Change as Submitted

Proponent: Don Davies, Salt Lake City Corporation, representing the Utah Chapter of ICC

1. Revise text as follows:

1109.6 Elevators. Passenger elevators on an accessible route shall be accessible and comply with Section ~~3001.3~~ <u>3001</u>.

2. Add new text as follows:

<u>**1109.6.1 Limited use limited application elevators.** Limited use limited application elevators are permitted to be a part of a required accessible route. The maximum rise of the car platform shall not exceed 25 feet (7.6 m).</u>

<u>**1109.6.2 Private Residence elevators.** Private residence elevators are permitted to be part of a required accessible route within or serving an individual dwelling unit or sleeping unit. The maximum rise of the car platform shall not exceed 50 feet (15 m).</u>

Reason: The code currently scopes the provisions for passenger elevators (Section 1109.6). A reference to Section 3001 will pick up a reference to safety standard, ASME A17.1, as well as the accessibility standard, ICC A117.1. It is unclear to those unfamiliar with ASME A17.1 that LULAs and private residence elevators are 'passenger elevators' with limited applications. The 25 feet of vertical rise for LULAs is found in ASME A17.1 Section 5.2.1.16.5. The 50 feet of vertical rise for private residence elevators is found in ASME A17.1 Section 5.3.1.10.3. Since the code is very explicit on the limitations of lifts in new construction it seems reasonable that some guidance be placed in the body of the code scoping the provisions and stating the limitations of these types of elevators.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Davies-E1-1109.7

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Limited Use/Limited Access (LULA) elevators and Private Residence Elevators are considered passenger elevators by ASME A17.1, so this text is not needed. ASME A17.1 should contain the limitations for use of these elevators. Repeating ASME A17.1 requirements in the IBC could lead to possible conflicts in the future.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Don Davies, Salt Lake City Corporation, representing the Utah Chapter of ICC, requests Approval as Submitted.

Commenter's Reason: It is very clear in the code what limitations are placed on lifts, but the code is totally silent on the limitations of LULA's and Private Residence elevators. Even though LULU's and Private Residence elevators are addressed in a current standard, scoping the limitations of their use makes the code a user friendly document. At a glance, code users can quickly see the limitations of these types of elevators without referencing some document they may not even have in their libraries. Very few code users have access to all the standards when all they want to know what the limitations of the use of an item are. One concern at the hearings was the possibility of the standard being changed, thus conflicting with the code. This is not likely to happen, since this limitation has been unchanged for several years, and is unlikely to change in the future, just because the code addresses the issue.

Final Action: AS AM AMPC____ D

E194-09/10, Part I
1002.1 (IFC [B] 1002.1)

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I.

Proposed Change as Submitted

Proponent: Jeff Lowinski, representing the Window and Door Manufacturers Association (WDMA)

PART I – IBC MEANS OF EGRESS

Add new definition as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

LANDING. A floor area or a designated portion of a floor area, at the top or bottom of a flight of stairs, or at the top or bottom of a ramp, or at the door of an elevator.

Reason:
(PART I) This proposal adds a definition to the IBC for "landing" which is beneficial when attempting to interpret and apply the IBC. "landing" is used in numerous locations of the IBC but is not defined.

WDMA is of the perspective than "landing" relates to the flight of stairs (or ramp) that may be near a door; and that doors, other than elevator doors, do not have "landings" necessarily associated to them. A flight of stairs, or ramp, may have a landing, and that landing may be on one side of a door. Hence there are requirements in the code for landings at doors. The proposed definition clarifies that landings are associated with stairs, ramps, or elevators.

WDMA members, as they assist their customers, have found that some jurisdictions have interpreted the exception in 1008.1.7 significantly different than the language intends.

ICCFILENAME:Woestman-E2-1008.1.7

Public Hearing Results

PART I- IBC MEANS OF EGRESS
Committee Action: Disapproved

Committee Reason: The definition does not address landings at doors where a single step is provided. There is a conflict with the definition of 'flight' which only deals with several risers. The definition is not clear for intermediate landings on stairways and ramps. There are other areas in the code that use this term, such as balconies, where this definition could be considered a conflict.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeff Inks, representing the Window and Door Manufacturers Association (WDMA) requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein:

LANDING. A floor area or a designated portion of a floor area, at the top or bottom of a stair, stairway, flight of stairs, or ~~at the top or bottom of a~~ ramp; intermediate floor areas within the run of a stairway, flight of stairs, or ramp; or, at the door of an elevator.

Commenter's Reason: As noted in the reason statement for the original proposal, this proposal adds a definition to the IBC for "landing" which is beneficial when attempting to interpret and apply provisions in the IBC related to them. "Landing" is used in numerous locations in the codes but is not defined.

The intent of the definition is to clarify that "landing" relates to floor areas serving stairs, stairways, flight of stairs, and ramps, and that doors, other than elevator doors, do not have a "landing" unless required by the code in association with these elements. The proposed definition clarifies that.

The issue being addressed is the interpretation by some jurisdictions that have interpreted extensive level areas on the exterior of exterior doors such as a patio, as landings that doors are not permitted to swing over. The proposed definition addresses that concern and will clarify that doors are permitted to swing over such areas.

Cost Impact: The code change proposal will not increase the cost of construction.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY- SEE ABOVE.

E194-09/10, Part II
IRC R202

Proponent: Jeff Lowinski, representing the Window and Door Manufacturers Association (WDMA)

PART II – IRC BUILDING/ENERGY

Add new definition as follows:

SECTION R202
DEFINITIONS

<u>**LANDING.** A floor area or a designated portion of a floor area, at the top or bottom of a flight of stairs, or at the top or bottom of a ramp.</u>

Reason:
(PART II) This proposal adds a definition to the IRC for "Landing" which is beneficial when attempting to interpret and apply the IRC. "Landing" is used in numerous locations in the IRC but currently is not defined.
WDMA is of the perspective than "landing" relates to the flight of stairs (or ramp) that may be near a door; and that doors do not have "landings" necessarily associated to them. A flight of stairs, or ramp, may have a landing, and that landing may be on one side of a door. Hence there are requirements in the code for landings at doors. The proposed definition clarifies that landings are associated with stairs or ramps.

Cost Impact: The code change proposal will not increase the cost of construction.

Assembly Action: **None**

PART II- IRC B/E
Committee Action: **Disapproved**

Committee Reason: The proposed definition does not address the landings at the exterior door. This should be reworked and brought to Final Action.

Assembly Action: **None**

INTERNATIONAL BUILDING CODE – GENERAL

G1-09/10
202, 419.1

Proposed Change as Submitted

Proponent: Maureen Traxler representing Washington Association of Building Officials Technical Code Development Committee

1. Add new definition as follows:

SECTION 202
DEFINITIONS

LIVE/WORK UNIT. A *dwelling unit* or *sleeping unit* in which a significant portion of the space includes a nonresidential use that is operated by the tenant. See Section 419.

2. Revise as follows:

419.1 General. A live/work unit ~~is a dwelling unit or sleeping unit in which a significant portion of the space includes a nonresidential use that is operated by the tenant and~~ shall comply with Sections 419.1 through 419.8.

> **Exception:** Dwelling or sleeping units that include an office that is less than 10 percent of the area of the dwelling unit ~~shall not be~~ ~~classified as a live/work unit~~ are permitted to be classified as dwelling units with accessory occupancies in accordance with Section 508.2.

Reason: The term live/work unit is found in several sections of the IBC, including Sections 310, 419, 508 and 1103, so the definition should be located in Chapter 2. This proposed definition of live/work unit is currently contained within 419, but not identified as a definition.
Section 419 is revised to relocate the definition of "live/work unit" to Chapter 2. The exception to Section 419.1 is revised to more clearly coordinate with the accessory occupancy provisions of Section 508.2.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TRAXLER-G1-202

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee supported the concept of moving the definition to Chapter 2 because it is a definition that applies throughout the code, however it was felt that the wording of the definition needed to be refined. Referrals to code sections within definitions are inappropriate and only used in Chapter 2 when the definition itself is located in a different section. The committee felt that the language of the exception to Section 419.1 needed further refinement.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202
DEFINITIONS

LIVE/WORK UNIT. A *dwelling unit* or *sleeping unit* in which a significant portion of the space includes a nonresidential use that is operated by the tenant. ~~See Section 419.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This comment moves the definition of "live/work unit" to Chapter 2, but deletes the inappropriate cross reference that was found in the original proposal. The term is used in other chapters so it should not be located in Section 419.

Final Action: AS AM AMPC____ D

G9-09/10
202 (NEW)

Proposed Change as Submitted

Proponent: Tony Crimi, A.C., Consulting Solutions Inc., representing North American Insulation Manufacturers Association

Add new text as follows:

SECTION 202
DEFINITIONS

<u>**NONCOMBUSTIBLE MATERIAL.** A material that will not ignite or burn when subjected to specified fire or heat conditions. Materials that meet the acceptance criteria of ASTM E 136 are considered noncombustible materials.</u>

Reason: There is a need for a definition of "noncombustible material" in the IBC. Several of the I-Codes have varying definitions of the term "non-combustible material", each based upon the way in which the concept of "non-combustible" is used within that Code. Throughout the ICC code system, the concept of "noncombustible material" is based on the idea that the material should not ignite or burn when subjected to fire or heat The IBC, which uses the term extensively, does not contain a specific definition.

The concept of "noncombustible materials" and "noncombustibility" in terms of types of construction is widely used throughout the International Codes. While the IRC, IMC, and IWUIC all contain definitions of the term, they are all different from each other.

In contrast, the IBC, IFC, IEBC and IFGC do not contain a separate definition, even though they use the terminology "non-combustible materials". There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

> **Noncombustible, adj** – not capable of igniting and burning (Webster's Third New International Dictionary of the English Language, Unabridged, 2007)

In contrast to the common usage, the traditional use of the terminology and concept of "noncombustible materials" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

While each of the model I-Codes which reference the term "noncombustible" do have unique additional attributes, we are in agreement with the original proponent, that these are best addressed outside of the definition. For example, section 703.4 of the IBC does provide additional requirements and acceptance criteria which are specific to its own intent and contained in Sections 602.2, 602.3, and 602.4. However, this section only describes "Noncombustibility Tests", rather than providing a definition.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee did not believe that the proposed definition of non-combustible reflected all of the various uses of the term in the code. Installing this definition could unintentionally affect application of other provisions.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C., Consulting Solutions Inc., representing North American Insulation Manufacturers' Association (NAIMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

NONCOMBUSTIBLE ~~MATERIAL~~ INSULATION. A material installed for thermal or acoustical purposes, that will not ignite or burn when subjected to specified fire or heat conditions. Materials that meet the acceptance criteria of ASTM E 136 or ASTM E 2652 are considered non-combustible.

2. Add new to Chapter 35 as follows:

ASTM
E 2652-09 Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C.

Commenter's Reason: There is no general definition of "noncombustible material" in the IBC. Section 703.4 identifies "Non-Combustibility Tests", but only for the purpose of providing criteria for acceptance of building materials related to types of Construction in Sections 602.2, 602.3 and 602.4 (i.e. Type I, II, III and IV construction). It further clarifies that the term "noncombustible" does not apply to the flame spread characteristics of *interior finish* or *trim* materials, and states that a material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

Several of the I-Codes have varying definitions of the term "non-combustible material", each based upon the way in which the concept of "non-combustible" is used within that Code. Throughout the ICC code system, the concept of "noncombustible material" is based on the idea that the material should not ignite or burn when subjected to fire or heat

The IBC, which uses the term extensively, does not contain a specific definition for "non-combustible material". In terms of insulation materials, there is a need to clearly delineate requirements for flame spread, foamed plastics, and non-combustible insulations.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

> **Noncombustible, adj** – not capable of igniting and burning (Webster's Third New International Dictionary of the English Language, Unabridged, 2007)

In the traditional use of the terminology and concept of "non-combustible" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, *Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C*. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

ASTM has recently published another standard ASTM E2652-09, entitled *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*. This test method is similar to ASTM E136, and based more on the international standard (ISO) for noncombustibility. The key difference between the two standards is in the equipment. The apparatuses in this test method and in Test Method E 136 is that the furnace tube in this test method has a conical air-flow stabilizer section attached at its bottom. Both test methods use cylindrical furnace tubes. The test Standard does not include mandatory pass/fail criterion. It allows those criteria to be determined by the Codes or other users. Appendix X3 also contains a comparison of results obtained from this apparatus versus ASTM E136. The results are quite consistent.

This additional method should also now be incorporated into the IBC as an appropriate test method.

Analysis: The standard, ASTM E2562, was not reviewed or considered by the General Code Development Committee prior to the Baltimore hearings and it was not considered by the hearing attendees at the time of the code development hearings. Section 3.6.3.1 of Council Policy # 28, *Code Development,* requires that new standards be introduced in the original code change proposal, therefore, the introduction of a new standard via a public comment is not in accordance with the process required by CP # 28 for adding new standards to the code.

Final Action: AS AM AMPC____ D

G15-09/10

202, 304.1 (IFC [B] 202), 304.1.1 304.2, 422, 710.5, [F] 903.2.2, [F] 903.3.2, [F] 907.2.2, [F] 907.2.2.1 (IFC 903.2.2, 903.3.2, 907.2.2, 907.2.2.1)

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, P.E., Chair, representing ICC Code Technology Committee (CTC)

1. Revise as follows:

304.1 (IFC [B] 202) Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Ambulatory ~~health~~ care facilities
Clinic – outpatient

(Portions of list not shown remain unchanged)

~~304.1.1~~ 304.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

(Relocate definition for Ambulatory Health Care Facilities from Section 202, and revise.)

AMBULATORY ~~HEALTH~~ CARE FACILITY. Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less than 24-hour basis to individuals who are rendered incapable of self-preservation by the services provided.

CLINIC-OUTPATIENT. Buildings or portions thereof used to provide medical care on less than a 24-hour basis to individuals who are not rendered incapable of self-preservation by the services provided.

SECTION 422
AMBULATORY ~~HEALTH~~ CARE FACIILITIES

422.1 General. Occupancies classified as ~~Group B~~ ambulatory ~~health~~ care facilities shall comply with the provisions of Sections 422.1 through ~~422.6~~ 422.7 and other applicable provisions of this code.

422.2 Separation. Ambulatory care facilities where the potential for four or more care recipients are to be incapable of self preservation at any time, whether rendered incapable by staff or staff accepted responsibility for a care recipient already incapable, shall be separated from adjacent spaces, corridors or tenants with a fire partition installed in accordance with Section 708.

~~422.2~~ 422.3 Smoke ~~barriers~~ compartments. ~~Smoke barriers shall be provided to subdivide every~~ Where the aggregate area of one or more ambulatory ~~health~~ care facilities ~~greater than~~ exceeds 10,000 square feet on one story, the story shall be provided with a smoke barrier to subdivide the story into not less than ~~into a minimum of~~ two smoke compartments ~~per story~~. The area of any one such smoke compartment shall not exceed 22,500 square feet (2092 m^2). The travel distance from any point in a smoke compartment to a smoke barrier door shall not exceed 200 feet (60 960 mm). The smoke barrier shall be installed in accordance with Section 710 with the exception that smoke barriers shall be continuous from outside wall to an outside wall, a floor to a floor, or from a smoke barrier to a smoke barrier or a combination thereof.

~~422.3~~ 422.4 Refuge area. At least 30 net square feet (2.8 m^2) per nonambulatory ~~patient~~ care recipient shall be provided within the aggregate area of corridors, ~~patient~~ care recipient rooms, treatment rooms, lounge or dining areas and other low-hazard areas ~~on each side of each smoke barrier~~ within each smoke compartment. Each occupant of an ambulatory care facility shall be provided with access to a refuge area~~s~~ without passing through or utilizing adjacent tenant spaces.

~~422.4~~ 422.5 Independent egress. A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which means of egress originated.

~~422.5~~ 422.6 Automatic Sprinkler Systems. Automatic sprinklers systems shall be provided for ambulatory care facilities in accordance with Section 903.2.2.

~~422.6~~ 422.7 Fire alarm systems. A fire alarm system shall be provided for ambulatory care facilities in accordance with Section 907.2.2.1.

710.5 Openings. Openings in a *smoke barrier* shall be protected in accordance with Section 715.

Exceptions:

1. In Group I-2 and ambulatory care facilities, where doors are installed across *corridors*, a pair of opposite-swinging doors without a center mullion shall be installed having vision panels with fire-protection-rated glazing materials in fire-protection-rated frames, the area of which shall not exceed that tested. The doors shall be close fitting within operational tolerances, and shall not have undercuts in excess of 3/4-inch, louvers or grilles. The doors shall have head and jamb stops, astragals or rabbets at meeting edges and shall be automatic closing by smoke detection in accordance with Section 715.4.8.3. Where permitted by the door manufacturer's listing, positive-latching devices are not required.
2. In Group I-2 and ambulatory care facilities, horizontal sliding doors installed in accordance with Section 1008.1.4.3 and protected in accordance with Section 715.

[F] 903.2.2 (IFC 903.2.2) ~~Group B~~ ambulatory ~~health~~ care facilities. An automatic sprinkler system shall be installed throughout all fire areas containing an ~~Group B~~ ambulatory ~~health~~ care facility ~~occupancy~~, when either of the following conditions exist at any given time:

1. Four or more care recipients are incapable of self preservation, whether rendered incapable by staff or staff have accepted responsibility for care recipients already incapable.
2. One or more care recipients that are incapable of self preservation are located at other than the level of exit discharge.

In buildings where care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed on the entire floor where care is provided as well as all floors below, and all floors between the level of care and the closest level of exit discharge.

[F] 903.3.2 (IFC 903.3.2) Quick-response and residential sprinklers. Where automatic sprinkler systems are required by this code, quick-response or residential automatic sprinklers shall be installed in the following areas in accordance with Section 903.3.1 and their listings:

1. Throughout all spaces within a smoke compartment containing ~~patient~~ sleeping units in Group I-2 in accordance with this code.
2. Throughout all spaces within a smoke compartment containing treatment rooms in ambulatory care facilities.
3. ~~2.~~ Dwelling units, and sleeping units in Group R and I-1 occupancies.
4. ~~3.~~ Light-hazard occupancies as defined in NFPA 13.

[F] 907.2.2 (IFC 907.2.2) Group B. A manual fire alarm system shall be installed in Group B occupancies where one of the following conditions exists:

1. The combined Group B *occupant load* of all floors is 500 or more.
2. The Group B *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*.
3. The ~~Group B~~ *fire area* contains a ~~Group B~~ ambulatory ~~health~~ care facility.

   Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

[F] 907.2.2.1 (IFC 907.2.2.1) ~~Group B~~ ambulatory ~~health~~ care facilities. Fire areas containing ~~Group B~~ ambulatory ~~health~~ care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory ~~health~~ care facility and in public use areas outside of tenant spaces, including public *corridors* and elevator lobbies.

Exception: Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, provided the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Care Facilities". The scope of the activity is noted as: Study issues associated with Day Care/Adult Care, Ambulatory Health Care and Assisted Living facilities with an emphasis on the number of occupants in relation to the supervision, and the determination of the resident's capability of responding to an emergency situation without physical assistance from the facility's supervision.

The Code Technology Committee Study Group on Care Facilities has conducted a comprehensive review of current building and fire codes, federal regulations and prior code change proposals dealing with the provision of "care". "Care" as it relates to the scope of this work relates to an occupant of a building who is compromised (mentally or physically) and receives some type of support (care). These facilities encompass a full spectrum of acuity and span a wide range of occupancy types including Groups B, E, I and R. On the lower end of the spectrum, occupants may be aged and receive occasional day living assistance such as cooking and cleaning. On the opposite end of the spectrum, occupants may be completely bedridden and dependant on medical gases and emergency power to maintain life.

The proposed changes provide clear direction for design and construction by using terms and concepts consistently and clearly identifying thresholds related to the condition of an occupant. Federal regulations and state licensing provisions were considered, but primarily in terms of avoiding conflicting requirements. It is not the intent of these changes to address licensing or operational issues. We do believe that the proposed changes will provide consistent and correlated language between these multiple sources of regulations that will help design and code professionals address the needs of care recipients in the many different types of facilities.

A major goal is to provide clarity and consistency of terminology. New definitions are added to specifically describe each type of care or facility and identify the distinct differences in these. Some terms are consolidated to be more descriptive of a group of occupants, yet generic enough to be used interchangeably. For example: a "Patient" is now identified as a "care recipient" and "nurse" is now "care provider". People receive care of varying types but they are not always referred to as "patients". They receive care from a wide range of persons with different technical abilities, not just a "nurse" or "staff". Other definitions address existing terms not defined within current code. The study group believes that these changes bring a practical response to the recent developments within the healthcare delivery system.

Ambulatory Care Facilities, Section 422 and related sections

This public comment represents the collaborative efforts to address the more specifically concerns regarding these uses over the past several cycles.

Change modifying the existing language includes:

Remove an unneeded reference to "Health" as the definition clearly expresses that these types of facilities are related to some form or care. Also relocate the definition to Section 304.2 to align with the formatting of other Groups that provide definitions for special occupancies within that specifically related section.

Remove an unneeded reference to "Group B" whenever the term Ambulatory Health Care Facility is used.

Added Section 422.2 to require fire partition separation from adjacent spaces in facilities with greater than 4 care recipients. The intent is to subdivide the floor to allow for a reasonable level of safety for care recipients who made need assistance to evacuate, or to allow for the option of protecting in place for a limited period of time.

Modified the continuity requirements of a smoke barrier to deal with intersection or connection to adjacent tenants, and maintain the integrity and safety.

Several of these changes are mindful of existing buildings to allow for renovations without going into other tenant spaces.

Added 22,500 square foot limit to a smoke compartment, similar to Group I-2s.

For multiple tenant spaces, language is added to the area of refuge requirements to clarify that the area of refuge must be accessed without going through adjacent tenant spaces.

Correlative changes to Sections 710, 903 and 907 are bringing consistency of terminology and provision cross references.

Cost Impact: This proposal will increase the cost of construction.

ICCFILENAME: HEILSTEDT-G2-304.1.doc

Public Hearing Results

Committee Action: **Approval as Submitted**

Committee Reason: The changes clarify the regulations of the ambulatory care facilities. It will also result in the IBC requirements being more consistent with CMS standards than they are currently.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce, Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[F] 903.2.2 (IFC 903.2.2) Ambulatory care facilities. An automatic sprinkler system shall be installed throughout ~~all fire areas~~ the entire floor containing an ambulatory care facility, when either of the following conditions exist at any given time:

1. Four or more care recipients are incapable of self preservation, whether rendered incapable by staff or staff have accepted responsibility for care recipients already incapable.
2. One or more care recipients that are incapable of self preservation are located at other than the level of exit discharge.

In buildings where care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed on the entire floor where care is provided as well as all floors below, and all floors between the level of care and the closest level of exit discharge, including the level of exit discharge.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Item F68-09/10 was Approval as Submitted and addresses several of the same issues as this revision in G15-09/10. Item F68 was approved as follows:

> **903.2.2 (IBC [F] 903.2.2) Group B Ambulatory health care facilities.** An *automatic sprinkler system* shall be installed throughout ~~all fire areas~~ the entire floor containing a Group B ambulatory health care facility ~~occupancy~~ and all floors between the ambulatory health care facility and the *level of exit discharge*, including the *level of exit discharge* when either of the following conditions exist at any time:
>
> 1. Four or more care recipients are incapable of self preservation.
> 2. One or more care recipients that are incapable of self preservation are located at other than the *level of exit discharge* serving such an occupancy.

As you can see, both code change proposals revised the following items:

1. Deletion of the word "occupancy"
2. Requirement to have the fire sprinkler installed from the floor of the ambulatory care facility and the level of exit discharge; however each proposal worded this in a different fashion.

G15 additionally revised the title of the facility to simply "ambulatory care facility".
F68 also required the fire sprinkler system to be installed on the entire floor, not just the fire area. G15 also requires the entire floor to sprinklered when on a floor other than the level of exit discharge.
This Public Comment combines all the revisions between the two code changes. The last phrase in the final paragraph is added to ensure that the level of exit discharge is included in the floors requiring fire sprinklers.

Final Action: AS AM AMPC____ D

G16-09/10

305.1, 305.2 (New), 305.2 (IFC [B] 202); 308.5, 308.5.1, 308.5.2 (IFC [B] 202), 310.2; [F] 903.2.6 (IFC 903.2.6); 1015.1, Table 1015.1, 1015.7 (New), 1021.2, Table 1021.2 (IFC [B] 1015.1, Table 1015.1, 1015.7 (New), 1021.2, Table 1021.2); 1103.2.12; [P] Table 2902.1, [P] 2903.1, [P] 2903.2 (IPC Table 403.1, 403.1, 403.2)

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, P.E., Chair, representing ICC Code Technology Committee (CTC)

1. Revise as follows:

SECTION 305
EDUCATIONAL GROUP E

305.1 (IFC [B] 202) Educational Group E. Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

> **Exception:** Religious educational rooms and religious auditoriums, which are accessory to *places of religious worship* in accordance with Section 303.1 and have *occupant loads* of less than 100, shall be classified as a Group A-3 occupancies.

305.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

(Relocated definition for Personal Care Service from Section 310.2, and revise.)

PERSONAL CARE SERVICE. The care of ~~residents~~ occupant's who do not require ~~chronic or convalescent~~ medical ~~or nursing~~ care. Personal care involves responsibility for the safety of the ~~residents~~ occupants while inside the building.

~~**305.2**~~ **305.3 (IFC [B] 202) Group E, Day care facilities.** The use of a building or structure, or portion thereof, for educational, supervision or *personal care services* or more than five children older than 2 1/2 years of age, shall be classified as a Group E occupancy.

A facility such as the above within a dwelling unit and having five or fewer persons shall be classified as a Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2.

SECTION 308
INSTITUTIONAL GROUP I

308.5 (IFC [B] 202) Group I-4, day care facilities. This group shall include buildings and structures occupied by persons of any age who receive custodial care for less than 24 hours by individuals other than parents or guardians, relatives by blood, marriage or adoption, and in a place other than the home of the person cared for. ~~A facility such as the above five or fewer persons shall be classified as a Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2.~~ ~~Places of worship during religious functions are not included.~~ This group shall include, but not be limited to, the following:

Adult day care
Child day care

~~**308.5.1 (IFC [B] 202) Adult care facility.** A facility that provides accommodations for less than 24 hours for more than five unrelated adults and provides supervision and custodial care shall be classified as Group I-4.~~
~~**Exception:** A facility where occupants are capable of responding to an emergency situation without physical assistance from the staff shall be classified as Group R-3.~~

~~**308.5.2 (IFC [B] 202) Child care facility.** A facility that provides supervision and custodial care on less than a 24-hour basis for more than five children 2 1/2 years of age or less shall be classified as Group I-4.~~

Exceptions:

1. A child day care facility that provides custodial care for more than five but no more than 100 children 2-1/2 years or less of age, when the rooms where such children are cared for are located on the level of exit discharge and each of these child care rooms has an exit door directly to the exterior, shall be classified as Group E.
2. Rooms and spaces within places of worship providing such care during religious functions shall be classified as part of the primary occupancy.

A facility such as the above within a dwelling unit and having five or fewer persons shall be classified as a Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2.

[F] 903.2.6 (IFC 903.2.6) Group I. An *automatic sprinkler system* shall be provided throughout buildings with a Group I *fire area*.

Exceptions:

1. An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 or 903.3.1.3 shall be allowed in Group I-1 facilities.
2. An *automatic sprinkler system* is not required where day care facilities are at the *level of exit discharge* and where every room where care is provided has at least one exterior *exit* door.
3. In buildings where Group I-4 day care is provided on levels other than the level of exit discharge, an automatic sprinkler system in accordance with 903.3.1.1 shall be installed on the entire floor where care is provided as well as all floors below, and all floors between the level of care and the closest level of exit discharge.

1015.1 (IFC [B] 1015.1) Exits or exit access doorways from spaces. Two *exits* or *exit access doorways* from any space shall be provided where one of the following conditions exists:

Exception: Group I-2 occupancies shall comply with Section 1014.2.2 through 1014.2.7.

1. The *occupant load* of the space exceeds one of the values in Table 1015.1.

   Exception: In Group R-2 and R-3 occupancies, one *means of egress* is permitted within and from individual dwelling units with a maximum *occupant load* of 20 where the dwelling unit is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

2. The *common path of egress travel* exceeds one of the limitations of Section 1014.3.
3. Where required by Section 1015.3, 1015.4, 1015.5, 1015.6 ~~or~~ 1015.6.1, or 1015.7.

Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.

TABLE 1015.1 (IFC [B] TABLE 1015.1)
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD
A, B, E[a], F, M, U	49
H-1, H-2, H-3	3
H-4, H-5, I-1, I-3, I-4, R	10
S	29

~~a. Day care maximum occupant load is 10.~~

2. Add new text as follows:

1015.7 (IFC [B] 1015.7) Day care means of egress. Day care facilities, rooms or spaces where care is provided for more than 10 children that are 2-1/2 years of age or less, shall have access to not less than two exits or exit access doorways.

3. Revise as follows:

1021.2 (IFC [B] 1021.2) Single exits. Only one *exit* shall be required from Group R-3 occupancy buildings or from stories of other buildings as indicated in Table 1021.2. Occupancies shall be permitted to have a single *exit* in buildings otherwise required to have more than one *exit* if the areas served by the single *exit* do not exceed the limitations of Table 1021.2. Mixed occupancies shall be permitted to be served by single *exits* provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with a single *exit* shall not be located more than one *story* below *grade plane*.

TABLE 1021.2 (IFC [B] TABLE 1021.2)
STORIES WITH ONE EXIT

STORY	OCCUPANCY	MAXIMUM OCCUPANTS (OR DWELLING UNITS) PER FLOOR AND TRAVEL DISTANCE
First story or basement	A, B[d], E[e], F[d], M, U, S[d]	49 occupants and 75 feet travel distance
	H-2, H-3	3 occupants and 25 feet travel distance
	H-4, H-5, I, R	10 occupants and 75 feet travel distance
	S[a]	29 occupants and 100 feet travel distance
Second story	B[b], F, M, S[a]	29 occupants and 75 feet travel distance
	R-2	4 dwelling units and 50 feet travel distance
Third story	R-2[c]	4 dwelling units and 50 feet travel distance

For SI: 1 foot = 304.8 mm.
a. For the required number of exits for parking structures, see Section 1021.1.2.
b. For the required number of exits for air traffic control towers, see Section 412.3.
c. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1029.
d. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.
~~e. Day care occupancies shall have a maximum occupant load of 10.~~

1103.2.12 Day care facilities. Where a day care facility ~~(Groups A-3, E, I-4 and R-3)~~ is part of a dwelling unit, only the portion of the structure utilized for the day care facility is required to be accessible.

[P] TABLE 2902.1 (IPC TABLE 403.1)
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]
(See Sections 2902.2 and 2902.3)

No.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2 OF THE INTERNATIONAL PLUMBING CODE)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAINS [e, f] (SEE SECTION 410.1 OF THE INTERNATIONAL PLUMBING CODE)	OTHER
				MALE	FEMALE	MALE	FEMALE			
5	Institutional	I-4	Adult day care and child day care	1 per 15		1 per 15		1	1 per 100	1 service sink

(Portions of table not shown are unchanged.)

[P] 2903.1 (IPC 403.1) Water closet compartment. Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet rooms located in ~~day care and~~ child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 housing areas.

[P] 2903.2 (IPC 403.2) Urinal partitions. Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The walls or partitions shall begin at a height not more than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. The walls or partitions shall extend from the wall surface at each side of the urinal a minimum of 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished back wall surface, whichever is greater.

Exceptions:

1. Urinal partitions shall not be required in a single occupant or unisex toilet room with a lockable door.
2. Toilet rooms located in ~~day care and~~ child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

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The Code Technology Committee Study Group on Care Facilities has conducted a comprehensive review of current building and fire codes, federal regulations and prior code change proposals dealing with the provision of "care". "Care" as it relates to the scope of this work relates to an occupant of a building who is compromised (mentally or physically) and receives some type of support (care). These facilities encompass a full spectrum of acuity and span a wide range of occupancy types including Groups B, E, I and R. On the lower end of the spectrum, occupants may be aged and receive occasional day living assistance such as cooking and cleaning. On the opposite end of the spectrum, occupants may be completely bedridden and dependant on medical gases and emergency power to maintain life.

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Day Care Facilities, Section 305.3 and related sections

This public comment represents the collaborative efforts of the CTC Study Group on Care to clarify the scope and intent of the code as it applies to the subject of when care is provided and what are the appropriate elements of the building code to address the risks associated with Day Care. Changes to modify the existing language include:

Changing the provisions for religious educational facilities to become an exception.

Adding a definition section for the educational group and moving the definition of personal care services from 310.2 to 305.2, clarifying the day care as a day care facility, and adding the correlation to classify that a Group E, day care facility with five or fewer is allowed in an R-3 or may be constructed per the IRC.

Adding clarifications to the I-4 Group to include both adult and child day care services, and adding an exception for such services within a place of worship, and clarifying that day care facility with five or fewer is allowed in an R-3 or may be constructed per the IRC.

Correlating the requirements for fire suppression in Chapter 9 with the provisions for day care.

Clarifying the requirement for means of egress from day care where more than 10 children receive care.

Removing the occupancy group designations from the scoping criteria in Chapter 11 as being unnecessary, C

Clarifying that the plumbing table is applicable for day care, and that the exclusion for partitions is meant to apply to child day care, not all day care.

Issues concerning the multitude of occupancies, conflicting criteria and/or confusion between the occupancies identified as "Day Care vs. Child or Adult Day Care" were the initial impetus for the study of care. The overlap and inconsistencies for all types of care were eventually included once the true scope of the issues was recognized.

Cost Impact: The code change proposal will not increase the cost of construction.

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Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The change would leave a gap in the code for facilities where 1 to 5 people are receiving care but they are not located in a dwelling unit. The proposal appeared to not provide an occupancy classification for this size of facilities.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing the ICC Code Technology Committee (CTC), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

305.3 (IFC [B] 202) Group E, Day care facilities. The use of a building or structure, or portion thereof, for educational, supervision or *personal care services* ~~or~~ for more than five children older than 2 1/2 years of age, shall be classified as a Group E occupancy.

305.3.1 Five or fewer children. A facility having five or fewer persons receiving such care shall be classified as part of the primary occupancy.

305.3.2 Five or fewer in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer persons receiving such care shall be classified as a Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2.

308.5 (IFC [B] 202) Group I-4, day care facilities. This group shall include buildings and structures occupied by persons of any age who receive custodial care for less than 24 hours by individuals other than parents or guardians, relatives by blood, marriage or adoption and in a place other than the home of the person cared for. This group shall include, but not be limited to, the following:

Adult day care
Child day care

Exceptions:

1. A child day care facility that provides custodial care for more than five but no more than 100 children 2-1/2 years or less of age, when the rooms where such children are cared for are located on the level of exit discharge and each of these child care rooms has an exit door directly to the exterior, shall be classified as Group E.
2. Rooms and spaces within places of worship providing such care during religious functions shall be classified as part of the primary occupancy.
3. A building or space that has more than 5 people that receive custodial care and are occupants of that building or space as their place of employment or as a volunteer.

308.5.1 Five or fewer occupants receiving care. A facility having five or fewer persons receiving such care shall be classified as part of the primary occupancy.

308.5.2 Five or fewer occupants receiving care in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer persons receiving such care shall be classified as a Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2.

[F] 903.2.6 (IFC 903.2.6) Group I. An *automatic sprinkler system* shall be provided throughout buildings with a Group I *fire area*.

Exceptions:

1. An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 or 903.3.1.3 shall be allowed in Group I-1 facilities.
2. An *automatic sprinkler system* is not required where day care facilities are at the *level of exit discharge* and where every room where care is provided has at least one exterior *exit* door.
3. In buildings where Group I-4 day care is provided on levels other than the level of exit discharge, an automatic sprinkler system in accordance with 903.3.1.1 shall be installed on the entire floor where care is provided ~~as well as all floors below,~~ and all floors between the level of care and the ~~closest~~ level of exit discharge, //////////????????s all floors below the level of exit discharge, other than areas classified as an open parking garage.

(Portions of proposal not shown are unchanged)

Reason: The code change committee correctly noted in Sections 305.3 and 308.5 that there are gaps where the occupants receiving care are not in a dwelling unit. This public comment maintains intent of the original proposal but clarifies that the threshold number of individuals are those receiving care and not the total occupant load of the dwelling unit. The additions of Exception 3 to Section 308.5 addresses the instance where there are people that may need or receive custodial care but are not in the building for that purpose; it is their place of employment. Examples are facilities such as Goodwill or Salvation Army that provides employment opportunities for persons that need custodial care in the course of their work day.

The proposed revisions to Exception 3 in Section 903.2.6 clarifies the application of the sprinkler system based on code parameters of “level of exit discharge”.

Public Comment 2:

Maureen Traxler City of Seattle, representing the Department of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the definition of PERSONAL CARE SERVICE as in the original proposal, and move to Chapter 2.

PERSONAL CARE SERVICE. The care of occupants who do not require medical care. Personal care involves responsibility for the safety of the occupants while inside the building.

(*Portions of proposal not shown remain unchanged.)*

Commenter's Reason: The term "personal care service" is used in several code sections (305, 308 & 310), and so belongs in Chapter 2 rather than in one of the sections of Chapter 3.

Public Comment 3:

Maureen Traxler, City of Seattle, representing the Department of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

SECTION 305
EDUCATIONAL GROUP E

305.1 (IFC [B] 202) Educational Group E. Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

305.1.1 Accessory to places of worship. Religious educational rooms and religious auditoriums, which are accessory to *places of religious worship* in accordance with Section 303.1 and have *occupant loads* of less than 100, shall be classified as Group A-3 occupancies.

305.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

(Relocated definition for Personal Care Service from Section 310.2, and revise.)

PERSONAL CARE SERVICE. The care of ~~residents~~ occupants who do not require ~~chronic or convalescent~~ medical ~~or nursing~~ care. Personal care involves responsibility for the safety of the ~~residents~~ occupants while inside the building.

~~305.2~~ 305.3 (IFC [B] 202) Group E, Day care facilities. This group includes buildings and structures or portions thereof occupied by more than five children older than 2-1/2 years of age who receive educational, supervision or *personal care services* for less than 24 hours per day. ~~The use of a building or structure, or portion thereof, for educational, supervision or *personal care services* or more than five children older than 2 1/2 years of age, shall be classified as a Group E occupancy.~~

305.3.1 Within places of worship. Rooms and spaces within places of worship providing such care during religious functions shall be classified as part of the primary occupancy.

305.3.2 Five or fewer children. A facility having five or fewer children receiving such care shall be classified as part of the primary occupancy.

305.3.3 Five or fewer in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer children receiving such care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code.*

SECTION 308
INSTITUTIONAL GROUP I

308.5 (IFC [B] 202) Group I-4, day care facilities. This group shall include buildings and structures occupied by more than five persons of any age who receive custodial care for less than 24 hours per day by individuals other than parents or guardians, relatives by blood, marriage or adoption, and in a place other than the home of the person cared for. ~~A facility such as the above five or fewer persons shall be classified as a Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2.~~ ~~Places of worship during religious functions are not included.~~ This group shall include, but not be limited to, the following:

Adult day care
Child day care

~~**308.5.1 (IFC [B] 202) Adult care facility.** A facility that provides accommodations for less than 24 hours for more than five unrelated adults and provides supervision and custodial care shall be classified as Group I-4.~~

~~**Exception:** A facility where occupants are capable of responding to an emergency situation without physical assistance from the staff shall be classified as Group R-3.~~

~~**308.5.2 (IFC [B] 202) Child care facility.** A facility that provides supervision and custodial care on less than a 24-hour basis for more than five children 2 1/2 years of age or less shall be classified as Group I-4.~~

~~**Exception:**~~

308.5.1 Classification as Group E. A child day care facility that provides custodial care for more than five but no more than 100 children 2-1/2 years or less of age, when the rooms where such children are cared for are located on the level of exit discharge and each of these child care rooms has an exit door directly to the exterior, shall be classified as Group E.

308.5.2 Within a place of worship. Rooms and spaces within places of worship providing such care during religious functions shall be classified as part of the primary occupancy.

308.5. 3 Five or fewer occupants receiving care. A facility having five or fewer persons receiving custodial care shall be classified as part of the primary occupancy.

308.5.4 Five or fewer occupants receiving care in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer persons receiving custodial care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code.*

Commenter's Reason: This modification carries out the intent of the original proposal in a more comprehensive, focused and coordinated manner. It focuses on clarifying the relationship between E and I day cares by using parallel charging language in Sections 305.3 and 308.5. Both E and I classifications apply where more than 5 occupants receive care for less than 24 hours per day. The differences are that Group E only applies where the occupants are children older than 2-1/2 years and they are receiving educational, supervision or personal care services and not custodial care.

First please note that this public comment provides a consistent format in Sections 305.1, 305.3 and 308.5 in which each provision that establishes an exception to the classification and places a building use into a different classification is specified in its own subsection rather than as exceptions or a sentence lost in the main occupancy section.

This public comment adds to Section 305.3 the same 'exception' that was originally proposed only for Section 308.5. The 'exception' allows areas used for care of children during religious functions to be considered part of the main occupancy.

New subsections are proposed in both Sections 305.3 and 308.5 that set forth the classification for occupancies with five or fewer people receiving care.

This public comment does not make any changes to the substantive provisions in chapters other than Chapter 3.

Final Action: AS AM AMPC____ D

G20-09/10

308.1, 308.2, 308.3, 308.3.1, 310.1, 310.2, (IFC [B] 202); [F] 903.2.6, [F] 903.2.8, [F] 903.3.1.3, [F] 903.3.2, [F] 907.2.6, [F] 907.2.6.2, (IFC 903.2.6, 903.2.8, 903.3.1.3, 903.3.2, 907.2.6, 907.2.6.2); Table 1021.2 (IFC [B] Table 1021.2); 1107.5.3; [P] Table 2902.1 (IPC Table 403.1)

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, P.E., Chair, representing ICC Code Technology Committee (CTC)

Revise as follows:

308.1 (IFC [B] 202) Institutional Group I. Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which ~~people are cared for or live in a supervised environment, having physical limitations because of health or age are harbored for medical treatment or other care or treatment, or in which people are detained for penal or correctional purposes or in which the liberty of the occupants is restricted~~ care or supervision is provided to individuals who, are or are not capable of self preservation without physical assistance or in which people are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

308.2 1 (IFC [B] 202) Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

(Relocate revised definitions from Section 308.3.1, and revise.)

24 HOUR CARE. The actual time that a person is an occupant within a facility for the purpose of receiving care. It shall not include a facility that is open for 24 hours and is capable of providing care to someone visiting the facility during any segment of the 24 hours.

CUSTODIAL CARE. Assistance with day-to-day living tasks; such as assistance with cooking, taking medication, bathing, using toilet facilities and other tasks of daily living, usually on a long-term basis. Custodial care include occupants who evacuate at a slower rate and/or who have mental and psychiatric complications.

DETOXIFICATION FACILITIES. Facilities that ~~serve patients who are~~ provided treatment for substance abuse ~~on a 24-hour basis~~ ~~and~~ serving care recipients who are incapable of self-preservation or who are harmful to themselves or others.

~~CHILD~~ FOSTER CARE FACILITIES. Facilities that provide care ~~on a 24-hour basis~~ to more than five children, $2^1/_2$ years of age or less,

HOSPITALS AND ~~MENTAL~~ PSYCHIATRIC HOSPITALS. Facilities ~~buildings or portion thereof~~ ~~used on a 24 hour basis~~ that provides care or treatment for the medical, psychiatric, obstetrical, or surgical treatment of inpatients ~~who~~ care recipients that are incapable of self-preservation.

INCAPABLE OF SELF PRESERVATION. Persons because of age; physical limitations; mental limitations; chemical dependency; or medical treatment cannot respond as an individual to an emergency situation.

MEDICAL CARE. Care involving medical or surgical procedures, nursing or for psychiatric purposes.

NURSING HOMES. ~~Nursing homes are long-term care~~ Facilities that provide long-term care ~~on a 24-hour basis~~, including both intermediate care facilities and skilled nursing facilities, ~~serving more than five persons and~~ where any of the persons are incapable of self-preservation.

~~308.2~~ 308.3 (IFC [B] 202) Group I-1. This occupancy shall include buildings, structures or portions thereof ~~housing~~ for more than 16 persons who reside on a 24 hour basis ~~who because of age, mental disability or other reasons, live~~ in a supervised ~~residential~~ environment ~~that provides *personal care services*~~ and receive custodial care. The occupants are capable of ~~responding to an emergency situation without physical assistance from staff~~ self preservation. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
Initial stage Alzheimer's facilities
Residential board and custodial care facilities
Social rehabilitation facilities

A facility such as the above with five or fewer persons shall be classified as a Group R-3 or shall comply with the International Residential Code in accordance with Section 101.2. A facility such as above, housing at least six and not more than 16 persons, shall be classified as Group R-4.

~~308.3~~ 308.4 (IFC [B] 202) Group I-2. This occupancy shall include buildings and structures used for medical~~, surgical, psychiatric, nursing or custodial~~ care on a 24 hour basis for more than five persons who are not capable of self-preservation. This group shall include, but not be limited to, the following:

Foster ~~Child~~ care facilities
Detoxification facilities
Hospitals
Nursing homes
~~Mental~~ Psychiatric hospitals

A facility such as the above with five or fewer residents shall be classified as Group R-3 or shall comply with the International Residential Code in accordance with Section 101.2.

~~**308.3.1 (IFC [B] 202) Definitions.** The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.~~

(Relocate revised definitions to Section 308.2)

310.1 (IFC [B] 202) Residential Group R. Residential Group R includes, among others, the use of a building, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the International Residential Code in accordance with Section 101.2. Residential occupancies shall include the following:

R-1 Residential occupancies containing sleeping units where the occupants are primarily transient in nature, including:

Boarding houses (transient)
Hotels (transient)
Motels (transient)

Congregate living facilities (transient) with 10 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

R-2 Residential occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

Apartment houses
Boarding houses (not transient)
Convents
Dormitories
Fraternities and sororities
Hotels (nontransient)
Live/work units
Monasteries
Motels (nontransient)
Vacation timeshare properties

Congregate living facilities with 16 or fewer individuals are permitted to comply with the requirements for Group R-3.

R-3 Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, or I, including:

Buildings that do not contain more than two dwelling units.
~~Adult care facilities that provide accommodations for five or fewer persons of any age for less than 24-hours.~~
~~Child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.~~
Care facilities as that provide accommodations for five or fewer persons
Congregate living facilities with 16 or fewer individuals**.**

~~Adult care and child~~ Care facilities for 5 or fewer individuals receiving care that are within a single-family ~~home~~ dwellings are permitted to comply with the International Residential Code.

R-4. This occupancy shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a 24 hour basis in a supervised residential environment and receive custodial care. The occupants are capable of self preservation. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
Initial stage Alzheimer's facilities
Residential board and custodial care facilities
Social rehabilitation facilities

~~Residential occupancies shall include buildings arranged for occupancy as residential care/assisted living facilities including more than five but not more than 16 occupants, excluding staff.~~

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code ~~or shall comply with the *International Residential Code* provided the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.2.8.~~

310.2 (IFC [B] 202) Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

BOARDING HOUSE. A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

CONGREGATE LIVING FACILITIES. A building or part thereof that contains sleeping units where residents share bathroom and/or kitchen facilities.

DORMITORY. A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

<u>**GROUP HOME.** A facility for social rehabilitation, substance abuse or mental health problems that contain a group housing arrangement that provides custodial care but does not provide acute care.</u>

~~**RESIDENTIAL CARE/ASSISTED LIVING FACILITIES.** A building or part thereof housing persons on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment which provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff. This classification shall include, but not be limited to, the following: residential board and care facilities, assisted living facilities, halfway houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug abuse centers and convalescent facilities.~~

TRANSIENT. Occupancy of a *dwelling unit* or *sleeping unit* for not more than 30 days.

[F] 903.2.6 (IFC 903.2.6) Group I. An *automatic sprinkler system* shall be provided throughout buildings with a Group I *fire area*.

Exception: An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 ~~or 903.3.1.3~~ shall be ~~allowed~~ <u>permitted</u> in Group I-1 facilities.

[F] 903.2.8 (IFC 903.2.8) Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R *fire area*.

<u>An *automatic sprinkler system* installed in accordance with 903.3.1.3 shall be permitted in congregate residences with 16 or fewer residents. An automatic sprinkler system installed in accordance with 903.3.1.3 shall be permitted in care facilities with 5 or fewer individuals a single family dwelling.</u>

[F] 903.3.1.3 (IFC 903.3.1.3) NFPA 13D sprinkler systems. *Automatic sprinkler systems* installed in one and two-family *dwellings*<u>, Group R-3 and R-4 congregate residences</u> and *townhouses* shall be permitted to be installed throughout in accordance with NFPA 13D.

[F] 903.3.2 (IFC 903.3.2) Quick-response and residential sprinklers. Where automatic sprinkler systems are required by this code, quick-response or residential automatic sprinklers shall be installed in the following areas in accordance with Section 903.3.1 and their listings:

1. Throughout all spaces within a smoke compartment containing ~~patient~~ <u>care recipient</u> sleeping units in Group I-2 in accordance with this code.
2. Dwelling units, and sleeping units in Group R and I-1 occupancies.
3. Light-hazard occupancies as defined in NFPA 13.

[F] 907.2.6 (IFC 907.2.6) Group I. A manual fire alarm system that activates the occupant notification system shall be installed in Group I occupancies. An automatic smoke detection system that activates the occupant notification system shall be provided in accordance with Sections 907.2.6.1, 907.2.6.2 and 907.2.6.3.3.

Exceptions:

1. Manual fire alarm boxes in ~~resident or~~ ~~patient~~ sleeping units of Group I-1 and I-2 occupancies shall not be required at *exits* if located at all ~~nurses'~~ care providers' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that travel distances required in Section 907.4.2 are not exceeded.
2. Occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is *approved* by the fire code official.

[F] 907.2.6.2 (IFC 907.2.6.2) Group I-2. An automatic smoke detection system shall be installed in *corridors* in nursing homes, long term care facilities ~~(both intermediate care and skilled nursing facilities)~~, detoxification facilities and spaces permitted to be open to the *corridors* by Section 407.2. The system shall be activated in accordance with Section 907.5. Hospitals shall be equipped with smoke detection as required in Section 407.

Exceptions:

1. *Corridor* smoke detection is not required in smoke compartments that contain ~~patient~~ sleeping units where such units are provided with smoke detectors that comply with UL 268. Such detectors shall provide a visual display on the *corridor* side of each ~~patient~~ *sleeping unit* and shall provide an audible and visual alarm at the care provider ~~nursing~~ station attending each unit.
2. *Corridor* smoke detection is not required in smoke compartments that contain ~~patient~~ *sleeping units* where ~~patient~~ *sleeping unit* doors are equipped with automatic door-closing devices with integral smoke detectors on the unit sides installed in accordance with their listing, provided that the integral detectors perform the required alerting function.

1021.2 (IFC [B] 1021.2) Single exits. Only one *exit* shall be required from Group R-3 occupancy buildings or from stories of other buildings as indicated in Table 1021.2. Occupancies shall be permitted to have a single *exit* in buildings otherwise required to have more than one *exit* if the areas served by the single *exit* do not exceed the limitations of Table 1021.2. Mixed occupancies shall be permitted to be served by single *exits* provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with a single *exit* shall not be located more than one *story* below *grade plane*.

TABLE 1021.2 (IFC [B] TABLE 1021.2)
STORIES WITH ONE EXIT

STORY	OCCUPANCY	MAXIMUM OCCUPANTS (OR DWELLING UNITS) PER FLOOR AND TRAVEL DISTANCE
First story or basement	A, B[d], E[e], F[d], M, U, S[d]	49 occupants and 75 feet travel distance
	H-2, H-3	3 occupants and 25 feet travel distance
	H-4, H-5, I, ~~R~~ R-1, R-2, R-4	10 occupants and 75 feet travel distance
	S[a]	29 occupants and 100 feet travel distance
Second story	B[b], F, M, S[a]	29 occupants and 75 feet travel distance
	R-2	4 dwelling units and 50 feet travel distance
Third story	R-2[c]	4 dwelling units and 50 feet travel distance

For SI: 1 foot = 304.8 mm.

a. For the required number of exits for parking structures, see Section 1021.1.2.
b. For the required number of exits for air traffic control towers, see Section 412.3.
c. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1029.
d. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.
e. Day care occupancies shall have a maximum occupant load of 10.

1107.5.3 Group I-2 hospitals. Accessible units and Type B units shall be provided in General-purpose hospitals, psychiatric facilities, <u>and</u> detoxification facilities ~~and residential care/assisted living facilities~~ of Group I-2 occupancies in accordance with Sections 1107.5.3.1 and 1107.5.3.2.

[P] TABLE 2902.1 (IPC TABLE 403.1) MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.2 and 2902.3)

No.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2 OF THE INTERNATIONAL PLUMBING CODE)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAINS[e, f] (SEE SECTION 410.1 OF THE INTERNATIONAL PLUMBING CODE)	OTHER
				MALE	FEMALE	MALE	FEMALE			
7	Residential	R-3	Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		R-4	~~Residential care/assisted living facilities~~ <u>Congregate living facilities with 16 or fewer persons</u>	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink

(Portions of table not shown remain unchanged.)

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Care Facilities". The scope of the activity is noted as:

Study issues associated with Day Care/Adult Care, Ambulatory Health Care and Assisted Living facilities with an emphasis on the number of occupants in relation to the supervision, and the determination of the resident's capability of responding to an emergency situation without physical assistance from the facility's supervision.

The Code Technology Committee Study Group on Care Facilities has conducted a comprehensive review of current building and fire codes, federal regulations and prior code change proposals dealing with the provision of "care". "Care" as it relates to the scope of this work relates to an occupant of a building who is compromised (mentally or physically) and receives some type of support (care). These facilities encompass a full spectrum of acuity and span a wide range of occupancy types including Groups B, E, I and R. On the lower end of the spectrum, occupants may be aged and receive occasional day living assistance such as cooking and cleaning. On the opposite end of the spectrum, occupants may be completely bedridden and dependant on medical gases and emergency power to maintain life.

The proposed changes provide clear direction for design and construction by using terms and concepts consistently and clearly identifying thresholds related to the condition of an occupant. Federal regulations and state licensing provisions were considered, but primarily in terms of avoiding conflicting requirements. It is not the intent of these changes to address licensing or operational issues. We do believe that the proposed changes will provide consistent and correlated language between these multiple sources of regulations that will help design and code professionals address the needs of care recipients in the many different types of facilities.

A major goal is to provide clarity and consistency of terminology. New definitions are added to specifically describe each type of care or facility and identify the distinct differences in these. Some terms are consolidated to be more descriptive of a group of occupants, yet generic enough to be used interchangeably. For example: a "Patient" is now identified as a "care recipient" and "nurse" is now "care provider". People receive care of varying types but they are not always referred to as "patients". They receive care from a wide range of persons with different technical abilities, not just a "nurse" or "staff". Other definitions address existing terms not defined within current code. The study group believes that these changes bring a practical response to the recent developments within the healthcare delivery system.

Group I-1, I-2, R-4; Section 308 and related correlations

Change modifying the existing language includes:

A modification is proposed to the general charging language of Group I to more clearly express the various types of occupancy conditions found within Group I.

Consolidate the definitions from Section 308.3.1 and 308.1 to create a definition Section 308.2 for all of Group I, consistent with current format within the code. Some of the definitions have been modified to add clarity; others are new to remove confusion of meaning and intent.

Modified the general language of specific use occupancies within Group I and R to reflect the new definitions proposed and be more current with industry and licensing descriptions, but not the provisions.

Modifications or additions have been made to the example listings of uses and correlate the terminology for a consistency of application. The threshold of more than 5 persons was added to the first paragraph of Group I-2 and the last sentence was added after the example listing to allow for families to care for person without becoming an I-2 use. This also correlates how the occupancies with less than 5 persons are handled in the other care facilities.

The definition of Child Care Facilities has been to Foster Care Facilities and the provision of 24 hours was removed as it is redundant to the general language of an I-2 use. Foster Care for more than 5, children 2 ½ years of age or less is still an I-2 use. Facilities providing care to 6 to 16 children greater than 2 ½ years of age, is an R-4 and facilities for greater than 16 children it will be an I-1. Additionally, this will eliminate the confusion between day care and 24 hour care facilities.

In Section 903.2.6 it is proposed to delete the option for the NFPA13D sprinkler system for Group I-1 because a NFPA 13D system is not permitted based on the threshold for Group I-1 being greater than 16 occupants. The sprinkler requirements for Group R is generic and currently not clear for facilities such as small congregate residences. As a small assisted living facility, the NFPA 13D sprinkler system is appropriate permitted in Group R-4 (see the revisions to Section 903.2.8) as well as other congregate residences with 16 or fewer occupants. Indicating the used in Section 903.1.3 clarifies that congregate residences with 16 or fewer occupants, while not single family dwellings, are permitted to use NFPA 13D systems. This is consistent with NFPA13D requirements. This was permitted specifically for Group R-4 in the 2000 IBC. This would also be consistent with Fair Housing Act court cases based on non-discrimination for group homes.

Changes proposed beyond Chapter 3 are correlative in nature to reflect the new definitions or provisions previously allowed under chapter 3 provisions but not correlated for ease of use.

Cost Impact: This proposal will not increase the cost of construction.

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Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

308.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

DETOXIFICATION FACILITIES. Facilities that ~~provided~~ <u>provide</u> treatment for substance abuse serving care recipients who are incapable of self-preservation or who are harmful to themselves or others.

HOSPITALS AND PSYCHIATRIC HOSPITALS. Facilities that ~~provides~~ <u>provide</u> care or treatment for the medical, psychiatric, obstetrical, or surgical treatment of inpatients care recipients that are incapable of self-preservation.

[F] 903.2.8 (IFC 903.2.8) Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R *fire area*.

An *automatic sprinkler system* installed in accordance with 903.3.1.3 shall be permitted in congregate residences with 16 or fewer residents. An automatic sprinkler system installed in accordance with 903.3.1.3 shall be permitted in care facilities with 5 or fewer individuals <u>in</u> a single family dwelling.

(Portions of proposal not shown remain unchanged)

Committee Reason: The change reflects a collaborative effort to refine and clarify the various care occupancies. The committee remains concerned about the definition of foster care and its relationship to various state laws. In addition there was concern regarding undefined terms introduced by the change, specifically "Initial stage Alzheimer's" and 'long term care'. The committee acknowledged that this is not the same as the various state regulations, but provided a better framework for states to coordinate their regulations. On balance, the change improves the code and the committee hopes to see public comments to clarify the definitions.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Modified by this Public Comment.

Further modify proposal as follows:

308.2 (IFC [B] 202) Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

CUSTODIAL CARE. Assistance with day-to-day living tasks; such as assistance with cooking, taking medication, bathing, using toilet facilities and other tasks of daily living, ~~usually on a long-term basis~~. Custodial care include occupants who evacuate at a slower rate and/or who have mental and psychiatric complications<u>.</u>

NURSING HOMES. Facilities that provide ~~long-term~~ care, including both intermediate care facilities and skilled nursing facilities, where any of the persons are incapable of self-preservation.

308.3 (IFC [B] 202) Group I-1. This occupancy shall include buildings, structures or portions thereof for more than 16 persons who reside on a 24 hour basis in a supervised environment and receive custodial care. The occupants are capable of self preservation. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
~~Initial stage Alzheimer's facilities~~
Residential board and custodial care facilities
Social rehabilitation facilities

A facility such as the above with five or fewer persons shall be classified as a Group R-3 or shall comply with the International Residential Code in accordance with Section 101.2. A facility such as above, housing at least six and not more than 16 persons <u>receiving such care</u>, shall be classified as Group R-4.

[F] 903.2.8 (IFC 903.2.8) Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R *fire area*.

An *automatic sprinkler system* installed in accordance with 903.3.1.3 shall be permitted in congregate residences with 16 or fewer residents. An automatic sprinkler system installed in accordance with 903.3.1.3 shall be permitted in care facilities with 5 or fewer individuals <u>in</u> a single family dwelling.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: While the code committee agreed that the code change clarifies various care occupancies, they noted in there reason for As Modified the concern over vague terminology, specifically in regards to "long term care" and "Initial stage Alzheimer's". The CTC agrees and submits this public comment in order to rectify those concerns and correlate the language "receiving such care" in Section 308.3 to that added in G16 -09/10.

Public Comment 2:

Ed Altizer, Virginia State Fire Marshall's Office, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1. Add definition to 308.2 (IFC [B] 202)

<u>**ASSISTED LIVING FACILITIES**. Custodial care congregate residential settings that provide or coordinate personal and health care services, 24-hour supervision, and assistance (scheduled and unscheduled) for the maintenance or care of adults who are aged, infirm or disabled and who are cared for in a primarily residential setting. Maintenance or care means the protection, general supervision and oversight of the physical and mental well-being of an aged, infirm or disabled individual. Residents may or may not need assistance to evacuate.</u>

2. Revise as follows:

308.3 (IFC [B] 202) Group I-1. This occupancy shall include buildings, structures or portions thereof housing for more than 16 persons who reside on a 24 hour basis who because of age, mental disability or other reasons, live in a supervised residential environment that provides *personal care services* and receive custodial care. The occupants are capable of self preservation. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities <u>with residents capable of self preservation</u>
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
Initial stage Alzheimer's facilities
Residential board and custodial care facilities
Social rehabilitation facilities

308.4 (IFC [B] 202) Group I-2. This occupancy shall include buildings and structures used for medical or <u>custodial</u> care on a 24 hour basis for more than five persons who are not capable of self-preservation. This group shall include, but not be limited to, the following:

<u>Assisted living facilities with residents incapable of self preservation</u>
Foster Child care facilities
Detoxification facilities
Hospitals
Nursing homes
Psychiatric hospitals

A facility such as the above with five or fewer residents shall be classified as Group R-3 or shall comply with the International Residential Code in accordance with Section 101.2.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: Requesting further modification to G20-09/10. The current proposal in G20-09/10 limits I-2 to only medical care facilities which in itself would be in conflict with foster child care facilities. There are many facilities housing residents incapable of self preservation that are not medical facilities by state definitions. As an example, assisted living facilities are a group in Virginia that are not medical facilities but are licensed care facilities and can house residents incapable of self preservation. The term assisted living facility is also used in the I-1 laundry list but G20 removes the definition. This proposal to modify G20 would add a definition of assisted living facilities and include them as well as other care facilities in the I-2 use group.

Public Comment 3:

Joe Pierce, Chairman - Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

308.4 (IFC [B] 202) Group I-2. This occupancy shall include buildings and structures used for medical care on a 24 hour basis for more than five persons who are not capable of self-preservation. This group shall include, but not be limited to, the following:

Child care facilities
Detoxification facilities
Hospitals
Nursing homes
Psychiatric hospitals

A facility such as the above with five or fewer residents shall be classified as Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2 <u>provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or *International Residential Code* Section P2904</u>.

310.1 (IFC [B] 202) Residential Group R. Residential Group R includes, among others, the use of a building, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the International Residential Code in accordance with Section 101.2. Residential occupancies shall include the following:

R-1 Residential occupancies containing sleeping units where the occupants are primarily transient in nature, including:

Boarding houses (transient)
Hotels (transient)
Motels (transient)

Congregate living facilities (transient) with 10 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

R-2 Residential occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

Apartment houses
Boarding houses (not transient)
Convents
Dormitories
Fraternities and sororities
Hotels (nontransient)
Live/work units
Monasteries
Motels (nontransient)
Vacation timeshare properties

Congregate living facilities with 16 or fewer individuals are permitted to comply with the requirements for Group R-3.

R-3 Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, or I, including:

Buildings that do not contain more than two dwelling units.
Care facilities ~~as~~ that provide accommodations for five or fewer persons
Congregate living facilities with 16 or fewer individuals**.**

Care facilities for 5 or fewer individuals receiving care that are within a single-family dwellings are permitted to comply with the *International Residential Code* <u>provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or *International Residential Code* Section P2904</u>.

R-4 This occupancy shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a 24 hour basis in a supervised residential environment and receive custodial care. The occupants are capable of self preservation. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Convalescent facilities

Group homes
Halfway houses
Initial stage Alzheimer's facilities
Residential board and custodial care facilities
Social rehabilitation facilities

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This Public Comment revises the reference to construct small I-2 facilities and care facilities housed in a dwelling constructed under the IRC. This Public Comment will continue to allow the smaller facilities to be constructed either as an R-3, or under the IRC. When the IBC is used to construct an R-3, the facility will be equipped with fire sprinklers. And if the option is exercised to build the facility under the IRC, the facility must also be equipped with fire sprinklers. These revisions specify that even though the IRC is used, the facility must still be equipped with fire sprinklers. These occupancies, even though housing less than six occupants, still have the same clientele as the larger occupancy.

In the IBC, the reference to 903.3.1.3 is the appropriate reference and sends the user to NFPA 13D. In the IRC, Section P2904 is the appropriate reference, and Section P2904 can be used to design the fire sprinkler system or it also provides the option to use NFPA 13D.

If a new structure is built, it will be required to be sprinklered. A new facility can be constructed either as an R-3 under the IBC which will require a fire sprinkler system, or as a one-family dwelling under the IRC which will also require a fire sprinkler system is installed. However, many congregate care facilities open and occupy an existing structure. This revision will require that when an existing single family home is used as a small congregate care facility, it will also be sprinklered.

Public Comment 4:

Joe Pierce, Chair, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Further modify proposal as follows:

308.3 (IFC [B] 202) Group I-1. This occupancy shall include buildings, structures or parts thereof for more than 16 *persons* who reside on a 24-hour basis in a supervised environment and receive custodial care. The occupants are capable of self-preservation. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
Initial stage Alzheimer's facilities
Residential board and custodial care facilities
Social rehabilitation facilities

A facility such as the above with five or fewer ~~*persons*~~ <u>residents</u> shall be classified as Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2 <u>provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or *International Residential Code* Section P2904</u>.

A facility such as above, housing at least six and not more than 16 *persons*, shall be classified as Group R-4.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This Public Comment revises the reference to construct small I-1 facilities constructed under the IRC. This Public Comment will continue to allow the smaller congregate care facilities to be constructed either as an R-3, or under the IRC.

When the IBC is used to construct an R-3, the facility will be equipped with fire sprinklers. And if the option is exercised to build the facility under the IRC, the facility must also be equipped with fire sprinklers. These revisions specify that even though the IRC is used, the facility must still be equipped with fire sprinklers. These occupancies, even though housing less than six occupants, still have the same clientele as the I-1 occupancy. The facility is still a Group Home, a Congregate Care Facility, or an Assisted Living Facility, etc.

In the IBC, the reference to 903.3.1.3 is the appropriate reference and sends the user to NFPA 13D. In the IRC, Section P2904 is the appropriate reference, and Section P2904 can be used to design the fire sprinkler system or it also provides the option to use NFPA 13D.

If a new structure is built, it will be required to be sprinklered. A new facility can be constructed either as an R-3 under the IBC which will require a fire sprinkler system, or as a one-family dwelling under the IRC which will also require a fire sprinkler system is installed. However, many congregate care facilities open and occupy an existing structure. This revision will require that when an existing single family home is used as a small congregate care facility, it will also be sprinklered.

In the first line of the paragraph the term "persons" is replaced with the term "residents". This is consistent with the revision in the charging paragraph which refers to the number of persons who reside in the facility. This would not include daytime employees for example.

Public Comment 5:

Joe Pierce, Chairman - Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

[F] 903.2.8 (IFC 903.2.8) Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area.

An automatic sprinkler system installed in accordance with 903.3.1.3 shall be permitted in <u>Group R-3 or R-4</u> congregate residences with 16 or fewer residents. An automatic sprinkler system installed in accordance with 903.3.1.3 shall be permitted in care facilities with 5 or fewer individuals a <u>in</u> single family dwelling.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This code change currently allows all Group R buildings to be protected with a fire sprinkler system design according to Section 903.3.1.3, which is NFPA 13D. The approved code change allowed all congregate residences to use NFPA 13D as the design standard. This Public Comment will limit the application of NFPA 13D fire sprinkler systems to congregate residences when classified as Group R-3 or R-4.

The NFPA 13D standard is only applicable to one- and two-family dwellings. A one- and two-family dwelling is what you will find within the classification of Group R-3 or R-4. The other R occupancies such as R-1 and R-2 cannot be protected with a fire sprinkler system designed according to NFPA 13D.

This Public Comment will allow the reference to appropriately apply to R-3 and R-4 occupancies.

Final Action: AS AM AMPC____ D

G21-09/10

308.2 (IFC 202), 310.1, 310.2, 420.1, 420.2, 420.4 (New), 420.4.1 (New), 420.4.2 (New), 420.4.3 (New), 420.5 (New), 420.5.1 (New), Table 503, 504.2, 508.2.4, 508.3.3, Table 706.4, 710.5, 1006.1, 1107.6.4.1; IFC 903.2.6, 907.2.6.1, 907.5.2.3.3

<u>Proposed Change as Submitted</u>

Proponent: Daniel Purgiel, LRS Architects Inc.

1. Revise as follows:

308.2 (IFC [B] 202) Group I-1. This occupancy shall include buildings, structures or parts thereof housing more than ~~16~~ <u>five</u> persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services. <u>The occupants require physical assistance with evacuation in responding to an emergency situation.</u> ~~The occupants are capable of responding to an emergency situation without physical assistance from staff.~~ This group shall include, but not be limited to, the following:

Alcohol and drug centers
<u>Alzheimer's facilities</u>
Assisted living facilities
~~Congregate care facilities~~
Convalescent facilities
Group homes
~~Halfway houses~~
Residential board and care facilities
~~Social rehabilitation facilities~~

A facility such as the above with five or fewer persons shall be classified as a Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2. A facility such as above, housing at least six and not more than 16 persons, ~~shall be classified as Group R-4.~~ <u>shall meet the requirements for construction as defined for Group R-3, except as otherwise provided in this code or shall comply with the *International Residential Code*, provided the building complies with Section 903.2.6. A facility such as above, where occupants are capable of responding to an emergency situation without physical assistance, shall be classified as Group R-4.</u>

310.1 (IFC [B] 202) Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code* in accordance with Section 101.2. Residential occupancies shall include the following:

R-1 Residential occupancies where the occupants are primarily transient in nature, including:

Boarding houses (transient)
Hotels (transient)
Motels (transient)

Congregate living facilities (transient) with 10 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

R-2 Residential occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

Apartment houses
Boarding houses (not transient)
Convents
Dormitories
Fraternities and sororities
Hotels (nontransient)
Monasteries
Motels (nontransient)
Vacation timeshare properties

Congregate living facilities with 16 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

R-3 Residential occupancies where the occupants are primarily permanent in nature and not classified as R-1, R-2, R-4 or I including:

Buildings do not contain more than two dwelling units.
Adult facilities that that provide accommodations for five or fewer persons of any age for less than 24 hours.
Child care facilities that that provide accommodations for five or fewer persons of any age for less than 24 hours.
Congregate living facilities with 16 or fewer persons.
Adult and child care facilities that are within a single-family home are permitted to comply with the *International Residential Code*.

R-4 ~~Residential occupancies shall include buildings, arranged for occupancy as residential care/assisted living facilities including more than five but not more than 16 occupants, excluding staff.~~ Residential occupancies located in buildings or portions thereof housing more than five persons, excluding staff, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
Residential board and care facilities
Social rehabilitation facilities

Group R-4 occupancies housing 16 or fewer persons, shall meet the requirements for construction as defined for Group R-3 except as otherwise provided for in this code, or shall comply with the *International Residential Code* provided the building is protected by an automatic sprinkler system installed in accordance with Section 903.2.7.

310.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

RESIDENTIAL CARE/ASSISTED LIVING FACILITIES. A building or part thereof housing persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment which provides personal care services. ~~The occupants are capable of responding to an emergency situation without physical~~

~~assistance from staff.~~ The occupants are not bedridden, except during temporary sickness. Occupancy classification is based on the ability of occupants to respond to an emergency situation with or without physical assistance. ~~This classification~~ Residential care/ assisted living facilities shall include, but not be limited to, the following: residential board and care facilities, assisted living facilities, halfway houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug abuse centers and convalescent facilities.

(Definitions not shown are unchanged.)

SECTION 420
GROUPS I-I~~, R-1, R-2, R-3~~ and R

420.1 General. Occupancies in Groups I-1~~, R-1, R-2 R-3~~ and R shall comply with the provisions of this section and other applicable provisions of this code.

420.2 Separation walls. Walls separating dwelling units in the same building, walls separating sleeping units in the same building and walls separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as fire partitions in accordance with Section 709.

Exception: Walls separating dwelling units and sleeping units within Groups I-1 and R-4 occupancies, housing 16 or fewer persons are not required to be constructed as fire partitions.

420.3 Horizontal separation. Floor assemblies separating dwelling units in the same buildings, floor assemblies separating sleeping units in the same building and floor assemblies separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as horizontal assemblies in accordance with Section 712.

2. Add new text as follows:

420.4 Groups I-1 Smoke barriers. Group I-1 occupancies housing more than 16 residents shall be provided with smoke barriers in accordance with Section 710. Smoke barriers shall subdivide every story used by residents for sleeping or treatment into at least two smoke compartments. Each smoke compartment shall have a maximum of 16 sleeping rooms, or 10,500 square feet (976 m^2), whichever is less, and the travel distance from any point in a smoke compartment to a smoke barrier door shall not exceed 150 feet (60 960 mm).

420.4.1 Refuge area. At least 6 net square feet (0.56 m^2) of refuge area per resident shall be provided within the aggregate area of corridors, treatment rooms, or other low hazard common space rooms on each side of each smoke barrier.

420.4.2 Independent egress. A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which means of egress originated.

420.4.3 Horizontal assemblies. Horizontal assemblies supporting smoke barriers required by this section shall be designated to resist the movement of smoke and shall comply with Section 712.9.

420.5 Group I-1 corridors. Group I-1 occupancies shall have an exit access door from dwelling units or sleeping rooms leading directly to a corridor. Corridors in Group I-1 shall be continuous to the exits and separated from other areas in accordance with Section 1018, except areas conforming to Section 420.5.1

Exception: Sleeping rooms and dwelling units with exit doors opening directly to the exterior at ground level shall not be required to have an exit access door leading directly to a corridor.

420.5.1 Group I-1 multipurpose areas. Multipurpose areas directly adjacent to sleeping rooms that are not part of a dwelling unit shall be permitted to be open to the corridor where the following criteria are met:

1. The area shall be under continuous 24 hour supervision by the facility staff;
2. The area is not used as an exit access for more than 16 sleeping rooms;
3. Travel distance within the smoke compartment, where the sleeping rooms and multipurpose areas are located, shall not exceed 75 feet (30 480 mm);
4. The area shall have direct access to an exit or shall exit into a fire-resistance rated corridor in accordance with Section 1018;
5. The area is arranged so as not to obstruct any access to the required exits;

6. The area is equipped with an automatic fire detection system installed in accordance with Section 907.2;
7. The walls and ceilings of the area outside the sleeping rooms are constructed as required for corridors;
8. The area shall be separated from incidental accessory occupancies in accordance with Section 508.2.5; and
9. Doors from the sleeping rooms opening into the area shall not have a required protection rating and shall not be required to be equipped with self-closing or automatic closing devices, but shall provide an effective barrier to limit the transfer of smoke and shall be equipped with positive latching. Roller latches are not permitted.

3. Revised text as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per floor

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HEIGHT (feet) HEIGHT (s)	UL	160	65	55	65	55	65	50	40
I-1[e]	S A	UL UL	~~9~~ 6 55,000	~~4~~ 2 19,000	~~3~~ 1 10,000	~~4~~ 1 16,500	~~3~~ 1 10,000	~~4~~ 1 18,000	~~3~~ 1 10,500	~~2~~ NP ~~4,500~~ NP
R-4	S A	UL UL	~~11~~ 9 ~~UL~~ 55,000	4 ~~24,000~~ 19,000	~~4~~ 3 ~~16,000~~ 10,000	4 ~~24,000~~ 16,500	~~4~~ 3 ~~16,000~~ 10,000	4 ~~20,500~~ 18,000	3 ~~12,000~~ 10,500	2 ~~7,000~~ 4,500

(Portions of Table and footnotes not shown remain unchanged)

504.2 Automatic sprinkler system increase. Where a building is equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum *building height* is increased by 20 feet (6096 mm) and the maximum number of *stories* is increased by one. These increases are permitted in addition to the *building area* increase in accordance with Sections 506.2 and 506.3. For Group R buildings equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum *building height* is increased by 20 feet (6096 mm) and the maximum number of *stories* is increased by one, but shall not exceed 60 feet (18 288 mm)or four *stories*, respectively.

Exceptions:

1. Buildings or portions of buildings, classified as a Group I-1 occupancy, specifically designated or licensed by a state to house residents with Alzheimer's disease in Types IIB, III, IV, or V construction.

~~1.~~ 2. Buildings or portions of buildings, classified as a Group I-2 occupancy of Type IIB, II, IV or V construction.

~~2.~~ 3. Buildings or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.

~~3.~~ 4. Fire resistance rating substitution in accordance with Table 601, Note d.

508.2.4 Separation of occupancies. No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Incidental accessory occupancies required to be separated or protected by Section 508.2.5.
3. Group ~~I-1,~~ R-1, R-2 and R-3 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.
4. Groups I-1 and R-4 occupancies with more than 16 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.

508.3.3 Separation. No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group ~~I-1,~~ R-1, R-2 and R-3 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.
3. Groups I-1 and R-4 occupancies with more than 16 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.

Table 706.4
FIRE WALL FIRE RESISTANCE RATINGS

A, B, E, H-4, I, R-1, R-2, R-4, U	3[a]
F-1, H-3[b], H-5, M, S-1	3
H-1, H-2	4[b]
F-2, S-2, R-3, ~~R-4~~	2

(Footnotes not shown, remain unchanged)

710.5 Openings. Openings in a smoke barrier shall be protected in accordance with Section 715.

Exceptions:

1. In Groups I-1 and I-2, where such doors are installed across corridors, a pair of opposite-swinging doors without a center mullion shall be installed having vision panels with fire-protection-rated glazing materials in fire-protection-rated frames, the area of which shall not exceed that tested. The doors shall be close fitting within operational tolerances, and shall not have undercuts in excess of ¾- inch, louvers or grilles. The doors shall have head and jamb stops, astragals or rabbets at meeting edges and shall be automatic-closing by smoke detection in accordance with Section 715.4.8.3. Where permitted by the door manufacturer's listing, positive-latching devices are not required.
2. In Groups I-1 and I-2, horizontal sliding doors installed in accordance with Section 1008.1.4.3 and protected in accordance with Section 715.

[F] 903.2.6 (IFC 903.2.6) Group I. An automatic sprinkler system shall be provided throughout buildings with Group I fire area.

Exception: An automatic sprinkler system installed in accordance with Section 903.3.1.2 or 903.3.1.3 shall be allowed in Group I-1 facilities, housing 16 or fewer persons.

[F] 907.2.6.1 (IFC 907.2.6.1) Group I-1. An automatic smoke detection system shall be installed in *corridors,* waiting areas open to *corridors* and *habitable spaces* other than *sleeping units* and kitchens. The system shall be activated in accordance with Section 907.5.

Exception~~s~~:

~~1. Smoke detection in habitable spaces is not required where the facility is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

~~2.~~1. Smoke detection is not required for exterior balconies.

[F] 907.5.2.3.3 (IFC 907.5.2.3.3) Groups I-1, ~~and~~ R-1, and R-4. Groups I-1, ~~and~~ R-1, and R-4 dwelling units or sleeping units in accordance with Table 907.5.2.3.3 shall be provided with a visible alarm notification appliance, activated by both the in-room smoke alarm and the building fire alarm system.

Exception: Visible alarm notification appliances are not required in Groups I-1 and R-4 occupancies, housing 16 or fewer persons.

1006.1 (IFC [B] 1006.1) Illumination required. The means of egress, including the exit discharge, shall be illuminated at all times the building space served by the means of egress is occupied.

Exceptions:

1. Occupancies in Group U.

2. Aisle accessways in Group A.
3. Dwelling units and sleeping units in Groups R-1, R-2, ~~and~~ R-3 and R-4.
4. Dwelling units and s~~S~~leeping units of Group I occupancies.

1107.6.4 Group R-4. Accessible Units and Type B units shall be provided in Group R-4 occupancies shall be provided in accordance with Sections 1107.6.4.1 and 1107.6.4.2.

1107.6.4.1 Accessible units. At least 4 percent but not less than one of the dwelling or sleeping units shall be an Accessible unit.

1107.6.4.2 Type B units. In structures with four or more dwelling or sleeping units or sleeping units intended to be occupied as a residence, every dwelling and sleeping unit intended to be occupied as a residence shall be a Type B unit.

Exception: The number of Type B units is permitted to be reduced in accordance with Section 1107.7.

Reason: IBC PERSONAL CARE OCCUPANCY REVISIONS: SUMMARY OVERVIEW OF THE ISSUE

This proposal revises Group I-1 to allow not capable of self preservation residents in facilities that provide personal care services. This reflects the actual conditions that currently occur across the country as is now indicated in a referenced national study. This proposal keeps all not capable of self preservation occupants in the Group I occupancy. The study also shows that there are capable of self preservation personal care uses. This proposal moves the current capable Groups I-1 and R-4 uses exclusively to the R-4. This makes Group R for overnight residential and personal care uses that are capable of self preservation. The smaller 6-16 resident personal care uses (current R-4), and their five current "exceptions" due to size, are now proposed to be made by "exceptions" in the new proposed I-1 and R-4, instead of by a separate occupancy classification.

This following Summary Overview provides background information required to understand why these revisions are proposed. More detailed background information is provided in attachment G- Additional Detailed Substantiation and the other referenced attachments in *(parenthesis and italics).*

Issue:

The IBC Groups I-1 and R-4 are the occupancy designations for personal care. The resident profile requirement in Section 308.2 states that the "occupants are capable of responding to an emergency situation without physical assistance from staff."

The IBC statement above about the types of residents in personal care assisted living, is a central point of reference in the findings of a 130 page national analysis conducted by the State of Hawaii in 2007. The analysis is entitled "Assisted Living Analysis of All State Regulations Relative to Building Codes and Life Safety Codes," hereafter referred to as the study or analysis. Attachments A, B, and D are from the Hawaii analysis. This national review of assisted living resident types and related protection features was conducted to give recommendations to Hawaii on how it should regulate its assisted living. The findings included in the study are also used here to help substantiate the reasons for the proposed changes to the IBC.

The Hawaii Study Is The Only Known In Depth National Review of Assisted Living Relative to These Subjects.

The analysis indicates that assisted living facilities and Alzheimer's facilities have the largest populations in personal care service occupancies. There are approximately 35,000 assisted living facilities in the United States. They are licensed by state governments under similar assisted living licenses in all 50 states, each with their own unique licensure regulations.

The study shows that the current resident profile requirements in the IBC I-1 and R-4 occupancies are exclusively applicable in just 4 states, relative to assisted living. *(See Attachment A-All State Summary Table.)*

The study finds that 51 of the 89 total assisted living categories in all 50 states have residents that require physical assistance with evacuation. The IBC does not currently allow non capable types of residents in its I-1 or R-4 personal care assisted living occupancies, and personal care is not listed in the I-2 occupancy.

The study recommends that the IBC personal care occupancies should be revised to include personal care service assisted living with its actual resident types, while adding more I-2 protection requirements.

It recommends that personal care assisted living not incorporate numerous other I-2 requirements and exceptions for reasons stated later in this summary.

The recommendations in the study also allow for personal care occupancies having capable of self preservation residents as is currently found in the I-1 and R-4 occupancies, closely matching the current R-2 requirements.

The IBC revisions proposed here follow concepts from the Hawaii recommendations and three other states that have created statewide amendments to the IBC, for the same reasons found in the Hawaii study.

Both Federal and Individual State Licensing Requirements Override Current IBC Personal Care Criteria and Requirements

The study shows that approximately 36 states allow Federal Medicaid waivers to allow Medicaid reimbursement to residents in their state's assisted living facilities, bringing other Federal requirements to personal care assisted living. *(See Attachment A-All State Summary Table).* Most of these states and other individual state licensing regulations then add other life safety protection requirements not currently covered in the IBC personal care I-1 and R-4 occupancies. (*See Attachment G-Additional Detailed Substantiation-Protection Feature Sampling of Recent Projects).* The Federal Centers for Medicare and Medicaid Services (CMS) enforce these requirements in many states, similar to what occurs in nursing facilities. This majority of states across the country, under additional enforcement of life safety, allow residents who need evacuation assistance, now further limit wood frame stories, and require full coverage commercial sprinklers and smoke barriers. *(See Attachment C-IBC Revision Summary Table.)*

The current lack of coordination with a majority of state licensing regulations life safety requirements, Federal CMS regulations, and the lack of classification of actual conditions in assisted living in the IBC, cause inconsistent application of the IBC across the country. Assisted living with residents of the same capabilities, and the same number of residents and stories, may be wood frame, have residential sprinklers with no smoke barriers in one city; and be required to be steel frame, have full coverage commercial sprinklers, and have smoke barriers in a nearby city. *(See Attachment G-Additional Detailed Substantiation.)*

Proposal Includes a Broad Spectrum National Approach

Finally, this proposal takes a broad spectrum national approach to personal care service uses, while not emphasizing preferences of one or a few states**.** It deals with the issue that each state has numerous types of these personal care uses and that each state regulates them differently.

This proposal realigns the personal care occupancies to match the actual conditions and variations of occupant capabilities across the country. It will help eliminate the current inconsistent application of the IBC and make the code more consistent with other Federal and state enforced regulations. Once incorporated, the proposed revisions in the IBC will cover the full spectrum of the different types of personal care uses. *(See Attachment B-Elder Care Resident Profile Guide and C-IBC Revision Summary Table.)*

SUMMARY OF CONCEPTS & PROPOSED REVISIONS

A. Proposed Not Capable of Self Preservation Personal Care Requiring Similar Protection Found in Nursing

Most actual personal care assisted living have residents that may not be capable of self evacuation. This revision concept makes the Group I occupancy for those who are not capable of responding to emergencies on their own, and makes the R occupancy for those who are capable of responding on their own. The revision allows the non capable personal care resident type in the I-1. It then revises the I-1 to have similar protection features found in I-2 nursing. This is versus the current I-1 closely matching the current the R-2 resident capability and protection features. The remaining personal care uses that have residents that are capable of evacuation are proposed to be moved to the R-4 occupancy. *(See Attachment C-IBC Revision Summary Table, E-Current IBC Occupancy Requirements Comparison Table, and F- Proposed IBC Occupancy Requirements Comparison Table.)*

These revisions:

Allow residents that may need assistance with evacuation in the I-1 occupancy. (Matching current CMS and a majority of state assisted living regulations.)

Keep the current IBC "personal care" definition the same: Personal care is care of residents that do not require chronic nursing care etc.

Adds the three main applicable protection features from I-2 into the I-1: Further story limitations on wood framing, full sprinklerization (NFPA 13 versus the current NFPA 13R), and smoke barriers providing compartmentalization. (Matching current CMS and a majority of state regulation concepts.)

Changes the I-1 from housing more than 16 to housing over five persons, and then includes “exceptions” for 6 to 16 occupant facilities, instead of making a separate occupancy classification for them.

Includes specially designated Alzheimer’s facilities in I-1 while providing exceptions for corridors and story limitations in the proposed Chapters 4 and 5 for Alzheimer’s facilities. (Aligning with current CMS concepts, matching 47 states that allow Alzheimer’s facilities under assisted living licenses, and matching a majority of state licensing regulations.)

B. **Proposed Not Capable of Self Preservation Personal Care Requiring More Stringent Protection than Nursing**

The State of Hawaii review of all 50 states assisted living regulations showed that personal care assisted living is different from I-2 nursing care. *(See Attachment A-All State Summary Table and G-Additional Detailed Substantiation)*

It showed that all states limit assisted living care to not include nursing care beyond intermittent care which is also consistent with the current IBC personal care definition. All states regulate nursing as another higher level of care not allowed in assisted living.

All states do not allow bedridden residents in personal care assisted living, except due to short term sickness. Residents who are bedridden beyond temporary sickness, or require beyond intermittent nursing care from temporary sickness, are required to be discharged to a nursing facility in all states assisted living regulations.

Assisted living residents are required to participate in fire drills and eventually disperse to a point of safety in case of an emergency in the fire code, in state assisted living regulations, and by most CMS enforced regulations. Nursing facilities are "protect in place," meaning residents are instructed to stay in their rooms and wait for rescue as needed.

Assisted living has generally less required staff to resident ratios than nursing due to assisted living residents generally being more capable of evacuation than nursing residents.

These four criteria differentiate personal care services in assisted living from nursing care, substantiating why it is and should continue to be classified as a different occupancy. These differences then require personal care service occupancies to have some different protection features that the I-2 nursing occupancy does not require. *(See Attachment G-Additional Detailed Substantiation)*

These proposed IBC revisions:

Make corridors in I-1 and R-4 more stringent than in I-2 nursing. The current requirement for protected rated corridors in I-1 and R-4 is maintained in most cases. This is more stringent than the unprotected corridor openings and spaces open to corridors allowed in I-2 nursing in the IBC Chapter 4. Having protected corridors in personal care service assisted living is appropriate because they are not "protect in place" and they have lower staff to resident ratios.

Make smoke barriers in I-1 more stringent than in I-2 nursing. The proposal requires the smoke barrier "compartments" to be smaller in size versus what is allowed in nursing. This effectively reduces travel distance and travel time to reach a point of safety, taking into account slower residents than the general public and less staff than found in nursing.

C. Proposed Capable of Self Preservation Personal Care Requiring Similar Protection Found in Residential Occupancies

The proposed IBC revisions moves current personal care service uses with occupants capable of exiting on their own without physical assistance, to Group R-4. This makes Group R for overnight uses for those that are considered generally capable of self preservation except for short term sickness. This proposal accomplishes the following:

Makes R-4 as fully capable personal care: It moves the current I-1 and R-4 personal care uses that have all residents that can evacuate on their own to the R-4 occupancy. It changes the current R-4 from housing 6 to 16 to housing over five persons. It then includes “exceptions” for 6 to 16 occupant facilities in other sections, instead of making a whole occupancy classification for them. There are only five exceptions for differentiating the current I-1 from the R-4, so combining the two resident counts into one-occupancy is appropriate.

The detailed analysis of the current I-1, R-2 and R-4 shows essentially the same protection features between these occupancies. *(See the Attachment E Current IBC Occupancy Requirements Comparison Table)* The only differences currently between I-1 and R-2 are minor Chapter 5 and 9 differences. There are also currently no differences between the R-2 and R-4 allowable areas and stories. So moving personal care uses that have residents capable of self evacuation such as boarding homes, halfway houses, social rehab, and some assisted living to the general Group R and specifically Group R-4 is appropriate.

D. Proposal Offers Conceptual Differentiation Between Two Letter Group Occupancies

This proposal creates a true conceptual difference between the Group I and R occupancies. It also eliminates the splitting of personal care uses between the Group I (I-1) and Group R (R-4) occupancies, based solely on the number of occupants. That current condition of changing an occupancy letter group (I and R) solely for the number of residents, only occurs in these two occupancies in the code. This proposal changes this previous “number only” split, and now provides a definitive user capability difference between Groups I and R. It makes the general Group I for persons most likely depending on others to exit a building. It creates a capability level order in Group I from limited capability to fully detained occupants:

Group I-1 is revised for non bedridden conscious persons needing limited assistance in exiting a building.

Group I-2 is maintained as a “protect in place” occupancy and for persons who may require full assistance to exit a building, including bedridden and unconscious patients.

Group I-3 is maintained for persons under restraint or security.

Group I-4 is maintained as more of an exception to typical 24 hour Group I, but who’s occupants still most likely require assistance with evacuation.

The proposal then keeps the R for overnight sleeping occupancies for persons generally capable of self preservation. It keeps transient and non transient differences in R, while now also including only capable of self preservation personal care uses.

E. **Other Proposed Assisted Living Substantiations**

The proposed IBC revisions maintain assisted living as I-1 and R-4. It keeps other non-related nursing protection features and exceptions out of these personal care service occupancies. The revisions also more closely match CMS and a majority of states existing additional building protection requirements, while having little or no cost effect.

This proposal accomplishes the following:

Keep sole I-2 requirements in I-2: It keeps exclusive I-2 requirements that are not applicable to personal care, only in I-2 and not in I-1 or R-4 personal care. They include a shorter 200’ general allowable travel distance in the I-2 in Chapter 10, which is offset by the proposed smaller smoke compartment area in the I-1. There are numerous egress width differences required in the I-2 occupancy i.e. 8' corridor, 44" door, .3 egress width, that are all related to bed movement of bedridden occupants in I-2. Bedridden residents are not allowed in personal care assisted living, so those requirements are not applicable to personal care and thus are not proposed here. There is also a structural redundancy requirement for I-2 because it is a protect in place occupancy, which is also not applicable to assisted living personal care. *(See Attachment G-Additional Detailed Substantiation)*

These proposed personal care revised resident type and associated requirements closely match approximately 40 states current state regulations and CMS regulations. Also note that last three editions of the CMS enforced life safety regulations for personal care, used in over half the states, have removed the timing of the resident formulas used in older editions that resulted in over complexity of determining capability of residents. This removal of timing is now just referenced as a guide but is not a determinate of its occupancy classification system anymore. The lack of timing of residents and other proposed changes in the IBC for personal care assisted living are consistent with the requirements already in existence in approximately 29 states through current CMS and other state licensing requirements: allowing assistance with evacuation in a non I-2 type occupancy, NFPA 13 sprinklers, further wood framing story limitations, and smoke barriers. The proposed revisions are also similar with 11 other states current licensing requirements for a total of about 40 states that already include the concepts proposed here. This continuity of requirements create national consistency similar to what already occurs between CMS life safety regulations in nursing and the IBC I-2 requirements. *(See Attachment C-IBC Revision Summary Table and G-Additional Detailed Substantiation)*

Proposal allows occupancy classification options for the variations of personal care around the country: The proposal allows assisted living in the 46 or so states that exclusively have assistance with evacuation or both assistance and no assistance categories, to use all the new appropriately categorized occupancies of I-1 and R-4, versus the current lack of applicable occupancy classifications. This then effectively eliminates the discussions that must now occur as to what IBC occupancy is to be used between the building official, fire marshal, state licensing department, and applicant, when not capable residents are proposed as often occurs.

- The proposal allows the 4 or so states that do not allow assistance with evacuation in personal care assisted living, to keep their regulations essentially the same, and now be classified as a Group R-4 occupancy.
- The 5 or so states assisted licensing regulations that currently require essentially I-2 assisted living exclusively, can continue doing that through their licensing regulations (as currently occurs) or update them to the proposed new IBC format and/ or current similar CMS regulations. It also allows the 10 or so states to have multiple assisted living classifications in the revised IBC due to requiring older CMS regulations or other licensing regulations.
- This seemingly complex issue of personal care occupancy classification is now made simpler for the building code plans reviewer compared to the lack of clarity that often now occurs. These classifications are revised and based on only whether the residents are capable or not capable of evacuation: The permit applicant must still confirm the state licensing agency resident type category and comply with their regulations (usually the Department of Human Services or Department of Health).
- The applicant will initially propose an assumed classification of I-1 or R-4. The submitted set of plans to the building department should also indicate the state license agency category, to confirm in writing that the occupancy classification is correct relative to resident counts and capabilities as defined by the state regulations. The applicant should state on the permit application drawings whether the resident type proposed are capable or not capable of self preservation. The Building Official then makes the final determination of the occupancy classification based on the applicant’s statement, and/or state licensing information provided to the building official. The applicant can also be requested by the building department to quote state licensing requirements of the state licensing regulation definitions on the drawings as now often occurs. This can be accomplished because numerous states write in their regulations whether the residents are capable or not capable of self preservation. If not shown in state licensing definitions, other parts of state licensing criteria indicate capability of residents including but not limited to: the types of facilities allowed, admissions and discharge criteria, or referenced CMS enforced life safety code and their resident capability classifications. This can help prove to the Building Official whether the I-1 or R-4 is the appropriate classification.

Keeps personal care out of I-2. There are advocates for moving personal care to the I-2 occupancy. This is misdirected due to the numerous reasons indicated in the above overview including: assisted living having less than the nursing level of care residents, having less staff to resident ratios, not being protect in place, and nursing having numerous non applicable exceptions and additional protection requirements due to being a protect in place occupancy.

- The major difference though is having less staff to resident ratios in assisted living. Higher staff ratios allows nursing and hospitals to be protect in place and exempt corridor protections, while also adding additional structural redundancy requirements.
- These I-2 advocates also do not recognize that moving non capable personal care to I-2 would cause a non justified increase in construction costs with no relative increased occupant protection: A majority of assisted living facilities are constructed of protected wood frame and many are over one story. Wood frame costs are generally in the $100 to $130 per square foot range for these facilities. Steel frame costs up to 5 stories, are generally in the $130 to $160 per square foot range for the limited number of these facilities built this way. Changing these personal care facilities to I-2 would cause a majority of facilities to be steel frame (I-2 limits

wood frame to 1 story) for little if any protection increases in comparison to the other protection features included in this proposal. This potential construction cost increase of 20% would be an undue burden on the industry. Keeping them in the new proposed I-1 (2 story wood) and R-4 (4 story wood) will have little if any affect on construction costs, especially in the majority of states under current CMS and state regulations with similar story and protection requirements matching this proposal.

Other options for including both capable and non capable personal care, with their different requirements, cause as many or more revised sections to the IBC, but create or do not solve other issues. Keeping personal care in the I-1 and R-4, while delineating capability differences between these two occupancies is the most appropriate occupancy designation solution for dealing with personal care. The following are summaries of numerous options for revising personal care. All the revision options below assume including both capable and non capable personal care while adding new requirements to non capable uses, similar to what is in this proposal. The following summary concludes that this proposal option in this submittal is the best overall long term solution to match actual conditions across the country.

- This proposal option:
  - (+) Makes conceptual I and R use differences with I as not capable and R as capable.
  - (+) Ads new requirements in the revised I-1.
  - (+) Removes the number only split of the current I-1 and R-4.
  - (+) Best long term conceptual revision.
  - (+/-) 22 sections revised.
- Option for making I-1 and R-4 not capable personal care, keeping current number split, and adding capable personal care to R-2:
  - (+) Leaves current I-1 and R-4 mostly in tact with just revising resident type, while adding new requirements.
  - (-) Adds capable personal care list to R-2 and mixes the use with R-2.
  - (-) Leaves the number only split of the current I-1 and R-4.
  - (+) Requires 10-15 revised sections.
- Option for keeping the current capable I-1 and R-4, and adding not capable personal care to I-2:
  - (+) Leaves current I-1 and R-4 in tact.
  - (-) Adds not capable personal care list to I-2 and adds various exceptions for non bed, not protect in place, and lower staff ratio personal care requirements and exceptions to I-2.
  - (-) Limits not capable personal care to one story wood, increasing construction costs.
  - (-) Leaves the number only split of the current I-1 and R-4.
  - (+/-)Requires 15-20 revised sections.
- Option for adding a new not capable personal care occupancy designation number in either I or R (R-5?):
  - (-) Creates a new occupancy
  - (-) Requires 40+ revised sections plus major IFC revisions.

ITEMIZED IBC SECTION REASONS

Section 308.2 is revised to allow residents in Group I-1 that require assistance with evacuation. Residential care/assisted living facilities and other personal care uses that are allowed by individual state licensing regulations to have these types of residents remain in this revised Group I-1.

The previous reference of "assistance from staff" is removed, since assistance can be from staff as was previously mentioned in this section, or from other residents, or from first responders, such as fire department personal. The proposed reference of just "assistance" assumes that assistance with evacuation can be from anyone. Assistance from anyone then places a resident in this category.

The term "not capable of self preservation" is not included as part of the personal care occupancy descriptions since the term is not currently defined in the IBC. The term is currently used in the I-2 and is generally accepted as meaning that an occupant is not capable of self preservation when they are incapable of responding to an emergency situation on their own to exit a building without physical assistance. The current I-1 Section 308.2 clarifies what the implied definition of capable of self preservation is by stating that occupants are capable of responding to an emergency situation on their own without physical assistance. This approach of stating the implied definition versus using the term itself is maintained in the proposed I-1 and R-4 occupancy resident type descriptions to clarify the intent without referencing a definition. The statements in the current I-1 and both the proposed I-1 and R-4, then definitively delineate resident capability classification.

Alzheimer's facilities are also specifically itemized since the Hawaii study showed that 47 states allow these facilities under assisted living licenses. *(See Attachment A-All State Summary Table).* Current CMS regulations also allow these facilities in their non nursing health care regulations. Alzheimer's facilities have additional requirements in the proposed Chapter 5 story limitation revisions. There is also a corridor protection exception to allow the current common "neighborhood" designs for Alzheimer's facilities in the proposed Chapter 4. See those section's "Reasons" for substantiation.

Some other types of uses are removed from the current I-1 list because none of those uses are considered to have occupants that are not capable of self preservation.

Group I-1 is also changed from housing more than 16 to housing over five persons, matching the current I-2 resident count. The "exceptions" for 6 to 16 occupant facilities are listed in other revised sections under I-1, instead of making a separate occupancy classification. The facilities that have residents capable of self evacuation are moved from the current I-1 category to the R-4 category since there are currently only minor differences between the I-1, R-2, and R-4 occupancies. The categories moved to the R-4 include the complete list of uses from the current I-1, since some or all of these types of facilities have residents that are capable of self preservation. They include: Alcohol and drug centers, congregate care facilities, convalescent facilities, group homes, halfway houses, social rehabilitation facilities, and the limited types of assisted living and residential care facilities that require full capability. Clarification of the differences between the I-1 and I-2 is that I-1 facilities only provide "personal care service" as appropriately defined in the current IBC. Personal care services (I-1, R-4) do not provide "chronic convalescent, health, medical or surgical care." The Group I-2 occupancy is the appropriate facility to provide those types of services. *(See Attachment C-IBC Revision Summary Table)*

The last paragraph of this section continues cross-referencing other related occupancies, which now include adding cross-referencing R-3, and referring capable personal care to the R-4 occupancy. Exceptions for complying with construction requirements for R-3 are maintained for facilities with 6-16 residents, including requiring added compliance with Section 903.2.6 (sprinklers), written in the same format as the current R-4 last paragraph description.

Section 310.1 Group R-4 is revised to include personal care facilities, all of which have residents that do not require physical assistance with evacuation, similar to the current I-1. The whole section is re-written to match the current I-1 description. These types of facilities that have residents that are capable of self evacuation are moved from the current I-1 category to the R-4 category since there are currently only minor differences between the I-1, R-2, and R-4 occupancies. The categories moved to the R-4 include the complete list of uses from the current I-1, since some or all of these types of personal care service facilities have residents that are capable of self preservation. They include: Alcohol and drug centers, congregate care facilities, convalescent facilities, group homes, halfway houses, social rehabilitation facilities, and the limited types of assisted living and residential care facilities that require full capability by certain individual state licensing regulations. *(See Attachment A-All State Summary Table)*. *(See Attachment C-IBC Revision Summary Table)*

The number of residents is revised from the current 6-16 to more than five residents. The "exceptions" for 6 to 16 occupant facilities are listed in other revised sections under R-4, instead of making a separate occupancy classification. The last paragraph of this section continues cross-referencing other related occupancies, which now include adding cross-referencing R-3.

Section 310.2 The "Residential Care/Assisted Living" definition is revised to delete the previous resident capability limitation. The revised definition states that occupancy classification is based on the ability of occupants to respond to an emergency situation with or without assistance. The limitation on not allowing assistance with evacuation is now only written into the R-4 occupancy description. The Group I-1 occupancies are revised to allow assistance with evacuation. The definition further adds text that the occupants are non bedridden persons, except during temporary common sicknesses that occur in the general public. This is added to clarify the limitation of personal care versus I-2 nursing care. It is consistent with the current "personal care" definition and current assisted living regulations across the country. See the Summary Overview substantiating the concept reasons for the change. Other aspects of the current definitions remain unchanged, since they reflect current common distinctions in the personal care service industry.

Section 420.1 Group R-4 is added since it is now proposed to be similar to the current I-1 in terms of resident types. The new R-4 requirements mostly parallel the current I-1 requirements.

Section 420.2 The exceptions for 6 to 16 occupant facilities are listed here matching current requirements, instead of making a separate occupancy classification.

Section 420.4 Smoke barriers are added as a requirement in Group I-1 occupancies with over 16 residents. They are added to I-1 due to the abilities of the new proposed resident type allowed and to match already existing CMS and state licensing regulations in a majority of states.

The section utilizes similar language and format from the current I-2 Section 407 for smoke barriers. This proposed section provides smoke barrier size and travel distance requirements that are more restrictive than the Group I-2 requirements. These limits, compared to I-2 smoke compartment size, are proposed because of the probability of less staff in personal care occupancies to assist in evacuation when compared to nursing. Smaller smoke compartments and shorter travel distance assumes less time to reach a point of safety from the compartment of origination. The proposed revisions limit the size of smoke compartments to 16 sleeping rooms, or 10,500 square feet, whichever is less, versus the 22,500 square feet allowed in I-2. The proposed limit is taken from the basic Group I-1 exceptions for over 16 occupant criteria throughout the code, or 10,500 square feet, the basic allowable area allowed in the I-1 occupancy. There are four states that have statewide amendments to the IBC for personal care implementing the overall concepts in this proposal. The State of Oregon and Hawaii statewide building code amendments reduce smoke compartment size in their non capable personal care occupancies to the approximately the size proposed here. Oregon has over a twenty year history of amendments for personal care occupancies with residents who are not capable of self preservation, including reduced smoke compartment size.

The use of the term "sleeping room" is included so not to mix the more limiting Chapter 10 occupant load calculations into this requirement. The concept is that actual sleeping rooms will be counted. The travel distance will additionally control the size. The reduction from the I-2 travel distance of 200' is reduced in the I-1 by 25 percent to 150'. This reduction is also based on the probability of less staff to assist residents in personal care during evacuation.

(See Attachment C-IBC Revision Summary Table)

Section 420.4.1 The added refuge area requirement utilizes wording matching the current I-2 Section 407.4.1.

Section 420.4.2 The added Independent egress requirement utilizes wording matching the current I-2 Section 407.4.2.

Section 420.4.3 The added Horizontal assembly requirement utilizes wording matching the current I-2 Section 407.4.3.

Section 420.5 is added to confirm that corridors are required in I-1 occupancies and to provide a scoping statement for the multipurpose areas next to sleeping room exception in lieu of corridors proposed in the new following Section 420.5.1. The language in this Section 420.5 is derived from the same scoping language requiring corridors in I-2 in Section 1014.2.2, then introducing the "suite" exception in the next Section 1014.2.3.

Section 420.5.1 is added to allow "neighborhood designs" often seen in many Alzheimer's facilities. These designs often have 10 to 16 sleeping rooms open into a common shared living, activity, and dining area. Many facilities currently using this design layout use the accessory provisions allowed in the exit access intervening room requirements in Chapter 10, or use Section 407 exceptions if classified as the I-2 occupancy. These proposed provisions utilize concepts and wording from the spaces open to corridor provisions for nursing in found Section 407.2.3.

The intent here is to allow these neighborhood designs when there are only sleeping rooms that open into the spaces as found in Alzheimer's facilities. Typical assisted living units that have their own bathroom, kitchenette, and living rooms, are dwelling units so they are excluded from utilizing this exception. They are not included in this exception due to a self contained dwelling unit not requiring a common shared living, eating and activity area just outside a sleeping room. The key controlling requirement of this exception to corridor protection is the size of the compartment by the further limiting travel distance to 75' within that smoke compartment. This affectively limits travel time before reaching the required protection areas outside the compartment. The 16 sleeping room limit is derived from the maximum number of sleeping rooms allowed in a smoke compartment in the proposed Section 419.4. Other controlling features are from Section 407.2.3.

Table 503 IBC Table 503 is proposed to be revised to reflect changes to the definitions and resident type in the revised Group I-1 occupancy:

The proposed I-1 basic allowable areas remain with the same limits as the current I-1.

There are revised limitations on the number of stories allowed that reflect current Federal CMS limits on these occupancies. *(See Attachment D Areas & Height Table)*

Approximately 36 states reference Federal CMS regulations for their assisted living occupancies, so general continuity between CMS enforced regulations and the IBC should occur. The revisions to the story limitations show a variance from one to three stories. The two story limitation in Type VA construction, also match California's IBC statewide amendments to the story limitations for its similar occupancy. California's state amendments also match other key protection features of CMS board and care regulations. *(See Attachment C-IBC Revision Summary Table)*

The two story limitation for up to one hour wood protection matches current CMS requirements and is appropriate for this occupancy due to the type of residents. These occupants are expected to be able to evacuate the building with or without assistance in case of emergencies. They are not bedridden as in I-2 nursing, (with one story limits), and with the I-2 occupants that may stay in place during emergencies in a "protect in place" occupancy. This further substantiates the difference in Group I-1 two-stories versus the Group I-2 one story. There are already numerous existing two story wood frame assisted living facilities. This will allow these existing facilities to continue to be in compliance.

Type IIA with fire sprinklers allows three stories. This matches the Federal CMS limits.

Type IB is allowed seven stories with fire sprinklers, half way in between the current I-1 and I-2 limits, with two more stories than the current I-2 limits. Type IB construction contains the most differences between various versions of CMS and other state enforced regulations. This proposal is an average of the difference between Federal CMS regulations and Group I-2.

Table 503 is revised for the new Group R-4 to match the current Group I-1, being that the current I-1 is essentially moved to the new R-4. The revisions here are more clerical revisions than actual revisions because of moving the current I-1 occupancy to the R-4.

Section 504.2 Exceptions. Most Group I-1 and all Group R-4 occupancies are still allowed the sprinkler increase of one story and 20 feet in height from Table 503 by the base scoping language of the unrevised Section 504.2. Group I-1 occupancies with specifically designated Alzheimer's facilities are added to the exceptions for not being allowed the sprinkler story and height increases in Type IIB, III, IV, or V construction, similar to the current I-2 exception. The wording of the phrase includes the text "specifically designated or licensed by a state" to clarify that these are specially designated facilities licensed by most state Department of Human Services or Department of Health. This text is included to exclude applying the exception to assisted living facilities that may have some residents with dementia and early Alzheimer's disease as occurs in many assisted living facilities. The exception is only intended for exclusively designated Alzheimer's facilities, due to the likelihood of all residents not being capable of self preservation.

This is an additional requirement for these facilities matching the story limitations of wood frame construction of the I-2, which most jurisdictions have categorized Alzheimer's facilities in the past. The revision affectively keeps Alzheimer's facilities with all the appropriate I-2 protection features except for non applicable protect in place and bedridden requirements. This is a practical exception versus placing these facilities in the I-2 occupancy, which would cause additional exceptions for Alzheimer's facilities due to the additional and reduced protection features required in the I-2 as stated in the Summary Overview. The State of Hawaii study also shows that Alzheimer's facilities are allowed with a special license in 47 state assisted living regulations. So keeping them in the same I-1 occupancy with the additional I-2 protection features, making them almost equivalent to I-2 protection, is appropriate.

The limitation of occurring on the first story in combustible and non protected construction is proposed because numerous state assisted living regulations and states using older CMS life safety codes limit these facilities to the first story in these construction types. (The last three editions of CMS enforced life safety code does allow two stories though.) The first story limitation is appropriate though mostly due to the likelihood that few if any of an exclusive Alzheimer's facility's residents have the capability of responding to an emergency on their own. This is compared to non Alzheimer's assisted living facilities proposed to be allowed to be two stories in height. These proposed two story types of assisted living facilities have fewer to substantially fewer occupants requiring assistance with evacuation.

Section 508.2.4 is revised to reflect the revisions to the I-1 and R-4 occupancies, now incorporating more than 5 residents. Group I-1 and R-4 are moved to number 4 of this section to cover the 16 resident exceptions for both occupancies. The exception for 16 and under residents in I-1 and R-4 occupancies is added to maintain current requirements found in the similar current R-4. This is proposed versus making a whole new occupancy classification based only on the number of residents. The revisions here are more clerical revisions than actual revisions because of revising resident counts in the I-1 and R-4.

Section 508.3.3 is revised to reflect the revisions to the I-1 and R-4 occupancies now incorporating more than 5 residents. Group I-1 and R-4 are moved to number 4 of this section to cover the 16 resident exceptions for both occupancies. The exception for 16 and under residents in I-1 and R-4 occupancies is added to maintain current requirements found in the similar current R-4. This is proposed versus making a whole new occupancy classification based only on the number of residents. The revisions here are more clerical revisions than actual revisions because of revising resident counts in the I-1 and R-4.

Table 706.4 is revised to reflect the revisions to the R-4 occupancy, being that the current I-1 is essentially moved to the new R-4 while now incorporating more than 5 residents. The revisions here are more clerical revisions than actual revisions because of essentially moving the I-1 to the R-4.

Section 710.5 is revised to include cross corridor doors in the new required smoke barriers in Group I-1, matching the same exceptions allowed for I-2. This exception matches current CMS requirements.

Section 903.2.6 is revised to require full NFPA 13 sprinkler coverage in the I-1 occupancy when housing over 16 residents. This is proposed to reflect that the new I-1 residents may require physical assistance to evacuate. The exception is revised to allow NFPA 13R in smaller facilities versus creating a whole new occupancy classification for them for the few exceptions. The requirements also match current CMS and state assisted living regulations in a majority of states. *(See Attachment A-All State Summary Table and C-IBC Revision Summary Table)*

Section 907.2.6.1 is revised to eliminate the exception for eliminating automatic smoke detection when sprinklers are provided. This proposal requires smoke detection even with sprinkler exceptions to reflect that the new less capable I-1 resident type.

Section 907.5.2.3.3 is revised to match the current I-1 and current R-4 requirements. Group R-4 is added because it is now proposed to match the current I-1 in resident capability but not in resident counts. The exception is added to match current R-4 not requiring visible alarms when there are 16 or less residents. The exception for 16 and under residents in I-1 and R-4 occupancies is added to maintain current requirements found in the similar current R-4. This is proposed versus making a whole new occupancy classification based only on the number of residents. The revisions here are more clerical revisions versus technical requirement changes solely due to moving the current I-1 to the new R-4 occupancy and changing resident counts in the occupancies.

Section 1006.1 is revised to match the current I-1 and new R-4 requirements. Group R-4 is added because it is essentially moved from the current I-1. Dwelling units are added in Group I because some I-1 uses have dwelling units, making them consistently exempt.

Section 1107.6.4 is revised to match the current I-1 with the new R-4 requirements. The revisions are clerical revisions versus technical requirement changes solely due to moving the current I-1 to the new R-4 occupancy and changing resident counts in the occupancies.

Cost Impact: The code change proposal will not increase the cost of construction due to current enforcement of similar requirements by other regulations such as CMS and state licensing regulations.

Personal Care "Assisted Living" Regulations and NFPA/ IBC References

State ALF [1,2]	Evacuation Criteria	Type of Facility	No of Residents	Alzheimer Residents Allowed	Admission / Discharge Criteria					Referenced NFPA Codes [2, 6]			Referenced IBC [6] Occupancy	
					Evacuation Capability [3]	Ongoing Nursing Care Allowed	Bedridden Allowed	Beyond Facil. Capabilities	Other	NFPA Referenced	NFPA Occupancy Type	Other 4, [6]	IBC Adoption & Stated IBC Occupancy	Assumed 16+ Res. IBC [6,7, 8]
Washington (M) (AFH)		Adult Family Home Level 1:	1-6 adults	No	Self-evacuate required	Limited intermittent	14 days max	Discharge	Unable to self-evacuate	IFC	1-2 Family Dwelling		S	
		Adult Family Home Level 2:	1-6 adults	No	AEA	Limited intermittent	14 days max	Discharge	Continuous or skilled care	IFC	1-2 Family Dwelling			I-1, I-2
		Adult Family Home Level 3:	1-6 adults	Yes	Impractical to evacuate	Limited intermittent	14 days max	Discharge	Continuous or skilled care	IFC		NCSP		
	AEA Y	Boarding Home: Same 3 levels of care	7+ adults	No level 1&2, Yes level 3	Same 3 levels as AFH	Limited intermittent	14 days max	Discharge	Continuous or skilled care	IFC		sprinklers required		
West Virginia		Legally Unlicensed Health Care Home - Class I	1-3 adults	No		Limited intermittent	Y if licensed	Discharge	Ongoing or extensive nursing care	NFPA 101, 20003 edition	1-2 Family Dwelling		S	
	AEA Y	Assisted Living Residence - Class II:	4+ adults	Yes w/special license		Limited intermittent	Y if licensed	Discharge	Ongoing or extensive nursing care	NFPA 101, 20003 edition			IBC	I-1, I-2
	AEA X	Residential Care Community - Class III	17+ adults	No	Self-evacuation required	Limited intermittent	No	Discharge	Unable to self-evacuate	NFPA 101, 20003 edition			IBC	
Wisconsin (M) (CBRF)	**AEA X**	Community Based Residential Facilities - Class A	5+ adults	No	Self-evacuate required	3hr/wk, 90 day max	No	Discharge	Ongoing nursing care	NFPA 101	Based on evacuation ability & time	NFPA 13D & 13R	S	I-1, I-2
	AEA Y	Community Based Residential Facilities - Class C	5+ adults	Yes w/special license	AEA	3hr/wk, 90 day max	90 day max	Discharge	Ongoing nursing care	NFPA 101	and number of beds	NFPA 13		
Wyoming		Assisted Living Facility - Small:	1-8 adults	No	Self-evacuation required	Limited intermittent	No	Discharge	Several health conditions	NFPA 101, 2000 edition	Residential Board & Care, Prompt		J	
	AEA Y	Assisted Living Facility - Large:	9+ adults	No	AEA - Cueing Only	Limited intermittent	No	Discharge	Several health conditions	NFPA 101, 2000 edition	Resid. Board & Care - Prompt & Slow		2003 IBC	I-1, I-2
	AEA Y	Assisted Living - Large:	9+ adults	Yes	Impractical to evacuate	Limited intermittent	No	Discharge	Several health conditions	NFPA 101, 2000 edition	Limited Care		2003 IBC	
Totals **Medicaid Waiver allowed in 36 States**	**AEA in +/- 46 States** **Y in +/- 35 States X in +/- 15 States**	**<u>Assisted Living or Similar</u>** **Allowed in <u>50 States</u>**		**<u>Alzheimer's</u>** **Allowed in <u>+/- 47 States</u>**	**AEA in +/-37 States**	**Limited Nursing** **Intermittent for 45-90 days max. allowed in <u>+/- 50 States</u>**	**Short term Bedridden up to** **7 - 45 days max. allowed in <u>+/- 21 States</u>**			**NFPA 101** **referenced in <u>37 States</u>**	**NFPA and it's** **Board & Care, and Limited Care Occupancies referenced in +/- <u>28 States</u>**		**IBC used in 50 States** **26 states adopt (S)Statewide 24 states adopt by each (J) Jurisdiction IBC Referenced in 10 state assisted regulations**	**I-1 in +/- <u>4 States</u>** **I-2 in +/- <u>14 States</u> I-1 & I-2 in +/- <u>32 States</u>**

FOOTNOTES

1. If no Assisted licensing category exists in a particular State, the closest category is listed. See more detailed description in "Assisted Living Occupancy Criteria Analysis by State."
2. **(M)** Indicates Medicaid Waiver is allowed in State.
3. **AEA:** Assistance with Evacuation Allowed is specifically stated. **NCOSP:** (Not) Capable of Self Preservation
4. **Y:** NFPA resident criteria allowed with its wood construction and limitation on wood stories. No limitation of location of residents on first floor when requiring assistance with evacuation is stated.
5. **X:** Self evacuation or nursing design is required, or location of residents on first floor is required when requiring assistance with evacuation is stated.
6. **IBC**: International Building Code, **NFPA:** National Fire Protection Association, **IFC:** International Fire Code.
7. Assumed base IBC Occupancy classification as determined by this analysis without any individual State amendments or interpretations.
   If "unable to evacuate" is a criteria for discharge, then IBC I-1 (Assisted Living) is the assumed IBC classification under this analysis.
   If "unable to evacuate" is not a criteria for discharge, and assistance with evacuation is allowed, only when noted, then the interpretation by this analysis under the IBC is that the occupancy classification would be I-2 (Nursing "not capable of self preservation" i.e. resident cannot get out on their own).
   If continuous nursing is allowed, and unable to evacuate are not marked, then it is assumed that all facilities would fit into the I-2 occupancy under this analysis.
   If Alzheimer's care is allowed then I-2 occupancy is the assumed designation under this analysis.
   If NFPA Residential Board and Care is referenced, then "prompt" is assumed to be I-1, and "slow" and "impractical" are assumed as I-2.
   <u>Assumed</u> IBC occupancy is stated because the personal care/ assisted living occupancy is not listed as part of the IBC I-2 occupancy.
8. Where noted, most likely 2 occupancies are assumed to be used in the State dependent on "Level of Care," or whether Alzheimer's residents allowed in special licensed units.

ATTACHMENT B (From the State of Hawaii Analysis)

ELDER CARE RESIDENT PROFILE GUIDE TABLE [1]				
Retirement/ Apartments	**Assisted Living**			**Skilled Nursing**
Independent	**Minimum Assistance**	**Standby Assistance**	**Hands-on Assistance**	**Total Assistance**
IBC: R-2 [2]	**IBC: I-1 [2]**	**IBC: I-2 [2]**	**IBC: I-2 [2]**	**IBC: I-2 [2]**
NFPA: Apartments[2]	**NFPA: Board & Care[2]**	**NFPA: Board & Care[2]**	**NFPA: Board & Care[2]**	**NFPA: Health Care[2]**
Able to respond independently in an emergency	Able to respond in an emergency	May need assistance in an emergency	Needs assistance in an emergency	Needs supervision and hands-on assistance in an emergency
Able to negotiate stairs in an emergency and exit the building	Walks/transfers independently - infrequent falls	Transfers - Standby assistance may be needed	Transfers- 1 person assist usually needed, and fall risk	Transfers - 2 person assist may be needed/Mechanical lift/bedfast
ADL (Acts of Daily Living)- Resident is able to accomplish all without assistance from staff	ADL - Independent to verbal reminders	ADL - Reminders to giving verbal cues	ADL - Verbal cues and/or hands-on assistance	ADL - Hands-on assistance
Transfer & ambulate. Eats and takes medications	Independent with medications & Dr. appointments	Medication reminders and management	Medication management	Medication adjustments and behavior management
Capable of own toileting and personal hygiene	Continent of bowel and bladder	Occasional incontinence assistance	Incontinence management	Incontinence management
Bathes, dresses, grooms	Independent in bathing	Bathing set up and monitoring	Bathing assistance	Bathing assistance
Meals/housekeeping, provide if chosen. No personal care assistance or monitoring	Meals, nutrition and housekeeping assistance is helpful	Meals, nutrition and housekeeping assistance is helpful	Meals, nutrition and housekeeping assistance is helpful	Verbal cues and hands-on assistance to eat
Would benefit from socialization and activities with minor encouragement	Able to independently plan and participate in social activities	Reminders and encouragement to participate in activities	Encourage and escort to participate inactivities	Encourage and escort to activities
No memory impairment	Little memory impairment	Mild memory impairment - sometimes disoriented	Impaired memory, poor orientation and mild confusion	Needs 24 hour nursing supervision or skilled services such as physical, occupational and/or speech therapy
Capacity for decision-making and understanding consequences	Some decline in capacity for self care and understanding consequences of actions	Declining capacity for self care and understanding consequences	Limited capacity and inability to understand consequences of actions	Limited or no capacity for self care and understanding of consequences of actions
Family does not "need" to move	Family "slightly concerned"	Family "concerned"	Family "very concerned" -"Have to do something"	Family must do something

1. Based on and edited from Nevada Elder Care Assisted Living Guidelines.
2. This analysis assumed occupancy designations from the 2006 IBC and 2003 NFPA 101.

(From the State of Hawaii Analysis)

Specific Criteria of Self-Preservation:
There are very specific details of the ability of occupants of a building to be “capable of self-preservation.” NFPA and its codes and guides outline very specific details of this topic. The NFPA 101A Guide on Alternative Approaches to Life Safety (2001 Edition) is referenced and summarized here to underscore the many details of self-preservation.

Chapter 6 of the NFPA defines variations of capabilities of occupants for Residential Board and Care occupancies. This is the most important aspect of determining if a building should have additional life safety elements incorporated into its design, therefore the topic is discussed in detail here. This NFPA Chapter 6 reviews capability and then offers calculation tables to determine occupant's ability of self-preservation. The review below summarizes some specific points of this NFPA Chapter 6. It then assumes the determination of self-preservation at the end of each category in *italics.*

Risk of Resistance

Some residents may resist leaving the building during an emergency situation. "Minimal risk" indicates that there is no specific evidence to suggest that the resident might resist an evacuation.

"Mild resistance" indicates that there is specific evidence that the resident had previously resisted instructions from staff or may have hidden from the staff and then might resist leaving the building in a situation similar enough to a fire emergency. "Strong resistance" includes resistance by the resident who necessitates the full attention of one or more staff members. The resident may have struggled vigorously, refused to cooperate, or has hidden in similar fire situations to predict that behavior recurring in an actual emergency.

Residents who show mild and strong resistance are considered not capable of self-preservation.

Impaired Mobility

The resident is rated according to how easily he can leave a building "given the presence of factors such as physical barriers that hinder movement (e.g. stairs), the resident's ability to get out of bed, or the chairs normally used. The resident should be given credit for being able to use devices that aid movement (e.g., wheelchairs, walkers, crutches, and leg braces) only if those devices are always available in an emergency situation….Guiding or directing the resident by giving gentle pushes or leading by the hand is not considered requiring physical assistance."

"Self starting" means a resident is physically able to start and complete an evacuation without physical assistance.

"Slow" is when the resident prepares to leave and travels to the exit or area of refuge at a speed significantly slower than the general population. The NFPA classifies the general
population as "prompt," meaning they can reach an exit (point of safety or area of refuge) within approximately 3 minutes. The NFPA categorizes a resident as being "slow" if it takes the resident more than 90 or 180 seconds to travel from a sleeping room to an exit, point of safety, or area of refuge. NFPA describes "very slow" as requiring over 150 seconds to reach an exit.

Residents who are self starting and slow or very slow are considered being capable of self-preservation. Residents who are not self starting and are considered beyond slow are not capable of self-preservation.

"Needs limited assistance" means "that the resident might need some initial or brief intermittent assistance but can accomplish most of the evacuation without assistance." The residents may require help getting into a wheelchair, descending stairs, getting out of bed, or opening a door, for example.

"Needs full assistance" means the resident either needs physical assistance from a staff member during most of the evacuation or must be assisted by staff by being carried from the facility, helped into the wheelchair and wheeled out of the facility, or helped into leg braces and helped to descend stairs.

Residents who require limited and full assistance are considered not capable of self-preservation.

Impaired Consciousness

The resident has experienced seconds or minutes of temporary impairment of consciousness over six times during the previous three months. The resident is only classified this way if the impairment would significantly interfere with his or her ability to exit the building. Temporary medical problems are also not counted in this definition. "Partially" impaired consciousness means the resident is still able to participate in an evacuation to some degree. "Totally" impaired consciousness means the resident needs full assistance by at least one staff member to evacuate out of a building.

Residents who are partially or totally impaired are considered not capable of self-preservation.

Need for Extra Help

The resident may need assistance in various circumstances from more than one staff to egress a building, whether to initially get out of bed or other individual actions or if the resident requires assistance during the duration of exiting the building.

Response to Instructions

This is the resident's ability to receive, comprehend and follow through with simple instructions during a self directed evacuation. Residents may require non constant "supervision, considerable attention, or might not respond during an evacuation."

Residents who need extra help or require supervision, considerable attention, or might not respond during an evacuation are considered not capable of self -preservation.

Waking Response to Alarm

Buildings with non-centralized alarm systems, residents who are on medication that inhibits responses to alarms, residents who have apparent hearing impairment (unless they are in a room with visual alarms), or if hearing aids are removed during the night, or residents who are exceptionally sound sleepers are all considered as "response not probable" to responding to an alarm.

Residents who are not probable to responding to an alarm are considered not capable of self-preservation.

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Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee acknowledged the proponent's effort to provide clarity to these regulations, but felt that the restructuring of the Group I-1, I-2 and R-4 occupancies to be unclear. There was concern that the resulting reductions in Table 503 were not justified. They found the additional provisions proposed in Section 420 to be confusing as to how they would be applied. The proposed smoke compartments are small and did not seem coordinated with other portions of the proposal.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Daniel Purgiel, LRS Architects Inc. and Tom Jaeger, Jaeger & Associates, LLC, representing American Health Care Association (AHC), American Association of Homes & Services for the Elderly (AAHSA), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1. Revise as follows:

308.2 (IFC [B] 202) Group I-1. This occupancy shall include buildings, structures or portions thereof housing more than 16 persons on a 24 hour basis who because of age, mental disability or other reasons, live in a supervised environment that provides *personal care services* ~~The occupants are capable of responding to an emergency situation without physical assistance from staff.~~ Occupants are either capable or incapable of self preservation.

I-1 A facility with occupants receiving personal care that are capable of self preservation, ~~This group~~ shall include, but not be limited to, the following:

Alcohol and drug centers
~~Assisted living facilities~~
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
~~Residential board and care facilities~~
Social rehabilitation facilities

I-1 Incapable. A facility with occupants receiving personal care that are incapable of self preservation, shall be classified as a Group I-1 Incapable condition and shall comply with the additional requirements of Group I-Incapable. This group shall include, but not be limited to, the following:

Assisted living facilities
Residential board and care facilities

A facility such as the above with five or fewer persons shall be classified as a Group R-3 or shall comply with the International Residential Code in accordance with Section 101.2. A facility such as above, housing at least six and not more than 16 persons, shall be classified as Group R-4.

2. Add new text as follows*:*

308.3.1 (IFC [B] 202) Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

INCAPABLE OF SELF PRESERVATION. Persons because of age, physical limitations, mental limitations, chemical dependency or medical treatment cannot respond as an individual to an emergency situation.

(Definitions not shown are unchanged.)

3. Revise as follows:

310.2 (IFC [B] 202) Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

RESIDENTIAL CARE/ASSISTED LIVING FACILITIES. A building or part thereof housing persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment which provides personal care services. The occupants are either capable or incapable of self preservation. ~~of responding to an emergency situation without physical assistance from staff.~~ This classification shall include, but not be limited to, the following: residential board and care facilities, assisted living facilities, halfway houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug abuse centers and convalescent facilities.

(Definitions not shown are unchanged.)

SECTION 420
GROUPS I-I, R-1, R-2, R-3

420.1 General. Occupancies in Groups I-1, R-1, R-2, and R-3 shall comply with the provisions of this section and other applicable provisions of this code.

420.2 Separation walls. Walls separating dwelling units in the same building, walls separating sleeping units in the same building and walls separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as fire partitions in accordance with Section 709.

420.3 Horizontal separation. Floor assemblies separating dwelling units in the same buildings, floor assemblies separating sleeping units in the same building and floor assemblies separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as horizontal assemblies in accordance with Section 712.

420.4 Smoke barriers in Group I-1 Incapable. Smoke barriers shall be provided in Group I-1 Incapable facilities to subdivide every story used by occupants receiving care into a minimum of two smoke compartments. Such stories shall be divided into smoke compartments with an area of not more than 22,000 square feet (2092 m^2) and the travel distance from any point in a smoke compartment to a smoke barrier door shall not exceed 200 feet (60 960 mm). The smoke barrier shall be in accordance with Section 710.

420.4.1 Smoke compartment areas. Smoke compartment areas shall be used for relocation of occupants as part of building evacuation in a fire emergency. At least 15 net square feet (1.4 m^2) shall be provided per occupant receiving care within the aggregate area of corridors, lounge or dining areas and other low hazard areas on each side of each smoke barrier, for the total number of occupants in adjoining smoke compartments.

420.4.2 Independent egress. A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which means of egress originated.

420.4.3 Horizontal assemblies. Horizontal assemblies supporting smoke barriers required by this section shall be designated to resist the movement of smoke and shall comply with Section 712.9.

504.2 Automatic sprinkler system increase. Where a building is equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum *building height* is increased by 20 feet (6096 mm) and the maximum number of *stories* is increased by one. These increases are permitted in addition to the *building area* increase in accordance with Sections 506.2 and 506.3. For Group R buildings equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum *building height* is increased by 20 feet (6096 mm) and the maximum number of *stories* is increased by one, but shall not exceed 60 feet (18 288 mm)or four *stories*, respectively.

Exceptions:

1. Buildings or portions of buildings, classified as a Group I-1 Incapable or I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire resistance rating substitution in accordance with Table 601, Note d.

710.5 Openings. Openings in a smoke barrier shall be protected in accordance with Section 715.

Exceptions:

1. In Group I-1 Incapable and Group I-2, where such doors are installed across corridors, a pair of opposite-swinging doors without a center mullion shall be installed having vision panels with fire-protection-rated glazing materials in fire-protection-rated frames, the area of which shall not exceed that tested. The doors shall be close fitting within operational tolerances, and shall not have undercuts in excess of ¾- inch, louvers or grilles. The doors shall have head and jamb stops, astragals or rabbets at meeting edges and shall be automatic-closing by smoke detection in accordance with Section 715.4.8.3. Where permitted by the door manufacturer's listing, positive-latching devices are not required.
2. In Group I-1 Incapable, and Group I-2, horizontal sliding doors installed in accordance with Section 1008.1.4.3 and protected in accordance with Section 715.

[F] 903.2.6 (IFC 903.2.6) Group I. An automatic sprinkler system shall be provided throughout buildings with Group I fire areas.

Exception: An automatic sprinkler system installed in accordance with Section 903.3.1.2 or 903.3.1.3 shall be allowed in Group I-1 facilities, other than those classified as Group I-1 Incapable.

[F] 907.2.6.1 (IFC 907.2.6.1) Group I-1. An automatic smoke detection system shall be installed in *corridors,* waiting areas open to *corridors* and *habitable spaces* other than *sleeping units* and kitchens of Group I-1 occupancies. The system shall be activated in accordance with Section 907.5.

Exception~~s~~:

1. For buildings other than those classified as Group I-1 Incapable, s ~~S~~moke detection in habitable spaces is not required where the facility is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Smoke detection is not required for exterior balconies.

Commenter's Reason: GENERAL SUMMARY OF G21 SUBSTITUTION & MODIFICATION:
This modified and simplified G21 completely substitutes the original G21. It reflects the actual resident types that currently occur nationally and creates associated requirements already enforced across much of the country by individual state regulations. This background information and substantiation was referenced in the original G21 proposal. The modified G21 will bring more consistency to enforcement of the variety of Group I-1 uses.

The revised G21 is a response to the Baltimore hearings committee and public comments to the original G21 proposal. This revised proposal simplifies the original G21 substantially:

It leaves the number counts unrevised: I-1: >16/ R-4: 6-16 occupants.

It revises Group I-1 to allow both capable and incapable occupants versus the current only capable occupants.

It adds only to a new Group I-1 Incapable occupancy condition four more restrictive requirements: smoke barriers, story limitations, increased NFPA 13 sprinkler protection, and additional smoke detection.

The Group R-4 use definition is changed to allow either capable or incapable occupants. Group R-4 still matches what most states currently enforce even with capable and incapable residents in protection, story, and sprinkler requirements.

The modified G21 can also align and mix easily with the relative proposed revisions in the G20 if both are approved, since only three of the G21 sections would require integration with the correlating G20 sections.

This proposal also shows that the new Group I-1 Incapable categorization is appropriately more protective than having the use in the Group I-2 occupancy as some prefer.

It shows in the following table analysis that this revised Group I-1 Incapable still has appropriate corridor protections, smoke detection, and smoke alarms, which Group I-2 does not include. It shows that there are seven sections in the new Group I-1 that are more stringent than I-2, versus only three IBC sections in Group I-2 that are more stringent than the proposed I-1 Incapable requirements.

It also shows that I-1 assisted living normally have less staff to resident ratios than Group I-2, which is why assisted living requires a higher level of safety to compensate for these lower staff levels.

The new "Group I-1 Incapable" condition includes smoke barriers which provide an additional protective separation for occupants from a fire event. They provide temporary protection for occupants that require assistance from others to eventually reach an exit in an emergency. These Group I-1 facilities still complete building evacuation and residents participate in fire drills, which is consistent with the current International Fire Code. This is versus the "defend in place" concept of Group I-2.

The table below shows the differences of the two occupant types, staffing ratios and compares protection features based on those similarities and differences. The table is based on the original G21 referenced national Hawaii study on assisted living.

G21: INCAPABLE Personal Care to Health Care Comparisons LEGEND: (+ +) = New G21 Change or Requirement / Grey Fill = MORE Protection Required		
I-1 Incapable-Personal Care-Assisted Living **I-1: >16 Slower / Incapable** **R-4: 6-16 Slower / Incapable** **Conscious/ Evacuate with Assistance**		**I-2 Health Care-Nursing** **I-2: >5 Incapable** **Incapable/ Bedridden/ Life Support** **Defend in Place**
38,000 facilities regulated in 50 states under individual state regulations **-51 of 89 Categories Incapable** > 5 residents. (Some states have up to 3 categories). +/- 32 states have both Capable and Incapable categories. +/- 14 states categorize all facilities as Incapable. +/- 4 states require all their facilities to be Capable. **Bedridden NOT allowed** except to allow for typical short term illnesses ranging from 7-14 days in 21 states. **Nursing Care generally only allowed or only limited** intermittent in all 50 states. If allowed only when the facility can provide services for short term illness. Night time staff to resident ratio:+/- 1:20 to 1:35		**17,000 facilities** regulated in all 50 states under federal regulations. **All facilities are considered Incapable.** **Bedridden allowed and common.** **Nursing care allowed and common.** Night time staff to res. Ratio: +/- 1:8 to 1:15.
(+ +) Ch 4: SMOKE BARRIERS for Incapable only.. **Ch 4: NO OPEN SPACE** to corridor exceptions. (Less staff) **CH 4: NO EXCEPTIONS** for corridor and door rating**.** **Ch 4: FIRE PARTITIONS** between units.		**Ch 4: Smoke Barriers** required. **Ch 4:** Open space to corridor allowed. (More staff and Protect In Place) **CH 4: NO** corridor and door rating by exception**.** (More staff.) **Ch 4: NO** Fire Partitions between units.
Ch 5: (+ +) NO SPRINKLER STORY INCREASE ALLOWED 3 stories Type VA, 4 stories Type IIA for I-1 For Incapable only.		**Ch 5: No sprinkler story increase allowed** 1 story Type VA, 3 in Type IIA
(+ +) Ch 9: NFPA 13 SPRINKLERS For I-1 Incapable only. 13R/ D for others and R-4 **(+ +) CH 9: SMOKE DETECTION** In common spaces for Incapable only. **No exception**. (Less staff) **CH 9: SMOKE ALARMS** required. (Less staff)		**Ch 9: NFPA 13 sprinklers** **CH 9: NO** Smoke detection by exception allowed in common spaces. (More staff.) **CH 9: NO** smoke alarms required. (More staff)
CH 10: NO SUITE exception to corridor protection allowed. (Less staff) **Ch 10: RATED CORRIDORS & DOORS .** (Less staff) **CH 10:** No bedridden corridor width. (No bedridden/ life support)		**CH 10: Suites allowed.** (More staff) **Ch 10: NO rated corridor and doors.** (More staff) **CH 10:** Bedridden corridor width. (Bedridden/ life support)
Ch 16: No structural redundancy (No bedridden/ life support)		**Ch 16:** Structural redundancy required >50. (Bedridden/ life support)

ITEMIZED IBC SECTION REASONS:

Section 308.2 The G21 is modified to allow both capable and incapable of self preservation occupants in Group I-1. Currently nearly all state licensing agencies allow a majority of their assisted living classifications to have incapable residents according to the original G21 referenced Hawaii study. The general Group I-1 section is revised to be formatted similar to the Chapter 3 Group A format to cover both the capable and incapable conditions. The "condition" concept for Group I-1 is also used in the Group I detention occupancy.

Group I-1: The modified G21 maintains all current Group I-1 (capable of self preservation) facilities to remain as they are currently classified with the same associated requirements thru ought the code. Labeling Group I-1 without the "capable" condition heading maintains consistency with the past labeling of Group I-1 permits and classifications. The G21 then adds a new additional "incapable" condition:

Group I-1 Incapable: Both assisted living and residential board and care uses are relocated under the new heading "Group I-1 Incapable" condition, since the Hawaii study shows that a majority of these uses allow incapable occupants. This change will require most assisted living to conform to Group I-1 Incapable requirements. The revised G21 then confirms that Group I-1 Incapable will meet the basic Group I-1 requirements and "additional requirements of Group I-1 Incapable" in four areas of the code. This type of "in addition" charging statement is also used in Chapter 4 requirements. A majority of state licensing agencies already implement similar protection requirements, since they enforce either NFPA 101 for new buildings or include state amendments to the IBC. The "Incapable" occupancy condition keeps an obvious permit record to show the resident capability type.

Section 308.3.1 is added to introduce the term incapable if self preservation. This term is required to correspond to the modification of Section 308.2. This is the term introduced for its use in the Group I-1 charging statement. The revised G21 purposely matches the term and definition from the G20, in case both proposals are approved.

Section 310.2 The modified G21 revises the "Residential Care/Assisted Living" definition to allow either capable or incapable of self preservation occupants similar to the G21 Group I-1 changes. The modified G21 does not propose any other changes to the Group R-4 protection requirements for the following reasons:

Most state licensing agencies already allow the incapable resident type in these smaller 6-16 facilities. The reason for this is that three quarters of the state licensing agencies enforce NFPA 101 in their small facilities for 6-16 residents. All versions of NFPA 101 allow both capable and incapable residents in their small 6-16 category. The current IBC R-4 (capable) and correlating NFPA 101 Small (6-16) (incapable) Residential Board and Care facility requirements have essentially the same requirements. The key matching protection feature in both codes for these small facilities is the requirement of residential sprinklers. They both allow up to four stories in combustible construction. Other detailed protection requirements match each other. Both codes do not add smoke barriers since they are only required in facilities with over 16 residents (Group I-1 and NFPA Large). The smaller size of these facilities means travel time and possible exposure is less.

If the R-4 occupant type was not changed in the G21, those R-4 incapable uses would continue to not be specifically classified or be classified as Group I-2. Group I-2 classification for these small facilities requires excessive protection and cost such as NFPA 13 sprinklers, one story wood frame limitation, and hard conduit.

Section 420.4 Smoke barriers are modified in the G21 as a requirement in the Group I-1 Incapable condition. The heading is per heading formats currently found in other Chapter 4 sections and Section 1017. Smoke barriers are added due to new proposed resident type allowed and to match already existing state licensing regulations in a majority of states. The section utilizes and matches technical requirements, language and format from the current I-2 Section 407 for smoke barriers. The smaller smoke compartment size from the previous original G21 is removed and the current size requirements from the current Group I-2 are implemented.

Section 420.4.1 The modified G21 added "smoke compartment area" requirement utilizes similar current text from Section 422 Ambulatory Health Care Facilities and I-2 Section 407.4.1. The 15 square feet per occupant matches the non bed occupant area requirements of the current corresponding NFPA 101 Residential Board and Care requirements enforced over its last three editions. This 15 square foot requirement is already required by state assisted living licensing agencies in approximately 20 states. The area proposed is half the current bed and litter requirement but more than double the 6 square feet for non bed and litter areas in the Group I-2. Treatment rooms are purposely omitted from this I-1 version compared to the I-2, since occupants in personal care are not considered patients and thus do not receive treatment. Patient rooms are purposely omitted from this I-1 version compared to the I-2 for the same term reason and resident rooms are generally not a place where these types of residents are instructed to temporarily go to before exiting in emergency drills.

The charging statement is purposely different than the Group I-2 "Refuge Area" description and intent. The charging statement provides that smoke compartment areas are "for relocation of occupants as part of building evacuation in a fire emergency." This concept is different than the "defend in place" concept of the refuge area of the Group I-2 section 407.4.1. The Group I-2 defend in place concept assumes higher staff levels capable of assisting mostly incapable occupants, with some bedridden and some occupants on life support systems. Group I-1 incapable occupants, by not being bedridden or on life support, have typically less staff to resident ratios assisting residents than Group I-2. Less staff makes Group I-1 less of a viable option for the "defend in place" concept. For this reason the G21 Group I-1 Incapable "smoke compartments areas" only provide an additional temporary protection area for occupants. These occupants with assistance from others are trained through fire drills, to still eventually reach an exit in an emergency.

This emergency evacuation concept proposed is consistent with the current International Fire Code that states that Group I-1 residential care assisted living facilities shall include eventual complete building evacuation and that residents participate in fire drills. Residents are also still active participants in the required fire drills versus Group I-2 occupants. The Group I-1 Incapable residents still practice evacuation during fire drills to a "selected assembly point and shall provide experience in exiting through all required exits" as stated in the Fire Code. That practice evacuation assembly point is assumed to not require full building evacuation during fire drills due to impractical and unsafe weather but to train residents in evacuation drills to eventually reach an exit in a real emergency with assistance as needed.

Section 420.4.2 The independent egress requirement remains as is from the original G21 proposal and utilizes exact wording matching the current I-2 Section 407.4.2 for smoke barriers.

Section 420.4.3 The horizontal assembly requirement remains as is from the original G21 proposal and utilizes exact wording matching the current I-2 Section 407.4.3 for smoke barriers.

Section 504.2. The modified G21 requires that the new Group I-1 Incapable condition not be allowed to use sprinklers for story increases in Type IIB, III, IV, or V construction. The limitation is proposed due to the new incapable resident type allowed. It is also because about 30 states already limit their incapable assisted living facilities to less than the four stories that are currently allowed in Group I-1 in the combustible construction types. The three story limitation for the most commonly utilized Type VA construction is a "middle ground" of current enforcement across the 50 states. The four stories in Type VA are still allowed in this new G-21 for only Group I-1 capable facilities. Below is an approximate tally of the varying story requirements enforced by states licensing agencies that allow incapable occupants in their assisted living facilities. It is derived from the Hawaii study and compares the three different story requirements enforced by limited state IBC amendments and various editions of NFPA 101 that most states currently enforce.

- About 15-20 state licensing agencies limit incapable assisted living Type VA wood frame to 4 stories: They use older NFPA 101 1998 and prior editions for their "Slow" incapable category. The largest percentage of assisted are considered "Slow," which allows 3-13 minutes with assistance to reach a point of safety, including the state of Washington incapable R-2 (I-1) IBC amendments.
- About 15-20 state licensing agencies limit incapable assisted living Type VA wood frame to 2 stories: They use current NFPA 101 2003 and 2006 editions which eliminate the "Prompt," "Slow" and "Impractical" timing categories and assume incapable occupants. This tally also includes the older NFPA 101 1998 and prior editions "Impractical" categorization alternate means with horizontal exits with smoke barriers, and include incapable I-1 state of California and Hawaii IBC amendments.
- Less than 10 state licensing agencies limit incapable assisted living Type VA wood frame to 1 story: This is because those state licensing agencies use the most restrictive NFPA 101 2000 edition and they only allow the "Impractical" category, which is the most stringent NFPA category. About five of these states require that all of their incapable assisted living categories be limited to being classified as NFPA 101

2000 “Impractical” one story Type VA limit with no “Slow” categorization allowed: NJ, ID, SC, OK, TX. (<u>NFPA itself has eliminated this categorization in its last three more current editions.)</u>

Section 710.5 is modified in the G21 to include cross corridor doors in the new required smoke barriers in Group I-1 Incapable condition, matching the same exceptions allowed for I-2.

Section 903.2.6 is modified in the G21 to require full NFPA 13 sprinkler coverage in the Group I-1 Incapable condition facility fire areas. The NFPA 13 requirement is added due to the new proposed resident type allowed. Currently over half the states licensing agencies already require NFPA 13 sprinklers in their assisted living facilities with incapable occupants. This is due to their requiring various versions of NFPA 101 or by their state amendments to the IBC. The exception is revised to allow NFPA 13R in other capable of self preservation I-1 facilities, maintaining the current exception for the current capable Group I-1 uses.

Section 907.2.6.1 is revised in the modified G21 to eliminate the smoke detection exception only in Group I-1 Incapable condition buildings when sprinklers are provided. Currently over half the states licensing agencies already require smoke detection in their assisted living facilities with incapable occupants. This is due to their requiring various versions of NFPA 101 or by their state amendments to the IBC. This proposal still allows the exception to be applied to other Group I-1 when all residents are capable of self preservation within a building as defined by fire walls or exterior walls.

Cost Impact: The code change proposal will not increase the cost of construction due to current enforcement of similar requirements by other regulations such as state licensing regulations enforced in about three quarters of the states.

Final Action: AS AM AMPC____ D

G24-09/10
308.2 (IFC [B] 202)

<u>Proposed Change as Submitted</u>

Proponent: Tom Lariviere, Chairman, representing Joint Fire Service Review Committee

Revise as follows:

308.2 (IFC [B] 202) Group I-1. This occupancy shall include buildings, structures or parts thereof housing more than 16 persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
Residential board and care facilities
Social rehabilitation facilities

A facility such as the above ~~with~~ <u>housing</u> five or fewer persons shall be classified as Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2, <u>provided the building is protected by an automatic sprinkler system installed in accordance with Section 903.2.8</u>. A facility such as above, housing at least six and not more than 16 persons, shall be classified as Group R-4.

Reason: This proposal will continue to allow the smaller congregate care facilities to be constructed either as an R-3, or under the IRC. But when the IRC is used for this facility, the facility must be sprinklered.

If a new structure is built, it will be required to be sprinklered. A new facility can be constructed either as an R-3 under the IBC which will require a fire sprinkler system, or as a one-family dwelling under the IRC which will also require a fire sprinkler system is installed. However, many congregate care facilities open and occupy an existing structure. This revision will require that when an existing single family home is used as a small congregate care facility, it will also be sprinklered.

These occupancies, even though housing less than six occupants, still have the same clientele as the I-1 occupancy. The facility is still a Group Home, a Congregate Care Facility, or an Assisted Living Facility, etc. Many of the occupants in these facilities have limited capability or delayed response for self-preservation in an emergency.

This proposed wording in this proposal was approved in Item G36 07-08 for R-4 occupancies where a similar concept applies. The sprinkler system provides the desired level of life safety regardless of whether the facility houses 5 or 6 occupants.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: LARIVIERE-G1-308.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The IRC has its own sprinkler requirements and the IBC should not be used to specify sprinkler requirements in buildings subject to the IRC. In addition it would set up a conflict between the sprinkler systems allowed by the IRC and those that would be required under this change.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce, Chairman, representing Joint Fire Service Review Committee, requests Approval as Submitted.

Commenter's Reason: This proposal was Disapproved at the Code Development Hearing because it was felt that this is not consistent language with the I-Codes. However, Section 310.1 contains identical language for referring an R-4 to the IRC for construction.

The IBC governs construction for commercial purposes, and a Congregate Residence is a commercial facility. The IBC also allows construction of the Congregate Residence under the IRC provided that the building is equipped with a fire sprinkler system.

The references in the IBC assume that the building constructed under the IRC will be sprinklered, and it is important to maintain this requirement. This revision is the same as is currently required for an R-4 occupancy, and is only more critical in these facilities since they are classified as Group I occupancies.

Final Action: AS AM AMPC____ D

G28-09/10 Part I
310.1(IFC [B] 202), 310.2

Proposed Change as Submitted

Proponent: Maureen Traxler, City of Seattle, Seattle Dept of Planning & Development

PART I - IBC

1. Revise as follows:

310.1 (IFC [B] 202) Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code* in accordance with Section 101.2. Residential occupancies shall include the following:

R-1 Residential occupancies containing *sleeping units* where the occupants are primarily transient in nature, including:

Boarding houses (transient)
Hotels (transient)
<u>Lodging houses with more than 5 guest rooms</u>
Motels (transient)

Congregate living facilities (transient) with 10 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

R-2 Residential occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:

Apartment houses
Boarding houses (nontransient)
Convents
Dormitories
Fraternities and sororities
Hotels (nontransient)
Live/work units
Monasteries
Motels (nontransient)
Vacation timeshare properties

Congregate living facilities with 16 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

R-3 Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*.
Adult care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.
Child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.
Congregate living facilities with 16 or fewer persons.
<u>Lodging houses with 5 or fewer guest rooms</u>

Adult care and child care facilities that are within a single-family home are permitted to comply with the *International Residential Code*.
<u>Lodging houses with five or fewer guest rooms are permitted to comply with the *International Residential Code*.</u>

R-4 Residential occupancies shall include buildings arranged for occupancy as residential care/assisted living facilities including more than five but not more than 16 occupants, excluding staff.

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code or shall comply with the *International Residential Code* provided the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.2.7.

2. Add new definitions as follows:

310.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

<u>**GUEST ROOM.** Any room or rooms used or intended to be used by one or more guests for living or sleeping purposes.</u>

<u>**LODGING HOUSE.** A dwelling occupied as a single-family unit where rent is paid for guest rooms.</u>

Reason: This proposal allows small bed and breakfasts to be constructed according to the International Residential Code. Currently, the IRC does not address whether nightly rentals are allowed, so jurisdictions across the country are applying the code differently. We chose to add a definition of "lodging house" to generally encompass rental lodging within dwelling units, distinct from hotels and boarding houses which are "not occupied as a single-family unit." We are proposing a general term rather than the more common term "bed and breakfast" partly because that term would imply that the building official would monitor what meals were served at the lodging.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME: Traxler-G10-310.doc

<u>Public Hearing Results</u>

PART I- IBC GENERAL

Committee Action: **Disapproved**

Committee Reason: The proposal would set up a potential conflict with the already defined term of 'sleeping unit' and therefore the application of Chapter 11 would be unclear. There would also be a need to address this use in Chapter 29 regarding plumbing fixture requirements.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler City of Seattle representing the Department of Planning and Development, requests Approval as Modified by this Public Comment for Part I.

Replace the proposal as follows:

310.1 Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code* in accordance with Section 101.2. Residential occupancies shall include the following:

(no change to R-1 and R-2)

R-3 Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*.
Adult care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.
Child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.
Congregate living facilities with 16 or fewer persons.
Owner-occupied bed-and-breakfasts with 5 or fewer guest bedrooms

Adult care and child care facilities that are within a single-family home are permitted to comply with the *International Residential Code*.

Owner-occupied bed-and-breakfasts with 5 or fewer guest bedrooms are permitted to comply with the *International Residential Code*.

Commenter's Reason: This proposal is a coordinated attempt to revise the IBC and IRC to allow small bed and breakfasts to be classified as Group R-3 or comply with the IRC. The proposal for the IRC was approved with a modification on a floor vote at the committee hearings in Baltimore, and the IBC proposal was disapproved. This public comment will coordinate the IBC with the IRC provision by stating that bed and breakfasts with 5 or fewer guest bedrooms may comply with the IRC, and by making 5 guest bedrooms the maximum allowed as R-3 occupancies. This modified proposal also requires the bed and breakfast to be owner-occupied, for consistency with the IRC, and for consistency with the charging language in Section 310.1 which says that Group R-3 includes "Residential occupancies where the occupants are primarily permanent in nature…." While the guests are not permanent, the owner-occupants are permanent and familiar with the home. This comment deletes the original proposal's provision for classifying homes with more than 5 as R-1 because we believe they would be classified that way using the current language.

Final Action: AS AM AMPC____ D

G28-09/10 Part II
R101.2, R202

Proposed Change as Submitted

Proponent: Maureen Traxler, City of Seattle, representing the Department of Planning & Development

PART II – IRC BUILDING AND ENERGY

1. Revise as follows:

R101.2 Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, *alteration*, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures*.

Exceptions:

1. Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family *dwellings* or townhouses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section 903.3.1.3 of the *International Building Code*.

2. Lodging houses with five or fewer guest rooms shall be permitted to be constructed in accordance with the *International Residential Code for One- and Two-family Dwellings.*

2. Add new definitions as follows:

SECTION R202
DEFINITIONS

GUEST ROOM is any room or rooms used or intended to be used by one or more guests for living or sleeping purposes.

LODGING HOUSE is a one-family dwelling where one or more occupants are primarily permanent in nature, and rent is paid for guest rooms.

Reason: This proposal allows small bed and breakfasts to be constructed according to the International Residential Code. Currently, the IRC does not address whether nightly rentals are allowed, so jurisdictions across the country are applying the code differently. We chose to add a definition of "lodging house" to generally encompass rental lodging within dwelling units, distinct from hotels and boarding houses which are "not occupied as a single-family unit." We are proposing a general term rather than the more common term "bed and breakfast" partly because that term would imply that the building official would monitor what meals were served at the lodging.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME: Traxler-G10-310.doc

Public Hearing Results

This item is on the agenda for individual consideration because an Assembly Action was different than the Committee Action.

Staff Note: There was an error in the way G28-Part II was shown in the Report of Public Hearings. The text at the end of Exception 2 was added by the Assembly Action, but did not appear in the Report of Hearings.

PART II – IRC – B/E

Committee Action: Disapproved

Committee Reason: The committee feels this is a good change but it needs more work. The term "to be constructed" implies new construction and renovations need to be addressed. Also, some of the distinctions would be better suited in the Zoning Code rather than the IRC.

Assembly Action: Approved as Modified

R101.2 Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, *alteration*, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures*.

Exceptions:
1. Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family *dwellings* or townhouses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section P2904 ~~903.3.1.3 of the *International Building Code*~~.
2. Owner occupied lodging houses with five or fewer guest rooms shall be permitted to be constructed in accordance with the *International Residential Code for One- and Two-family Dwellings* when equipped with a fire sprinkler system complying with Section P2904.

(Portions of proposal not shown remain unchanged)

Reason for modification: The modification adds the term "owner occupied" and would aid the misinterpretation about accessibility. The modification also will assure these units will be sprinklered.

ICCFILENAME: Traxler-G10-310.doc

G31-09/10

402.2.1 (New), 402.3, 402.4, 402.4.1 402.4.1.1, 402.4.1.4, 402.4.3, 402.4.4, 402.4.5, 402.5.1, 402.5.2, 402.6, 402.6.1, 402.7.1, 402.7.3, 402.8, 402.9, 402.11, 402.12, 402.12.2, 402.12.3, [F]402.14, [F]402.15, 402.16, [F]905.3.3, [F]905.4, IFC 905.3.3, 905.4.

Proposed Change as Submitted

Proponent: Sarah A. Rice, C.B.O., representing self

1. Add new text as follows:

402.2.1 Open mall building perimeter line. For the purpose of this code, a perimeter line shall be established. The perimeter line shall encircle all buildings and structures which comprise the open mall building, and shall encompass any open-air interior walkways, open-air courtyards or similar open-air spaces. The perimeter line shall define the extent of the open mall building. Anchor buildings shall be outside of the perimeter line and are not considered as part of the open mall building.

2. Revise text as follows:

402.3 Lease plan. Each ~~*covered mall building*~~ owner of a covered mall building or of an open mall building shall provide both the building and fire departments with a lease plan showing the location of each occupancy and its exits after the certificate of occupancy has been issued. No modifications or changes in occupancy or use shall be made from that shown on the lease plan without prior approval of the *building official*.

402.4 Means of egress. ~~Each tenant space and the~~ *Covered mall buildings, open mall buildings and each tenant space within a mall building* shall be provided with *means of egress* as required by this section and this code. Where there is a conflict between the requirements of this code and the requirements of ~~this section~~ Sections 402.4.1 through 402.4.6, the requirements of ~~this section~~ Sections 402.4.1 through 402.4.6 shall apply.

402.4.1 Determination of occupant load. The *occupant load* permitted in any individual tenant space in a *covered or open mall building* shall be determined as required by this code. *Means of egress* requirements for individual tenant spaces shall be based on the *occupant load* thus determined.

402.4.1.1 Occupant formula. In determining required *means of egress* of the mall, the number of occupants for whom *means of egress* are to be provided shall be based on gross leasable area of the *covered or open mall building* (excluding *anchor buildings*) and the *occupant load* factor as determined by the following equation.

OLF = (0.00007) (GLA) + 25 **(Equation 4-1)**

where:
OLF = The *occupant load* factor (square feet per person).
GLA = The gross leasable area (square feet).

Exception: Tenant spaces attached to a *covered or open mall building* but with a *means of egress* system that is totally independent of the open mall of an open mall building or of ~~the~~ a *covered mall building* shall not be considered as gross leasable area for determining the required *means of egress* for the *covered mall building*.

402.4.1.2 OLF range. *(No change to text.)*

402.4.1.3 Anchor buildings. *(No change to text.)*

402.4.1.4 Food courts. The *occupant load* of a food court shall be determined in accordance with Section 1004. For the purposes of determining the *means of egress* requirements for the mall, the food court *occupant load* shall be added to the *occupant load* of the *covered or open mall building* as calculated above.

402.4.2 Number of means of egress. *(No change to text.)*

402.4.3 Arrangements of means of egress. Assembly occupancies with an *occupant load* of 500 or more within a covered mall building shall be so located in the *covered mall building* that their entrance will be immediately adjacent to a principal entrance to the mall and shall have not less than one-half of their required *means of egress* opening directly to the exterior of the *covered mall building*. Assembly occupancies with an occupant load of 300 or more within an open mall building shall be permitted to have their main exit open to the open mall.

402.4.3.1 Anchor building means of egress.*(No change to text)*

402.4.4 Distance to exits. Within each individual tenant space in a *covered or open mall building*, the maximum distance of travel from any point to an *exit* or entrance to the mall shall not exceed 200 feet (60 960 mm).

The maximum distance of travel from any point within a mall of a covered mall building to an *exit* shall not exceed 200 feet (60 960 mm). The maximum distance of travel from any point within an open mall to the perimeter line of the open mall building shall not exceed 200 feet.

402.4.5 Access to exits. Where more than one *exit* is required, they shall be so arranged that it is possible to travel in either direction from any point in a mall of a covered mall building to separate *exits* or from any point in an open mall to two separate locations on the perimeter line of an open mall building. The minimum width of an *exit passageway* or *corridor* from a mall shall be 66 inches (1676 mm).

Exception: Dead ends not exceeding a length equal to twice the width of the mall measured at the narrowest location within the dead-end portion of the mall.

402.4.5.1 Exit passageways.*(No change to text.)*

402.4.6 Service areas fronting on exit passageways.*(No change to text.)*

402.5 Mall width. For the purpose of providing required egress, malls are permitted to be considered as *corridors* but need not comply with the requirements of Section 1005.1 of this code where the width of the mall is as specified in this section.

402.5.1 Minimum width The ~~minimum~~ aggregate clear egress width of the mall in either a covered or open mall building shall be a minimum of 20 feet (6096 mm). The mall width shall be sufficient to accommodate the *occupant load* served. ~~There shall be a minimum of 10 feet (3048 mm) clear exit width~~ No portion of the minimum required aggregate egress width of shall be less than 10 feet measured to a height of 8 feet (2438 mm) between any projection of a tenant space bordering the mall and the nearest kiosk, vending machine, bench, display opening, food court or other obstruction to *means of egress* travel.

402.6 ~~402.5.2~~ ~~Minimum width~~ Open malls. Floor assemblies in, and roof assemblies over the mall of an open mall buildings shall be open for a minimum of 20 feet, measured perpendicular from the face of the tenant spaces on the lowest level, from edge of balcony to edge of balcony on upper floors or from edge of roof line to edge of roof line. The opening, or the unroofed area shall extend from the lowest/grade level of the mall to the sky above the roof. Balconies on upper levels of the mall shall not project into the required width. ~~The minimum floor and roof opening width above grade shall be 20 feet (9096 mm) in open malls.~~

Exception: Interior pedestrian bridges connecting balconies shall be permitted in the required width.

~~402.6~~ 402.7 Types of construction. The building area of any *covered mall or open building*, including *anchor buildings*, of Types I, II, III and IV construction, shall not be limited provided the *covered mall building* or open mall building, and ~~attached~~ adjoining *anchor buildings* and parking garages are surrounded on all sides by a permanent open space of not less than 60 feet (18 288 mm) and the *anchor buildings* do not exceed three *stories above grade plane*. For open mall buildings, the width of the permanent open space shall be measured from the perimeter line established by Section 402.2.1.

The type of construction allowable building height and building area of *anchor buildings* greater than three *stories above grade plane* shall comply with Section 503, as modified by Sections 504 and 506. The construction type of *open parking garages* and enclosed parking garages shall comply with Sections 406.3 and 406.4, respectively.

~~402.6.1~~ 402.7.1 Reduced open space. The permanent open space of 60 feet (18 288 mm) shall be permitted to be reduced to not less than 40 feet (12 192 mm), provided the following requirements are met:

1. The reduced open space shall not be allowed for more than 75 percent of the perimeter of the *covered or open mall building* and *anchor buildings*.
2. The *exterior wall* facing the reduced open space shall have a minimum *fire-resistance rating* of 3 hours.
3. Openings in the *exterior wall* facing the reduced open space shall have opening protectives with a minimum *fire protection rating* of 3 hours.
4. Group E, H, I or R occupancies are not within the *covered or open mall building* or *anchor stores*.

~~402.7~~ 402.8 Fire-resistance-rated separation. Fire-resistance-rated separation is not required between tenant spaces and the mall. Fire-resistance-rated separation is not required between a food court and adjacent tenant spaces or the mall.

~~402.7.1~~ 402.8.1 Attached garage. An attached garage for the storage of passenger vehicles having a capacity of not more than nine persons and *open parking garages* shall be considered as a separate building where it is separated from the *covered or open mall building* by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 712, or both.

> **Exception:** Where an *open parking garage* or enclosed parking garage is separated from the *covered or open mall building* or *anchor building* a distance greater than 10 feet (3048 mm), the provisions of Table 602 shall apply. Pedestrian walkways and tunnels that attach the *open parking garage* or enclosed parking garage to the *covered or open mall building* or *anchor building* shall be constructed in accordance with Section 3104.

~~402.7.2~~ 402.8.2 Tenant separations.
(No change to text.)

~~402.7.3~~ 402.8.3 Anchor building separation. An *anchor building* shall be separated from the *covered or open mall building* by *fire walls* complying with Section 706.

Exceptions:

1. *Anchor buildings* of not more than three *stories above grade plane* that have an occupancy classification the same as that permitted for tenants of the ~~*covered*~~ *mall building* shall be separated by 2-hour fire-resistive *fire barriers* complying with Section 707.

2. The exterior walls of anchor buildings separated from an open mall building by an open mall shall comply with Table 602.

~~402.7.3.1~~ 402.8.3.1 Openings between anchor building and mall.
(No change to text.)

~~402.8~~ 402.9 Interior finish. *Interior wall* and *ceiling finishes* within the mall of a covered mall and within the *exits* of covered or open mall buildings shall have a minimum *flame spread index* and smoke-developed index of Class B in accordance with Chapter 8. *Interior floor finishes* shall meet the requirements of Section 804.

[F] ~~402.9~~ 402.10 Automatic sprinkler system. ~~The~~ *Covered and open mall* ~~*building*~~ *buildings* and buildings connected shall be ~~equipped~~ protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, which shall comply with the all of the following:

1. The *automatic sprinkler system* shall be complete and operative throughout occupied space in the ~~*covered*~~ *mall building* prior to occupancy of any of the tenant spaces. Unoccupied tenant spaces shall be similarly protected unless provided with *approved* alternative protection.
2. Sprinkler protection for the mall of a covered mall building shall be independent from that provided for tenant spaces or ~~anchors~~ anchor buildings.
3. Sprinkler protection for the tenant spaces of an open mall building shall be independent from that provided for anchor buildings.
4. Sprinkler protection shall be provided beneath exterior circulation balconies located adjacent to an open mall.
5. Where tenant spaces are supplied by the same system, they shall be independently controlled.

> **Exception:** An *automatic sprinkler system* shall not be required in spaces or areas of *open parking garages* separated from the covered or open mall in accordance with Section 402.7.1 and constructed in accordance with Section 406.3.

~~402.9.1~~ [F] 402.11 Standpipe system. *(No change to text.)*

~~402.10~~ 402.12 Smoke control. *(No change to text.)*

~~402.11~~ 402.13 Kiosks. Kiosks and similar structures (temporary or permanent) located within the mall of a covered mall building or within the perimeter line of an open mall building shall meet the following requirements:

1. Combustible kiosks or other structures shall not be located within ~~the~~ a covered or open mall unless constructed of any of the following materials:

(Text not shown remains unchanged.)

~~402.12~~ 402.14 Children's playground structures. Where located within the mall of a covered mall or within the perimeter line of an open mall building, structures intended as children's playgrounds that exceed 10 feet (3048 mm) in height and 150 square feet (14 m^2) in area shall comply with Sections 402.12.1 through 402.12.4.

~~402.12.1~~ 402.14.1 Materials. *(No change to text.)*

~~402.12.2~~ 402.14.2 Fire protection. Children's playground structures located within ~~the~~ a mall or open mall shall be provided with the same level of *approved* fire suppression and detection devices required for kiosks and similar structures.

~~402.12.3~~ 402.14.3 Separation. Children's playground structures shall have a minimum horizontal separation from other structures within ~~the~~ a mall or open mall of 20 feet (6090 mm).

~~402.12.4~~ 402.14.4 Area limits. *(No change to text.)*

~~402.13~~ 402.15 Security grilles and doors. *(No change to text.)*

~~402.14~~ [F] 402.16 Standby power. *Covered mall buildings* exceeding 50,000 square feet (4645 m^2) and open mall buildings exceeding 50,000 square feet within the established perimeter line shall be provided with standby power systems that are capable of operating the emergency voice/alarm communication system.

~~402.15~~ [F] 402.17 Emergency voice/alarm communication system. ~~*Covered mall buildings* exceeding 50,000 square feet (4645 m^2) in total floor area shall be provided with an emergency voice/alarm communication system.~~ Where the total floor area exceeds 50,000 square feet within either a covered mall building or within the perimeter line of an open mall building, an emergency voice/alarm communication system shall be provided.

Emergency voice/alarm communication systems serving a mall, required or otherwise, shall be accessible to the fire department. The system shall be provided in accordance with Section 907.5.2.2.

~~402.16~~ 402.18 Plastic signs. Plastic signs affixed to the storefront of any tenant space facing ~~the~~ a mall or open mall shall be limited as specified in Sections ~~402.16.1 through 402.16.5.2~~ 402.17.1 through 402.17.5.2.

(Text not shown remains unchanged.)

~~402.17~~ [F] 402.19 Fire department access to equipment. (No change to text.)

[F] 905.3.3 (IFC 905.3.3) Covered and open mall buildings. ~~A~~ *Covered mall ~~building~~ and open mall buildings* shall be equipped throughout with a standpipe system where required by Section 905.3.1. *~~Covered~~ Mall buildings* not required to be equipped with a standpipe system by Section 905.3.1 shall be equipped with Class I hose connections connected to the *automatic sprinkler system* sized to deliver water at 250 gallons per minute (946.4 L/min) at the most hydraulically remote hose connection while concurrently supplying the *automatic sprinkler system* demand. The standpipe system shall be designed not to exceed a 50 pounds per square inch (psi) (345 kPa) residual pressure loss with a flow of 250 gallons per minute (946.4 L/min) from the fire department connection to the hydraulically most remote hose connection. Hose connections shall be provided at each of the following locations:

1. Within the mall at the entrance to each *exit* passageway or *corridor*.
2. At each floor-level landing within enclosed stairways opening directly on the mall.
3. At exterior public entrances to the mall of a covered mall building
4. At public entrances at the perimeter line of an open mall building.

<u>5.</u> At other locations as necessary so that the distance to reach all portions of a tenant space does not exceed 200 feet (60 960 mm) from a hose connection.

[F] 905.4 (IFC 905.4) Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1 through 3.*(No change in text.)*

4. In covered <u>and open </u>mall buildings, adjacent to each exterior public entrance to ~~the~~ <u>a covered </u>mall<u>, adjacent to each public entrance at the perimeter line of an open mall</u> and adjacent to each entrance from an *exit* passageway or *exit corridor* to the <u>covered </u>mall<u> or an open mall</u>.

5. and 6 *(No change in text.)*

Reason: The 2009 IBC was amended to allow an open mall to be built under the Covered Mall provisions of Section 402. However, the change was minimal in that it defined an open mall and open mall building and provided some specificity about the openness of the mall from the ground to the sky, but it did not address how each of the requirements within Section 402 would be applied to an open mall situation. For example, measuring the travel distance from a tenant space within a mall to an exit is unclear when the whole mall is 'exterior' to the buildings. This proposal goes through each section and revises each to clarify application to open malls. In general this required adding 'and open mall' or 'and open mall building' in various locations. Other locations the existing text stating application to a 'mall' was sufficient to allow application to both covered and open mall situations. Without providing revisions of this sort, the application of Section 402 will result in inconsistent interpretation from designer to designer and from jurisdiction to jurisdiction.

The intent of the 2009 change was to allow an open mall building to enjoy all of the benefits of being considered one unlimited area building with various tenants and occupancies. The key difference is that instead of the mall being covered, it is open to the sky. One then can begin wondering if the mall is 'exterior' to the building and therefore needs to be treated as exit discharge and the walls of the tenant spaces as exterior walls facing an assumed property line, or is it simply a covered mall building without a roof. The balance of this proposal takes the latter position, that the open mall building is simply a covered mall building without a roof.

Sec. 402.2.1. Only one new concept is established by the proposal – 'open mall building perimiter line'. The premise is that the designer establishes a boundary between what is considered to be part of the open mall building and what is outside of the building. This allows determination of the equivalent of exit travel distance for an exterior mall similar to a covered mall without there being a physical separation between the 'mall' and what is outside of the mall.

Sec. 402.3. Editorially revised to address owners of both types of malls and the required lease plan.

Sec. 402.4. Editorially revised to make it clear the egress provisions apply to covered and open malls. "This section' is replaced in two places with the specific section numbers for clarity of reference.

Sec. 402.4.1. Editorially revised in 3 subsections to clarify application of occupant load determinations.

Sec. 402.4.3. This is substantive change for open malls compared to covered mall buildings. Currently assembly occupancies with an occupant load over 500 needs to be located so that the entrance to the occupancy is adjacent to the mall entrance and 50% of the egress capacity goes directly outdoors. This proposal limits the application of this existing section to covered mall buildings. It then goes on to permit the open mall to be used as the discharge location for a main exit for assembly spaces over 300. There are many examples of this arrangement around the country including the theaters on the City walk open mall at Universal City in the Los Angeles area.

Sec.402.4.4 and 4.5. These sections use the open mall perimiter line as a substitute for the exterior wall of a covered mall to determine when means of egress transitions from 'within' the mall to 'outside' of the mall.

Sec. 402.5.1 The proposal makes section 402.5.1 generic for both types of malls. There is no intent to make a substantive change here.

Sec. 402.5.2. The existing code is currently in the wrong place –the requirement for 20 foot open is not related to egress but rather to the need for floor and roof assemblies in the mall portion of an open mall building to be open. There is no intent to make a substantive change here only to move to be a separate unique criteria.

Sec. 402.6. Since the concept of an open mall building is that there are many detached buildings, this provision of indicating the 60 foot open perimeter was around the attached buildings needed to be fixed to address that the anchor buildings next to an open mall building may not be physically attached.

Sec. 402.7.3. In an open mall building design, it is likely that the anchor buildings won't actually be attached. Therefore neither the fire wall nor fire barrier concept is appropriate. Therefore an exception is provided to treat such walls as exterior walls. But Section 402.7.3.1 will still apply and the openings in the wall need not be rated.

Sec. 402.8. This section currently requires wall and ceilings of the covered mall to meet specified flame spread of interior finishes. This applies to the mall itself. Tenant spaces need to comply with Chapter 8 independently. However, the walls of the open mall are not interior walls but actually exterior walls, which makes application of Chapter 8 inappropriate in most cases. The added language would still apply to any enclosed exits in an open mall building as well as the exits in a covered mall building.

Sec. 402.9. Since the open mall is open, without roof, there would be no requirement to provide sprinkler protection in the 'mall'. However, this proposal would still require sprinkler protection under exterior balconies which are providing circulation in the open mall. The concept here is there could be a multilevel open mall building with pedestrian walkways paralleling the front of the upper tenant spaces or bridges crossing the open mall. This would require sprinkler protection under such walkways.

Sec. 402.9.1 is changed to 402.10. This section refers to the standpipe requirements in Chapter 9. It is not a subset of sprinklers as is implied by the current numbering. This proposal moves it to its own equal section. Section 402 could use a reformatting of the sections similar to that provided to the 403 Highrise provisions in the 2009 code.

Sec. 402.11 Kiosks and 402.12 Children's play structures. This proposal treats those within the established perimiter line of an open mall building as if they were 'within' the mall.

Sec. 402.14 Standby power and 402.15 Emergency Communication. These would use the open mall building perimiter line to determine when the 50,000 square foot threshold was reached.

Sec. 402.16 Signs. The consistent approach of this proposal is to treat the 'open mall' as if it were interior facades along a mall which will have lots of occupants that are in restricted pathways until there get outside of the perimiter line. Therefore the limitation on signs should apply to those facing the open mall as well.

Sec. 905.3.3 and 905.4. These sections state the requirement for standpipes in a mall building and requires placement near the exits. As the open mall doesn't have 'exits' per se between the mall and the outside, the building perimiter line is used in lieu of the exits to specify the standpipe locations.

Other locations. The term 'covered mall building' is also used in the following sections of the IBC: 507.12, 709.1, 709.4, 716.5.4, Table 903.2.11.6, 907.2.7, 907.2.14, 2702.2.14, 2902.3.2, 2902.3.3 and 3412.6.19. In most of these locations the code should be editorially revised for consistency with this proposal. In most of these sections it will be sufficient to change 'covered mall building to 'covered and open mall buildings'.

Cost Impact: The code change proposal to the extent that it clarifies the application of the code in various situations may result in an increase the cost of construction where otherwise a designer or building official may have not thought that a provision of Section 402 applied.

Analysis: If this change is approved, staff can provide editorial revisions to the balance of the code and to the other I-Codes to be consistent with the intent of this proposal.

ICCFILENAME: RICE-G6-503.1.4.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee acknowledged the effort to clarify the application of the covered mall provisions to the open mall concept. The proposal needs additional refinements. Of specific concern is the lack of clarity regarding balconies and bridges and the extent to which they could 'cover'' the open mall; the relationship of the perimeter line to the anchor buildings and to the required open area around the open mall building; the relationship of the perimeter line with exit discharge as it would appear to permit exit access to dead end where a perimeter line adjoined an anchor building.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, CBO, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

402.2.1 Open mall building perimeter line. For the purpose of this code, a perimeter line shall be established. The perimeter line shall encircle all buildings and structures which comprise the open mall building, and shall encompass any open-air interior walkways, open-air courtyards or similar open-air spaces. The perimeter line shall define the extent of the open mall building. Anchor buildings and parking structures shall be outside of the perimeter line and are not considered as part of the open mall building.

402.4.3 Arrangements of means of egress. Assembly occupancies with an *occupant load* of 500 or more located within a covered mall building shall be so located ~~in the *covered mall building*~~ such that their entrance will be immediately adjacent to a principal entrance to the mall and shall have not less than one-half of their required *means of egress* opening directly to the exterior of the *covered mall building*. Assembly occupancies ~~with an occupant load of 300 or more~~ located within the perimeter line of an open mall building shall be permitted to have their main exit open onto the open mall.

402.4.5 Access to exits. Where more than one *exit* is required, they shall be so arranged that it is possible to travel in either direction from any point in a mall of a covered mall building to separate *exits,* or from any point in an open mall of a open mall building to two separate locations on the perimeter line ~~of an open mall building~~, provided neither location is an exterior wall of an anchor building or parking garage. The minimum width of an *exit passageway* or *corridor* from a mall or open mall shall be 66 inches (1676 mm).

> **Exception:** Dead ends not exceeding a length equal to twice the width of the mall measured at the narrowest location within the dead-end portion of the mall.

402.6 Open malls. Floor assemblies in, and roof assemblies over, the open mall of an open mall ~~buildings~~ building shall be open to the atmosphere for a minimum of 20 feet, measured perpendicular from the face of the tenant spaces on the lowest level, from edge of balcony to edge of balcony on upper floors ~~or~~ and from edge of roof line to edge of roof line. The opening within, or the unroofed area of, an open mall shall extend from the lowest/grade level of the open mall through ~~to the atmosphere sky above~~ the entire roof assembly. Balconies on upper levels of the mall shall not project into the required width of the opening.

402.6.1 Pedestrian walkways. ~~**Exception:**~~ ~~Interior~~ Pedestrian walkways ~~bridges~~ connecting balconies in an open mall shall shall be located not less than 20 feet from any other pedestrian walkway ~~be permitted in the required width~~.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: The fundamental intent of this proposal is to bring some design refinements to the relatively new code concept of an "open mall building." While these types of structures have been and are being constructed, the code has not had language that literally recognized the concept. With the introduction of the term "open mall building" in the 2009 IBC these designs were not recognized, but the code lacked the design details. This proposal is intended to give the code user those details.

The Committees fundamental reason for disapproving this code change was the need for "additional refinement." They were concerned by the following:

the lack of clarity regarding balconies and bridges and the extent to which they could 'cover'' the open mall;

the relationship of the perimeter line to the anchor buildings and to the required open area around the open mall building;

the relationship of the perimeter line with exit discharge as it would appear to permit exit access to dead end where a perimeter line adjoined an anchor building.

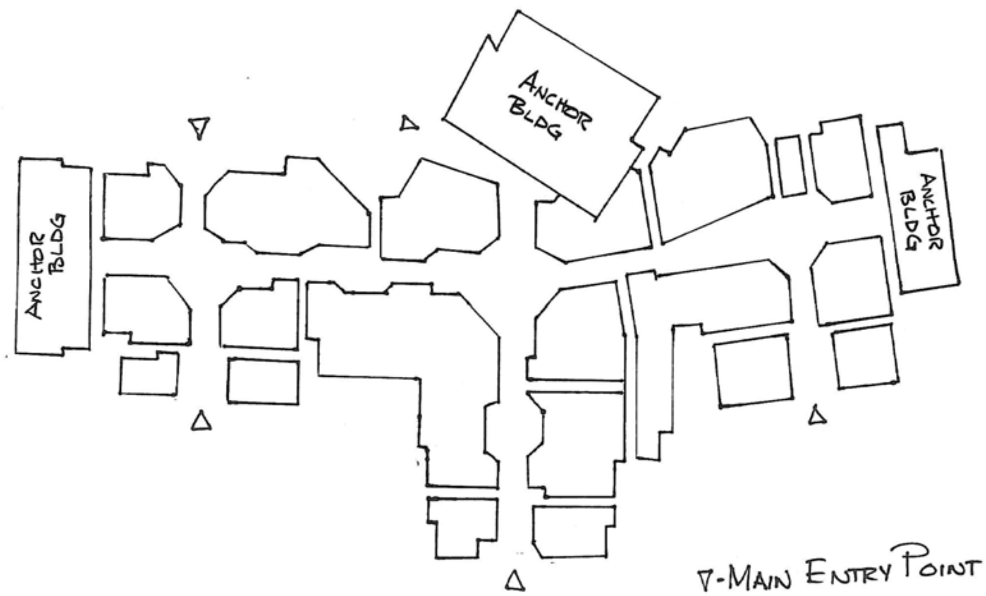
To bring clarity to the new provisions for open mall buildings and in response to the committee's comments the following revisions have been made:

In Section 402.4.3 the redundant language has been addressed.

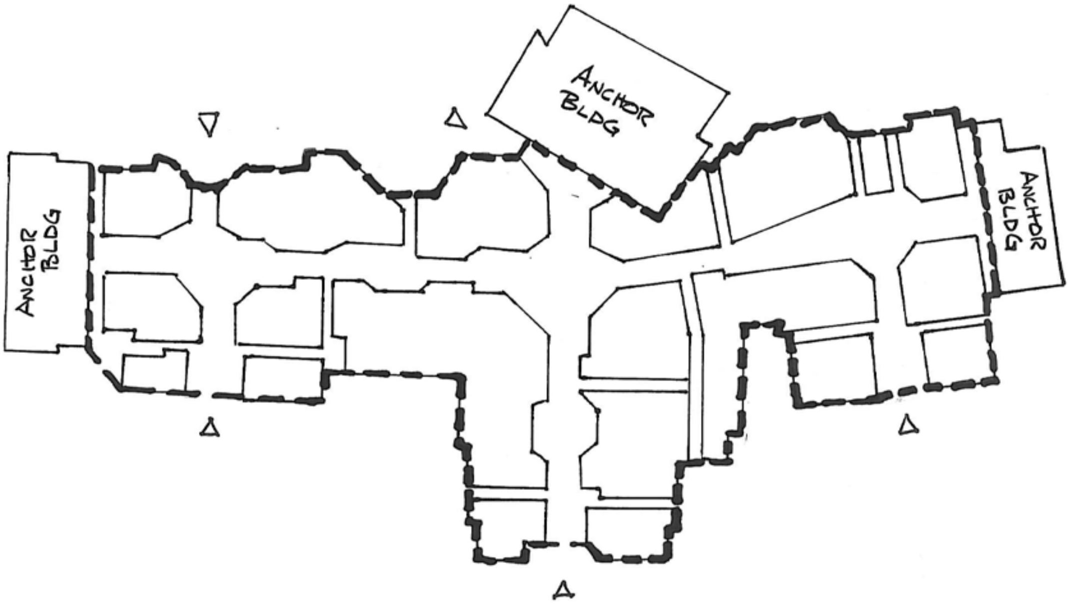
In Section 402.4.5 the language has been revised to clarify how the exit access travel distance in the open mall will be measured and that it cannot terminate at an exterior wall of an anchor building.

In Section 402.6 the language has been revised to clarify the sizing of the openings that must be in place for a structure to qualify as an open mall building. It also makes the Exception now a limitation on how pedestrian walkways are to be located in an open mall.

While not noted in the committee reason, there was some concern on where the "perimeter line" would be located. While each open mall building will be unique, the diagrams shown below is an example of how the various structures that typically make up an open mall building would be laid out, and then how the "perimeter line" would be situated around the structures. The designer will have the discretion as to the relative location of the "perimeter line," similar to the discretion they have to place an imaginary line for purposes of determining the "fire separation distance" when two buildings are located on the same lot. But even with that discretion, it is anticipated that the "perimeter line" created for an open mall building will in essence enclose the same space as exterior walls would in a covered mall building.



Open Mall Building
Without "Perimeter Line"



Open Mall Building
Example of where the "Perimeter Line" would be located.

Final Action: AS AM AMPC____ D

G41-09/10

403.2.4, Table 403.2.4

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC) and Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International

Delete without substitution as follows:

~~**403.2.4 Sprayed fire-resistive materials (SFRM).** The bond strength of the SFRM installed throughout the building shall be in accordance with Table 403.2.4.~~

~~**TABLE 403.2.4**~~
~~**MINIMUM BOND STRENGTH**~~

~~**HEIGHT OF BUILDING**~~ [a]	~~**SFRM MINIMUM BOND STRENGTH**~~
~~Up to 420 feet~~	~~430 psf~~
~~Greater than 420 feet~~	~~1,000 psf~~

~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kW/m²~~

~~a. Above the lowest level of fire department vehicle access~~

Reason: Heilstedt - The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public

This proposed change is a result of the CTC's investigation of the area of study entitled "Review of NIST WTC Recommendations". The scope of the activity is noted as:

> Review the recommendations issued by NIST in its report entitled "Final Report on the Collapse of the World Trade Center Towers", issued September 2005, for applicability to the building environment as regulated by the I-Codes. To evaluate the necessity of developing code changes in response to the NIST report.

The current provisions for minimum bond strength were added to the code via G68-06/97. The following is the committees reason for inclusion:

Committee Reason: Although the data which provides technical support was not provided within the proposal, this does go along with the NIST recommendations and should provide better safety in high-rise buildings. Using the greater bond strengths will increase the probability that the protection will stay in place and will reduce the likelihood of being dislodged. These factors should provide for a longer time of safety. Placing the requirements in the high-rise provisions of Chapter 4 instead of within Chapter 7 makes sense because they are only applicable to high-rises and will be more likely to be found within that section. The committee did agree with the different bond strength requirements based upon the thought the taller buildings are at a higher risk and that items such as the vibration of tall buildings will affect the long term performance. Based on testimony which was provided, the cost impact of this requirement was considered as being relatively small. The higher density products which are currently available will generally meet these requirements. The modifications included a revision of the terminology "spray applied" to "sprayed" to be consistent with the action of FS156-06/07 and to create a more global point of reference for building height by moving footnote a to the main title of the first column.

In submitting a public comment to G69-07/08 last cycle to remove the minimimum and retain the 150 psf in Chapter 17, CTC noted that the current provisions for minimum bond strength were the results of G68-06/07 last cycle. As noted in the reason statement for the code change, it notes "The purpose of this proposal is to increase the required adhesions of Spray Applied Fire Resistant Materials (SFRM)." The proposal further sites Recommendation 6 of the NIST WTC report which calls for improvement of the in-place performance of SFRM. NIST Recommendation 6 reads as follows:

NIST recommends the development of criteria, test methods, and standards: (1) for the in-service performance of sprayed fire-resistive materials (SFRM, also commonly referred to as fireproofing or insulation) used to protect structural components; and (2) to ensure that these materials, as-installed, conform to conditions in tests used to establish the fire resistance rating of components, assemblies, and systems.

The CTC notes that the prior to the approval of the increased bond strength in Table 403.15 that the code mandated cohesive/adhesive bond strength, regardless of height, was 150 psf in Section 1704.10.5. In fact, this section has remained unchanged and was not coordinated with the new provisions in Table 403.15.

Based on input received by the CTC, the CTC position remains that the bond strength should not be increased as a function of height. As noted in the NIST recommendation, the concern is one of in-service performance of the SFRM which means the material must remain in place to perform its intended function, regardless of height. This is an inspection related issue, one for which the CTC submitted code change S39-06/07 to improve the inspection provisions, including:

Increased number of sampling locations

Specific sampling for columns, beams, joists and trusses

Physical and visual tests for: substrates; thickness; density, bond strength

S39-06/07 was approved and the provisions will be incorporated in the 2009 edition of the IBC.

There is no credible technical evidence or documented experience to indicate that the increased minimum bond strength requirements specified in the subject text and Table improve the long term durability of sprayed fire –resistive materials (SFRM) in high-rise buildings or improve the chances of SFRM to be in place when it is needed (in the event of a fire). The single proven effect of these increased bond provisions is to dramatically increase the SFRM installed cost by up to 250%. SFRM minimum bond strength of 150 psf (Section 1704.12.6), in conjunction with inspections and field tests, specified in Section 1704.12, are adequate to ensure SFRM is in place after completion of the construction phase. Regular inspections and timely repairs are needed to ensure SFRM in-place condition over the life of the building, regardless of the bond strength of SFRM.

A survey of the commercially available SFRM products in terms of their bond strength and density, conducted by the American Iron and Steel Institute (AISI) in 2007 clearly indicates that the provisions in Section 403.2.4 and Table 403.2.4 are specifically calibrated and targeted to ban standard-density SFRM products from the high-rise market – i.e., these provisions create an artificial commercial barrier, but do not address any measurable risks or safety concerns tied to any meaningful bond strength values (in terms of SFRM in-place durability).

The current provisions in Section 403.2.4and Table 403.2.4 resulted from proposal G68-06/07 (and further slightly modified by proposal G68-07/08), based on misleading technical information and flawed cost impact analysis provided in the proposal and relevant testimonies during the public hearings:

G68-06/07 reason statement suggested "building sway" as a "known" "initiating event" for SFRM dislodgement. Testimony during the public hearings also suggested building vibration as a possible cause for SFRM dislodgement. To date, no evidence has been found to document either of these claims.

G68-06/07 reason statement noted that "The purpose of this proposal is to increase the required adhesions of Spray Applied Fire Resistant Materials (SFRM)", seeking to achieve the improvements called for in Recommendation 6 of NIST WTC Report. Testimonies during the hearings further suggested that proposal G68-06/07 is somehow based on NIST WTC Investigation and its recommendations. In fact, NIST Recommendation 6 reads as follows:

"NIST recommends the development of criteria, test methods, and standards: (1) for the in-service performance of sprayed fire-resistive materials (SFRM, also commonly referred to as fireproofing insulation) used to protect structural components; and (2) to ensure that these materials, as-installed, conform to conditions in tests used to establish the fire resistance rating of components, assemblies, and systems."

There is nothing in Recommendation 6, or in any other part of the NIST WTC Investigation Report, to justify the immediate need to arbitrarily increase the SFRM bond strength. Nothing in the published NIST report suggested that the SFRM bond strength was inadequate for any of the intended purposes. The compiled records actually indicated that WTC towers endured numerous fires prior to 9/11 with minimal or no structural damage. Nothing in the NIST Report suggested that any existing SFRM product with higher bond strength and/or higher density would have performed better, or would have changed the sequence or the outcome of events.

G68-06/07 proposal noted that "Many tall buildings already utilize these higher strength materials". However, in 2006, there was only one high-rise building known to utilize medium-density SFRM throughout the building (the reconstructed WTC 7), and the owner did it for understandable reasons In fact, the absence of long-term nation-wide experience with the "throughout" application of medium-density and high-density SFRM in high-rise buildings should be a cause for concern – due to the lack of long term data to support their use.

G68-06/07 offered flawed cost impact analysis stating that the associated cost increase will be only marginal. In fact, credible estimates for real projects indicated very significant cost increase for installed medium-density and high-density SFRM. Independent estimates by government agencies (reported in G69-07/08) indicated that minimum bond strength requirement of 430 psf increases the SFRM cost by over 50%, while the requirement of 1000 psf increases SFRM cost by about 170%. Other independent estimates in the 2007 AISI report show similar cost increases: by over 50% for medium-density SFRM, and by over 230% for high-density SFRM. These increases cannot be characterized as "marginal" or "relatively small". The cost impact of Table 403..2.4 provisions needs to be fully considered, and society's fire protection resources need to be effectively allocated in a meaningful way.

Several testimonies during the public hearing exploited the notion of standard-density SFRM dislodgement under its own weight for no apparent reason or due to the lack of bond strength. In fact, SFRM dislodgement are almost always linked to very specific reasons that are irrelevant to bond strength – over the building lifetime, the overwhelming majority of documented dislodgement cases are caused by direct contact/impact removals of SFRM associated with human activities such as construction, demolition, remodeling, testing, structural inspections, maintenance operations, electrical/mechanical installations, and also, associated with equipment failures, such as water leaks, improper elevator operations, and similar reasons. The information compiled in WTC Investigation Report NCSTAR 1-6A clearly illustrates typical cases, e.g.:

"Section 3.7 with photographs in Figures 3-5 through 3-10 states that, "There were many instances where SFRM had obviously been dislodged in the process of installing utilities. In some cases hardware was attached directly to the lower chords and SFRM was dislodged. These damaged areas should have been repaired when the various trades had completed their work". Section 3.7 also states that "the overall views of the trusses showed that regions of missing insulation were minor in extent when compared with the total area of applied SFRM".

Figure A-36 points to SFRM damage on trusses due to "tenant construction work" or "works over the years in the ceiling" by the Port Authority.

Figure A-37 points to SFRM damage on trusses "during demolition after tenants move out" as "ductwork, partitions, hangers, etc. are removed".

Figure A-38 points to SFRM "damaged by installation of new construction".

Figure A-39 points to SFRM "disturbed by remodeling operations"

Figure A-49 points to SFRM re-occurring "extensive damage" in the elevator shafts caused by "the slack condition in compensating cables, especially on shuttle cars, causing a chafing condition against finished spray-on fireproofing on structural steel within hoistways".

Figure A-56 and A-57 (excerpts from LERA reports dated 1993 and 1995) point to SFRM damage in elevator shafts due to "rubbing of the hoist cable against the face of column", or "due to testing purposes". In one instance, the LERA reports also point to the installation of bracket as the cause for missing fireproofing.

The entire compilation of maintenance and inspections documents in the published reports of NIST WTC Investigation does not contain a single case of SFRM dislodgement linked to the lack of SFRM bond strength, despite the fact that all structural steel and steel joists in WTC towers was primed (SFRM application over primed and/or painted steel is known to reduce bond strength).

Similar causes of SFRM dislodgement, irrelevant to bond strength, were reported in the 2007 AISI report of building architects and construction contractors to evaluate their use of SFRM and their experiences with it. This survey is more relevant to the initial construction and/or major renovation phases in buildings' lifetime, and identifies intentional removal of SFRM by construction trades as the primary cause of SFRM dislodgement.

In summary, the two leading causes of SFRM dislodgement during construction and maintenance of buildings are:

Primary cause - intentional removal of SFRM associated with human activities, such as construction, renovation, electrical/mechanical installations, testing, inspections, maintenance operations, etc. This type of SFRM dislodgement is completely irrelevant to SFRM bond strength. Only inspections and timely repairs could address intentional removal of SFRM.

Secondary cause - unintentional/accidental removal of SFRM associated with human activities and equipment failures. While the use of higher-density SFRM products could slightly reduce dislodgements associated with some accidental abuses, such as light abrasive actions and light impacts, existing medium-density and high-density SFRM products are still by far incapable to substantially reduce dislodgements or address all common causes of accidental removals (e.g. water leaks, repeated and stronger abrasive actions and impacts, etc). Concealment of SFRM-protected steel elements in protective envelopes (e.g. gypsum board) or behind suspended ceilings is the most effective way in avoiding accidental dislodgement due to most accidental impacts and abrasions. Again, only inspections and timely repairs could adequately address unintentional/accidental removal of SFRM.

Analysis of Proposed Change G68-06/07 to the 2006 Edition of IBC", by Farid Alfawakhiri, Ph.D., American Iron and Steel Institute, January 2007.

Bibliography: NIST NCSTAR 1, "Federal Building and Fire Safety Investigation of the World Trade Center Disaster: Final Report on the Collapse of the World Trade Center Towers", National Institute of Standards and Technology, September 2005 (available at http://wtc.nist.gov/).

Carino et al, NIST NCSTAR 1- 6A, "Federal Building and Fire Safety Investigation of the World Trade Center Disaster: Passive Fire Protection", National Institute of Standards and Technology, September 2005 (available at http://wtc.nist.gov/).

Perry - In their approval of the new SFRM requirements during the 2006/2007 cycle, the Fire Safety Committee specifically noted that neither technical substantiation nor cost data had been provided to the committee. Last cycle (2007/2008), cost information was provided to the committee, clearly indicating that costs are far beyond the moderate 'incremental' increases alluded to by proponents last cycle. The Fire Safety Committee voted to maintain the increased SFRM bond strength provisions, "based on a lack of technical substantiation to take them out".

This committee is on record that they had no technical substantiation when they added this requirement to the code, yet they now will not remove the provisions unless they receive technical substantiation?

There is no evidence that arbitrarily tripling (from 150 psf to 430 psf) the bond strength of SFRM will provide any additional degree of safety in 75' tall buildings, and no evidence that increasing the bond strength by a factor of 7 (from 150 psf to 1000 psf) will provide any additional degree of safety in buildings >420' in height.

The extent of the cost impacts calculated by both GSA and the steel industry make it clear that the first response to this provision, if it remains, will be to look for alternatives. There has been no explanation from those touting the need for increasing SFRM bond strength for how a gypsum-board encased column (which can achieve the required hourly ratings) would compare to columns with any of the various types of SFRM.

Cost Impact: Heilstedt - The code change proposal will not increase the cost of construction.
Perry - The code change proposal will not increase the cost of construction. This change will decrease the cost of construction.

ICCFILENAME: HEILSTEDT-G6-403.2.4.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee's disapproval is based on the lack of substantiating data to show that bond strength failure is not an issue for SFRM. Further, this action provides for consistency with the committees action on G42-09/10.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Approval as Submitted.

Commenter's Reason: This code change should be approved for the following reasons:

1. This significant, costly change was made without any evidence that it will increase either building performance or life safety, with a misleading industry statement about the 'minimal' cost impact.
2. The CTC rationale to the original code change provides a lengthy explanation of the history of this issue, and the lack of technical substantiation.

Final Action: AS AM AMPC____ D

G43-09/10

403.3.3 (New), Table 508.2.5

Proposed Change as Submitted

Proponent: Wayne R. Jewell, CBO, City of Southfield, representing self

1. Add new text as follows:

403.3.3 **Fire Pump Room.** Fire pumps shall be located in rooms protected in accordance with Section 913.2.1.

2. Revise Table as follows:

TABLE 508.2.5
INCIDENTAL ACCOSSORY OCCUPANCIES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic fire-extinguishing system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen cut-off rooms, not classified as Group H	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing system
Laboratories and vocational shops, not classified as Group H, located in Group E or I-2 occupancies	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Group I-3 cells equipped with padded surfaces	1 hour
Group I-2 waste and linen collection rooms	1 hour
Waste and linen collection rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons or a lithium-ion capacity of 1,000 pound used for facility standby power, emergency power or uninterrupted power supplies	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies
~~Rooms containing fire pumps in nonhigh-rise buildings~~	~~2 hours; or 1 hour and provide automatic sprinkler system throughout the building~~
~~Rooms containing fire pumps in high-rise buildings~~	~~2 hours~~

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

Reason: Adding Section 403.3.3 provides a proper link to the protection requirements found in Section 913.2.1 added during the last cycle for a fire pump room in a high-rise building. Revising Table 508.2.5 in striking the two lines removes the confusion that could occur since all options under Section 508 are not required to use the provisions of the table, yet fire pumps can occur in the multiple types of buildings permitted under Section 508 and these protection provisions are required under all instances.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: JEWELL-G1-403.3.3 NEW

Public Hearing Results

Committee Action: Approval as Submitted

Committee Reason: The change relocates the requirements to the appropriate location in the code and removes redundant language.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, National Concrete Masonry Association (NCMA), representing Masonry Alliance for Codes and Standards (MACS), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

403.3.3 Fire pump room. Fire pumps shall be located in rooms protected in accordance with Section 913.2.1.

TABLE 508.2.5
INCIDENTAL ACCESSORY OCCUPANCIES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic fire-extinguishing system
Rooms with boilers where the larges piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen cut-off rooms, not classified as Group H	1-hour in Group B, F, M, S, and U occupancies. 2-hour in Group A, E, I and R occupancies
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing system
Laboratories and vocational shops, not classified as Group H, located in Group E or I-2 occupancies	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Group I-3 cells equipped with padded rooms	1 hour
Group I-2 waste and linen collection rooms	1 hour
Waste and linen collection rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Stationary storage battery system having a liquid electrolyte capacity of more than 50 gallons or a lithium-ion capacity of 1,000 pound used for facility standby power, emergency power or uninterrupted power supplies	1-hour in Group B, F, M, S, and U occupancies. 2-hour in Group A, E, I and R occupancies
<u>Rooms containing fire pumps in buildings other than high-rise buildings</u>	<u>2 hours; or 1 hour and provide automatic sprinkler system throughout the building</u>
<u>Rooms containing fire pumps in high-rise buildings</u>	<u>2 hours</u>

For SI: 1 square foot = 0.0929m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

Commenter's Reason: We agree with the proponent's addition of the new Section 403.3.3 Fire Pump Room which we believe will make the code more user friendly and provide for better enforcement of the requirements for fire pump rooms which are covered by Section 913.2.1. However, we do not agree with the proponent's deletion of the two entries at the end of Table 508.2.5 Incidental Accessory Occupancies addressing fire pumps in both high-rise and nonhigh-rise buildings.

The proponent indicates in his Reason statement that the reason for deleting the two lines in Table 508.2.5 is to remove the confusion that could occur since all options under Section 508 are not required to use the provisions of the table. We disagree with the proponent's statement in that regard. In our opinion, it is very clear that Section 508.2.5 Separation of Incidental Accessory Occupancies which references Table 508.2.5 Incidental Accessory Occupancies is applicable for all buildings under all cases for buildings of mixed use and occupancy, whether they use the nonseparated occupancy option in Section 508.3 or the separated occupancies option in Section 508.4. Specific incidental accessory occupancies listed in Table 508.2.5 are required to be separated and/or protected as specified regardless of the main occupancy or the other occupancies in the building. Thus, we have reinstated the two lines and made an editorial correction to the one entry by deleting the term "nonhigh-rise buildings" and substituting the term "buildings other than high-rise buildings" to be consistent with the terminology in Section 913.2.1.

Again, we believe these two lines in Table 508.2.5 make the code more user friendly and enforceable by providing specific guidance to the protection and/or separation of fire pump rooms in any buildings where they are installed which is consistent with the requirements in Section 913.2.1. Therefore, we believe the Class A voting members should approve this Public Comment for approval as modified of Code Change G43-09/10.

Final Action: AS AM AMPC____ D

G44-09/10, Part I
403.4.5, 403.4.8.1, 708.14.1, Chapter 35

Proposed Change as Submitted

Proponent: Gary Lewis, Chair, ICC Ad Hoc Committee on Terrorism-Resistant Buildings

Part I - IBC

1. Add new text as follows:

403.4.5 Video surveillance system. A video surveillance system installed in accordance with NFPA 731, shall be installed in each elevator lobby provided in accordance with Section 708.14.1 and at every fifth floor of each required stairway and connected to an approved, constantly attended station. The surveillance system shall not be required to provide positive visual recognition of individual persons.

(Renumber subsequent sections.)

2. Revise as follows

403.4.8.1 Emergency power loads. The following are classified as emergency power loads:

1. **Exit signs and *means of egress* illumination required by Chapter 10;**
2. **Elevator car lighting;**
3. **Emergency voice/alarm communications systems;**
4. **Automatic fire detection systems;**
5. **Video surveillance systems;**

~~5.~~6. **Fire alarm** systems; and
~~6.~~7. Electrically powered fire pumps.

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements of Section 709 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code. In high-rise buildings the elevator lobby shall be provided with a video surveillance system installed in accordance with NFPA 731.

Exceptions:

1. through 7. *(No change to exceptions)*

3. Add new standard to Chapter 35 as follows:

NFPA

731-2008 The Standard for the Installation of Electronic Premises Security Systems

Reason: This proposal adds new requirements to the code for high-rise buildings. The purpose of this change is to increase the ability of firefighters, and other emergency responders, to develop a clear picture of conditions throughout the building which will enable them to better manage evacuation, fire suppression and other emergency response activities. The purpose is also to enhance the safety of emergency responders by enabling them to maintain better situational awareness.

The National Institute of Standards and Technology's (NIST) report on the World Trade Center (WTC) tragedy amply documented the tactical and informational difficulties experienced by emergency responders and occupants during the WTC event. Similar difficulties occur in much smaller events and they place lives at risk.

The Code already requires many systems which enhance emergency responder and occupant awareness. Their use can be improved and they can be further supplemented. Recommendation 23 of the WTC Report specifically calls for:

> The establishment and implementation of detailed procedures and methods for gathering, processing, and delivering critical information through integration of relevant voice, video, graphical and written data to enhance situational awareness of all emergency responders.

This proposal seeks to improve responder awareness of conditions in the building to assist in management of an incident and improve the existing fire command center to enhance its value. Awareness is improved by requiring control center monitoring of video surveillance in stairway shafts and elevator lobbies. With the introduction of dedicated fire service elevators and occupant egress elevators into the IBC, the necessity of monitoring the status of the elevator lobbies becomes even more significant.

There will be those opponents that will claim that that the amount of information generated by the video monitoring in a large building will cause "information overload". They will question the ability of the staff in the fire command center to observe all of the required video feeds at once. In response to this, please be aware that there is commercial off-the-shelf "intelligent software" that is available such that the staff of the fire command center need not observe all of these feeds; the software is "event driven" and will select information that is pertinent and display just this information. This software is currently available off-the-shelf from companies such as Johnson Control and Honeywell. The Port Authority of New York and New Jersey is currently installing a system to monitor the perimeter of the Newark airport by the use of *ONE* video screen. Clearly the perimeter of this airport is substantially larger than the portions of the building that are required to be monitored as a result of this code change. By requiring these video feeds, the situational awareness of the staff in the fire command center is substantially increased. While researching the availability of this software, we were informed by Mr. Alan Reiss the building manager of the World Trade Center, that he was unaware of the magnitude of the event on September 11, 2001. In fact, he commented that the people at home watching the television had a better situational awareness than he did because of the lack of information available at the fire command center. This has to be changed and this proposal will change it.

Bottom line, the video monitoring system will provide fire and emergency responders' immediate information on the life safety condition and status of the areas noted. Having such ability will exceed any expense incurred for the installation of the video monitoring system - the expense is minor to the benefit of the system. (Note: Regardless of this requirement, electronic data access systems can be installed for a reasonable cost in most buildings today). A video monitoring system will provide fire and emergency responders with accurate and up to date information on the condition and activities of the given areas for emergency responders to make tactical decisions under emergency conditions. With that said, the TRB committee encourages consideration and support for this proposal.

Bibliography: National Institute of Standards & Technology, Final Report of the National Construction safety Team on the Collapses of the World Trade Center Towers. United States Government Printing Office: Washington, D.C. September 2005.

Referenced Standards
National Fire Protection Association Standard 731, the Standard for the Installation of Electronic Premises Security Systems

Cost Impact: The code change proposal will not increase the cost of construction. These proposed amendments will increase the cost of construction, but, the increase will be modest when viewed as a percentage of total construction costs.

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

ICCFILENAME: LEWIS-G3-403.12.1.doc

Public Hearing Results

Part I - IBC

Committee Action: Disapproved

Committee Reason: The committee disapproved the proposal for a variety of reasons. The application to all high-rise buildings regardless of height was judged excessive. Providing surveillance every 5 floors did not provide very much situational awareness as intended by the proposal. Because there were so many exceptions for elevator lobbies, the effectiveness in those areas was uncertain. The occupant evacuation elevator requirements would provide communications in elevator lobbies, this system should be connected to the proposed system. There would be costs to installing such systems, especially as it relates to providing emergency power connections. The proponent should have provided more detailed cost impact information. Reference to the standard, while appropriate, was clear that the facial recognition was not required under the IBC provisions, but not for the reference contained in the IFC.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gary Lewis, City of Summit, representing ICC Ad Hoc Committee on Terrorism Resistant Buildings, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

403.4.5 Video surveillance systems. In buildings greater than 420 feet in height, a video surveillance system installed in accordance with NFPA 731 shall be installed. Video cameras shall be provided at every fifth floor in each required stairwell. The surveillance system shall not be required to provide positive visual recognition of individual persons.

(Renumber subsequent sections)

403.4.8.1 Emergency power loads. The following are classified as emergency power loads:

1. Exit signs and *means of egress* illumination required by Chapter 10;
2. Elevator car lighting;
3. Emergency voice/alarm communications systems;
4. Automatic fire detection systems;
5. Video surveillance systems required by this code;

~~5.~~ 6. Fire alarm systems;
~~6.~~ 7. Electrically powered fire pumps.

SECTION 3008
OCCUPANT EVACUATION ELEVATORS

3008.13 Two-way communication and video surveillance system. A two-way communication system and a video surveillance system shall be provided in each occupant elevator lobby for the purpose of initiating communication with the fire command center or an alternative location *approved* by the fire department.

3008.13.1 Design and installation. The two-way communication system shall include audible and visible signals and shall be designed and installed in accordance with the requirements of ICC 117.1.

3008.13.2 Instructions. Instructions for the use of the two-way communication system along with the location of the station shall be permanently located adjacent to each station. Signage shall comply with the ICC A117.1 requirements for visual characters.

3008.13.3 Video surveillance. Each elevator lobby shall be provided with a video surveillance system installed in accordance with NFPA 731. The surveillance system shall not be required to provide positive visual recognition of individual persons.

NFPA
731-2008 The Standard for the Installation of Electronic Premises Security Systems

Commenter's Reason: This proposal was disapproved by the Committee in Baltimore by a vote of 6-5. The Ad Hoc Committee continues to believe that emergency responders and incident commanders require enhanced situational awareness to properly manage evacuation, suppression and related emergency response activities.

Recommendation #23 of the National Institute of Standards and Technology (NIST) Final Report of the World Trade Center Disaster specifically calls for the "*establishment and implementation of detailed procedures and methods for gathering, processing and delivering critical information through integration of relevant voice, video, graphical and written data to enhance the situational awareness of all emergency responders*."

The disapproval from the Committee was based primarily on several issues raised at the hearing, and not an objection to the concept. The Ad Hoc Committee has revised this proposal twice in response to guidance from the General Committee and objectors, and has now further modified the language to meet all technical objections.

In response to comments by the Code Technology Committee, BOMA and a General Committee member, we have reduced the scope of the provision for stairway monitoring exclusively to apply to 'super' high-rise buildings in excess of 420' in height instead of all high-rise buildings pursuant to the Committee's stated reasons. The language of this modification also addresses the Committee's stated concern about elevator lobby exceptions.

In response to the cost issue, this public comment reduces the number of devices dramatically, by deleting the provision to provide surveillance at all elevator lobbies…..surveillance would only be mandated at every fifth floor in required stairwells and in occupant egress elevator lobbies, if provided. Remember, occupant egress elevators remain optional in the IBC. If utilized, the Ad Hoc Committee is convinced that incident commanders need real-time surveillance to understand whether building occupants are utilizing or waiting for elevator service. If such elevators are not provided, the cameras would not be required in those locations.

In response to earlier CTC objections, we have removed the requirement that the video signal be sent to a 'constantly attended location', in deference to those buildings that may not have 24-hour manned security. Instead, the provision would mandate the *capability* for monitoring all required video surveillance in the fire command center.

The issue of cost was raised some estimates indicate an overall 'system' cost at about $3,000 per device. That figure represents all associated costs, including the hardware, software, wiring, labor, general conditions, etc. While the Ad Hoc Committee believes this cost to be inflated. A 45-story building without egress elevators would require 27 devices under this proposal, with an attendant maximum cost of $81,000. By comparison, that equates to less than $0.10 per square foot on a typical 20,000 square foot per floor building, or less that one-tenth of one per-cent of the project construction cost.

In summary, NIST and the ICC's fire service members have attested that video monitoring of real-time building conditions are essential to timely and effective command decisions during an incident. The Ad Hoc Committee has refined this proposal and has focused the scope sufficiently such that all reasonable concerns have been met and the Committee petitions the membership for approval as modified herein.

Bibliography: National Institute of Standards and Technology, Final Report of the National Construction Safety Team on the Collapse of the World Trade Center Towers, United States Government Printing Office: Washington, D.C., September, 2005. Also, see wtc.nist.gov.

Referenced Standards:

National Fire Protection Association Standard 731, Standard for the Installation of Electronic Premises Security Systems

Cost Impact: The proposed amendments represent a minor increase in the cost of construction for certain iconic structures.

TRB Funding Disclosure: Since the inception of the Ad Hoc-TRB Committee, the ICC has fully funded the travel expenses of the Committee Chair to present the code proposals developed by the Ad Hoc Committee. Given the current economic condition, the ICC is not able to fully fund travel expenses by the Committee Chair to present the TRB proposals to you. The National Institute of Standards and Technology, a federal agency in the U.S. Department of Commerce, through a grant to the National Institute of Building Sciences, has agreed to fund the TRB Chair's travel expense *deficit*….whatever amount ICC does *not* fund….with full disclosure to the ICC. NIST has not ever, nor would, play *any* role in the deliberations of the TRB Committee in our development of code change proposals. This is entirely consistent with ICC CP#28.

Public Comment 2:

Gary Lewis, City of Summit, representing ICC Ad Hoc Committee on Terrorism Resistant Buildings, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

3007.6 Elevator system monitoring. The fire service access elevator shall be continuously monitored at the fire command center by a standard emergency service interface system meeting the requirements of NFPA 72. Each fire service access elevator lobby shall be provided with a video surveillance system installed in accordance with NFPA 731. The surveillance system shall not be required to provide positive visual recognition of individual persons.

NFPA
731-2008 The Standard for the Installation of Electronic Premises Security Systems

Commenter's Reason: Concerns expressed in Baltimore regarding the provisions for video surveillance included thresholds, cost and some confusion regarding the original proposed reference to elevator lobbies in Chapter 7, which contains certain exceptions. This public comment seeks to address all of those stated concerns and reasons for disapproval. The IBC General Committee issued a split 6-5 decision in favor of disapproval in Baltimore.

Recommendation #23 of the National Institute of Standards and Technology (NIST) Final Report of the World Trade Center Disaster specifically calls for the "*establishment and implementation of detailed procedures and methods for gathering, processing and delivering critical information through integration of relevant voice, video, graphical and written data to enhance the situational awareness of all emergency responders*."

The original G44-09/10 would have required video surveillance in *all* elevator lobbies of *all* high-rise buildings, which the Committee found excessive. The ICC Ad Hoc Committee on Terrorism Resistant Buildings reconsidered the matter and further refined the scope of lobby surveillance to the two critical needs: 1] occupant evacuation elevators if provided (see G44-09/10 TRB Public Comment #1), and 2] fire service access elevators.

Occupant evacuation elevators are an option, but the 2009 IBC now includes a first-ever provision that 'hardened' fire service access elevators be provided in all buildings greater than 120' in height. These elevators can and will be used for the transport of emergency responders and potentially building occupants in cases of emergency. Requiring video monitoring of the lobby spaces for such elevators will allow incident commanders to transmit real-time information about building conditions and occupant status to ascending responders, and will also serve as redundant protection to those responders in addition to the required communication systems.

Reference to the elevator lobby in Section 3007.6 as opposed to lobbies generally in Chapter 7 eliminates any application confusion from the original proposal.

Bibliography: National Institute of Standards and Technology, *Final Report of the National Construction Safety Team on the Collapse of the World Trade Center Towers*, United States Government Printing Office: Washington, D.C., September, 2005. Also, see wtc.nist.gov.

Referenced Standards:

National Fire Protection Association Standard 731, *Standard for the Installation of Electronic Premises Security Systems*

Cost Impact: This proposal does represent a minor increase in the cost of construction, but a portion of the cost is already absorbed in currently-required provision for continuous emergency system interface per NFPA 72, the balance representing less than two-tenths of one per cent of the project budget, a small price to pay for enhanced emergency responder and occupant life safety.

TRB Funding Disclosure: Since the inception of the Ad Hoc-TRB Committee, the ICC has fully funded the travel expenses of the Committee Chair to present the code proposals developed by the Ad Hoc Committee. Given the current economic condition, the ICC is not able to fully fund travel expenses by the Committee Chair to present the TRB proposals to you. The National Institute of Standards and Technology, a federal agency in the U.S. Department of Commerce, through a grant to the National Institute of Building Sciences, has agreed to fund the TRB Chair's travel expense *deficit*….whatever amount ICC does *not* fund….with full disclosure to the ICC. NIST has not ever, nor would, play *any* role in the deliberations of the TRB Committee in our development of code change proposals. This is entirely consistent with ICC CP#28.

Final Action: AS AM AMPC____ D

G44-09/10 Part II
IFC 508.1.5 (IBC [F] 911.1.5)

Proposed Change as Submitted

Proponent: Gary Lewis, Chair, representing ICC Ad Hoc Committee on Terrorism-Resistant Buildings

Revise as follows:

508.1.5 (IBC [F] 911.1.5) Required features. The fire-command center shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communication system control unit.
2. The fire department communications system.
3. Fire detection and alarm system annunciator.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air handling systems.
6. The fire-fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking stairway doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, firefighting equipment and fire department access and the location of fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.
13. Work table.
14. Generator supervision devices, manual start and transfer features.
15. Public address system, where specifically required by other sections of this code.
16. Elevator fire recall switch in accordance with ASME A17.1.
17. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.
18. Video monitoring for video surveillance system required by this code.

Reason: This proposal adds new requirements to the code for high-rise buildings. The purpose of this change is to increase the ability of firefighters, and other emergency responders, to develop a clear picture of conditions throughout the building which will enable them to better manage evacuation, fire suppression and other emergency response activities. The purpose is also to enhance the safety of emergency responders by enabling them to maintain better situational awareness.

The National Institute of Standards and Technology's (NIST) report on the World Trade Center (WTC) tragedy amply documented the tactical and informational difficulties experienced by emergency responders and occupants during the WTC event. Similar difficulties occur in much smaller events and they place lives at risk.

The Code already requires many systems which enhance emergency responder and occupant awareness. Their use can be improved and they can be further supplemented. Recommendation 23 of the WTC Report specifically calls for:

> The establishment and implementation of detailed procedures and methods for gathering, processing, and delivering critical information through integration of relevant voice, video, graphical and written data to enhance situational awareness of all emergency responders.

This proposal seeks to improve responder awareness of conditions in the building to assist in management of an incident and improve the existing fire command center to enhance its value. Awareness is improved by requiring control center monitoring of video surveillance in stairway shafts and elevator lobbies. With the introduction of dedicated fire service elevators and occupant egress elevators into the IBC, the necessity of monitoring the status of the elevator lobbies becomes even more significant.

There will be those opponents that will claim that that the amount of information generated by the video monitoring in a large building will cause "information overload". They will question the ability of the staff in the fire command center to observe all of the required video feeds at once. In response to this, please be aware that there is commercial off-the-shelf "intelligent software" that is available such that the staff of the fire command center need not observe all of these feeds; the software is "event driven" and will select information that is pertinent and display just this information. This software is currently available off-the-shelf from companies such as Johnson Control and Honeywell. The Port Authority of New York and New Jersey is currently installing a system to monitor the perimeter of the Newark airport by the use of *ONE* video screen. Clearly the perimeter of this airport is substantially larger than the portions of the building that are required to be monitored as a result of this code change. By requiring these video feeds, the situational awareness of the staff in the fire command center is substantially increased. While researching the availability of this software, we were informed by Mr. Alan Reiss the building manager of the World Trade Center, that he was unaware of the magnitude of the event on September 11, 2001. In fact, he commented that the people at home watching the television had a better situational awareness than he did because of the lack of information available at the fire command center. This has to be changed and this proposal will change it.

Bottom line, the video monitoring system will provide fire and emergency responders' immediate information on the life safety condition and status of the areas noted. Having such ability will exceed any expense incurred for the installation of the video monitoring system - the expense is minor to the benefit of the system. (Note: Regardless of this requirement, electronic data access systems can be installed for a reasonable cost in most buildings today). A video monitoring system will provide fire and emergency responders with accurate and up to date information on the condition and activities of the given areas for emergency responders to make tactical decisions under emergency conditions. With that said, the TRB committee encourages consideration and support for this proposal.

Bibliography: National Institute of Standards & Technology, Final Report of the National Construction safety Team on the Collapses of the World Trade Center Towers. United States Government Printing Office: Washington, D.C. September 2005.

Referenced Standards
National Fire Protection Association Standard 731, the Standard for the Installation of Electronic Premises Security Systems

Cost Impact: The code change proposal will not increase the cost of construction. These proposed amendments will increase the cost of construction, but, the increase will be modest when viewed as a percentage of total construction costs.

Analysis: A review of the standard proposed for inclusion in the code, NFPA 731, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: LEWIS-G3-403.12.1.doc

Public Hearing Results

IFC – Part II

Committee Action: **Disapproved**

Committee Reason: Consistent with the action taken to disapprove Part I.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary Lewis, City of Summit, representing ICC Ad Hoc Committee on Terrorism Resistant Buildings, requests Approval as Modified by this Public Comment.

Modify as follows:

508.1.5 (IBC [F] 911.1.5) Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communications system control unit.
2. The fire department communications system.
3. Fire detection and alarm system annunciator.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air handling systems.
6. The fire-fighters control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking stairway doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, firefighting equipment and fire department access and the location of fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.
13. Work table
14. Generator supervision devices, manual start and transfer features.
15. Public address system, where specifically required by other sections of this code.
16. Elevator fire recall switch in accordance with ASME A17.1.
17. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.
18. <u>Capability for</u> video monitoring for video surveillance system required by this code.

Commenter's Reason: See Commenter's reason for Part I, Public Comment 1

Final Action: AS AM AMPC____ D

G46-09/10
403.5.2, 3008.4

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing: California Fire Safety Advisory Council (CFSAC); Bill Ziegert, representing Smoke Guard, Inc.

1. Revise as follows:

403.5.2 Additional exit stairway. For buildings other than Group R-2 that are more than 420 feet (128 000 mm) in building height, one additional exit stairway meeting the requirements of Sections 1009 and 1022 shall be provided in addition to the minimum number of exits required by Section 1021.1. The total width of any combination of remaining exit stairways with one exit stairway removed shall not be less than the total width required by Section 1005.1. Scissor stairs shall not be considered the additional exit stairway required by this section.

> ~~**Exception:** An additional exit stairway shall not be required to be installed in buildings having elevators used for occupant self-evacuation in accordance with Section 3008.~~

2. Delete without substitution:

~~**3008.4 Additional exit stairway.** Where an additional means of egress is required in accordance with Section 403.5.2, an additional exit stairway shall not be required to be installed in buildings having elevators used for occupant self-evacuation in accordance with this section.~~

Reason:

Thornberry: We are proposing to delete the Exception to Section 403.5.2 as well as Section 3008.4 which allow the use of occupant evacuation elevators in lieu of the additional exit stairway where required by Section 403.5.2 for super high-rise buildings (buildings greater than 420 ft in height). We believe this technology is too new and unproven to allow it to substitute for a required means of egress. This position is also consistent with Section 1003.7 Elevators, Escalators and Moving Walks which prohibits elevators from being used as a component of a required means of egress. Until such time as occupant evacuation elevators (which are allowed to be used on a voluntary basis without reducing the required means of egress) have proven to be safe, reliable, and effective, this exception should be deleted from the code.

Ziegert: When the concept of Occupant Evacuation Elevators was proposed during the Palm Springs hearings in 2008, while many committee members were in favor of such a concept, the change was Disapproved primarily because it sought a tradeoff of reducing exit stair capacity (width). The proponent brought this change back to the Minneapolis Final Action hearings with substantial modifications and replaced the reduction in exit stair width with this alternate tradeoff to reduce the third stair in High Rise buildings over 420 feet (a different form of tradeoff but still a reduction in exit capacity). Justification for this tradeoff of exit capacity was never sufficiently provided, particularly when one recognizes that the elevator occupant evacuation system will only be operational until the Fire Service arrives (typically in 10 minutes or less from the first alarm). At this time Phase 1 Elevator Recall will normally be implemented which will immediately terminate the use of elevators for occupant evacuation. Following that, occupants needing to use stairs for evacuation in these very tall buildings would be limited to only the two stair systems, rather than the three stair systems the code currently mandates.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: THORNBERRY-G6-403.5.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The purpose of the third stairway is to allow for the fire service to take one stairway out of service for fire department activities. The third stairway is in excess to the required means of egress. Therefore, allowing for the option of occupant evacuation elevators in place of the third stairway will not reduce the required means of egress. The occupant evacuation elevator is future technology that is supported by NIST and the World Trade Center report. The tradeoff is an incentive to get effective technology into high rise buildings that will significantly reduce the time needed for evacuation of high rise buildings. This is especially important when a full building evacuation is deemed necessary. It is a significant improvement for persons with disability to allow for self-evacuation with the general population as well as to allow for them to evacuate with their mobility devices.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE, The Code Consortium, Inc., representing California Fire Safety Advisory Council (CFSAC), requests Approval as Submitted.

Commenter's Reason: We believe that the IBC Means of Egress Code Development Committee recommendation for disapproval of this code change proposal should be overturned and the code change voted for approval. A two-thirds majority vote will be necessary to achieve an approval recommendation by the Class A voting members so it is very important that all Class A voting members carefully listen to the arguments and consider the importance of this very significant code change.

The main reason the Committee recommended disapproval was on the basis of their Committee Statement that said: "Allowing for the option of occupant evacuation elevators in place of the third stairway will not reduce the required means of egress." However, the purpose of the required third stairway in these super high-rise buildings (greater than 420 feet in height) is to assure that the minimum required exit capacity will be available in the building once the fire department arrives and takes over one of the three exit stairways for their use in gaining access to the fire floor and performing their firefighting and search and rescue operations. Thus, the code presumes that the minimum required capacity for exiting will still be provided in the building. However, if the occupant evacuation elevators are allowed to substitute for the third required exit stairway, then once the fire department arrives and takes over one of the two remaining stairways, 50% of the exit capacity will be lost since the required exit width will be reduced because of the actions of the fire department. The assumption being made by the Committee is that the occupant evacuation elevators will make up the difference due to the loss of one of the two stairways being taken over by the fire department. But are they reliable enough at this time to allow such a trade-off?

It should be noted that this is a new technology to the United States which has yet to be proven. In fact, the criteria for occupant evacuation elevators are still being developed by the ASME Committee responsible for developing the elevator requirements. It should also be noted that IBC Section 3008.3 Operation states that the occupant evacuation elevators can only be used in the normal elevator operating mode prior to Phase I Emergency Recall Operation. So it only takes one smoke detector located in any elevator lobby to terminate the elevator use when that detector is activated and automatically recalls all elevators served by that lobby. Furthermore, once the fire department arrives, they will normally recall all elevators under their Phase I Manual Recall Operation. So there will be very little time available for the occupant evacuation elevators to be utilized in the early stages of a fire emergency.

Another concern we have with the reliability of these elevator systems is in regard to potential water damage which could cause malfunctioning operations of the elevators. IBC Section 3008.10 Water Protection simply requires an "approved method" to prevent automatic sprinkler system water from infiltrating into the hoistway enclosure. An approved method is specified since there is no simple resolution to this requirement that can be met in a cost-effective manner at this time. Furthermore, the water infiltration limitations only deal with automatic sprinkler system discharge water and not with firefighting hose streams which will be used during firefighting activities by the responding fire department. The water from firefighting hose streams can often be significantly greater than the automatic sprinkler system discharge water.

Another argument stated was that this code change will eliminate an incentive to utilize occupant evacuation elevators in these very tall buildings. However, this code change does not eliminate the option to install occupant evacuation elevators. It only eliminates the trade-off. If these occupant evacuation elevators are so critical to occupant evacuation, then it follows that building owners will install them in any case in order to minimize their liability and provide enhanced fire and life safety to the building occupants.

Furthermore, the performance based design option can be used to determine how occupant evacuation elevators can be integrated with an exit system in these super high-rise buildings in a cost-effective yet safe and reliable manner. But such a trade-off should not be contained in the prescriptive code requirements for these super high-rise buildings.

Let's get some experience with the voluntary use of occupant evacuation elevators in this country that don't substitute for any of the required exit capacity before we begin to allow such trade-offs. In essence, the trade-off is a de facto substitution of an elevator system for a required means of egress which is clearly prohibited by Section 1003.7 which states: "Elevators, escalators, and moving walks shall not be used as a component of a required means of egress from any other part of the building.

It was also noted that these occupant evacuation elevators would be a significant improvement for persons with disabilities to allow for self-evacuation with the general population. We can't argue with that statement but we can point out that the International Building Code (IBC) currently provides for occupant evacuation of persons with disabilities via elevators in accordance with Section 1007.2.1 Elevators Required which is part of the requirements for the accessible means of egress.

In conclusion, now is not the time to allow for a trade-off of the required means of egress capacity for the use of occupant evacuation elevators in super high-rise buildings. Therefore, we strongly urge the Class A voting members to overturn the Committee's recommendation for disapproval and subsequently vote for approval as submitted of this code change proposal to delete the trade-off.

Final Action: AS AM AMPC____ D

G48-09/10

403.6.1, 3007.1, 3007.1.1 (New)

Proposed Change as Submitted

Proponent: Dave Frable, representing U.S. General Services Administration

Revise as follows:

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, a minimum of ~~one~~ two elevators having a minimum 3,500 pounds (1588 kilograms) capacity serving every floor within the subject building shall be provided to serve as a fire service access elevator ~~shall be provided~~ in accordance with Section 3007.

> **Exception:** One elevator having a minimum capacity of 4,000 pounds (1814 kilograms) shall be permitted instead of 2 elevators of 3,500 pounds (1588 kilograms) capacity.

3007.1 General. Where required by Section 403.6.1, every floor of the building shall be served by ~~a~~ fire service access ~~elevator~~ elevators. Except as modified in ~~this section, the~~ Sections 3007.1 through 3007.7, fire service access ~~elevator~~ elevators shall be installed in accordance with this chapter and ASME A17.1/CSA B44.

Reason: Last Code Development Cycle, a code change was submitted to require a minimum of 3 fire service elevators. The subject proposal was disapproved by the Code Committee based on concerns that requiring a minimum of 3 fire service access elevators would have an adverse impact on a small footprint high-rise building and that requiring a minimum of 3 fire service access elevators seemed excessive. The intent of this code change is to provide a compromise that addresses the minimum number of fire service access elevators that are required in a building based on the size and capacity of the elevator and not strictly the number of elevators. The proposed text also allows for design flexibility as well as providing minimum requirements for the size and capacity of the fire service access elevators by correlating with Section 3002.4

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: FRABLE-G6-403.6.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The option of three elevators in G49-09/10 is preferred to one or two elevators with a higher capacity car as proposed in this item. If the trade-off is capacity vs. number of elevators the fire service would prefer more elevators to allow for different elevators to be used for different purposes. Whether fire service elevators need to be also sized for stretchers can be addressed in G157-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dave Frable, representing U.S. General Services Administration, requests Approval as Submitted.

Commenter's Reason: The intent of this code change is to address that the minimum number of fire service access elevators be based on size and capacity of the elevator and not strictly on the minimum number of elevators. In addition, it ensures that each fire service access elevator serves every floor of the building and that at least 1 fire service elevator car be of sufficient size to accommodate a 24 inch by 84 inch stretcher.

The Code Committee states in their reason statement that the option of three elevators in G49-09/10 is preferred to providing only two elevators with a higher capacity car as proposed. The Committee further states that if the trade-off is capacity vs. number of elevators the fire service would prefer to have available more elevators to allow for different elevators to be used for different purposes and to ensure an elevator car is available for fire department use.

It is our opinion, requiring a minimum of 3 fire service elevators for every building of 10 stories or more is not reasonable for all building designs and occupancy classifications. We strongly believe that without taking into consideration elevator capacity, a typical 10 story commercial office building having a small floor plate will lead to unintended architectural design consequences since each fire service elevator lobby will be required to have direct access to an exit stair. For example, a small floor plate building with two passenger elevator cars in one shaft and one service car/freight elevator car in another shaft would need both elevator lobbies providing direct access to the exit stairs while still meeting the exit remoteness requirements in the Code.

Typically in new commercial office buildings of this height, passenger elevator cars can range from a small 2,500 pound capacity elevator car, to a medium 3,500 pound capacity car, to larger 4,000 pound capacity elevator car. Therefore, the size of the available space within each car can range from 28 sq ft per car, 36 square feet per car, and to 41 sq ft per car, respectively. The premise of this code change is the larger the space within the elevator car the less number of trips and number of elevator cars the fire department may need to make to the staging floor on the upper floors of the building.

The subject exception is similar to what the City of San Francisco has required since 2007 for elevators for fire fighter use to be installed in buildings greater than 20 stories in height. One of the paragraphs within the San Francisco Fire Code states that "Where required, a minimum of one 4500 lb. capacity elevator or two 2500 lb. capacity elevators shall be provided for use as firefighter elevators but are not intended to be for exclusive use of the fire department." Therefore, it appears the City of San Francisco also believes that a minimum of one (1) fire service access is adequate if it is of sufficient size and capacity. However, 4,500 pound capacity elevator cars are typically only installed in hospitals and not commercial office buildings whereas 4,000 pound capacity cars are available in commercial office buildings.

It should also be noted that 2,500 pound capacity elevator cars can no longer accommodate the subject new stretcher dimensions and to our knowledge, a 3,500 pound capacity car can only accommodate the new stretcher dimensions if it is modified to a side door configuration opening. Whereas, the 4,000 pound elevator car will be able to accommodate the new stretcher dimensions without any door modifications.

We believe this revision will allow for maximum design flexibility as well as providing minimum requirements for the size and capacity of the fire service access elevators by correlating with Section 3002.4 and will improve the use of fire service access elevators across the country.

Lastly, it should be noted that a similar code change was submitted to the NFPA TC on Building Systems during the NFPA Code Development ROP phase and was approved.

Public Comment 2:

Dave Frable, representing U.S. General Services Administration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, a minimum of two elevators having a minimum 3,500 pounds (1588 kilograms) capacity serving every floor within the subject building shall be provided to serve as a fire service access elevator in accordance with Section 3007.

> ~~**Exception:** One elevator having a minimum capacity of 4,000 pounds (1814 kilograms) shall be permitted instead of 2 elevators of 3,500 pounds (1588 kilograms) capacity.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The intent of this code change is to address that the minimum number of fire service access elevators be based on size and capacity of the elevator and not strictly on the minimum number of elevators. In addition, it ensures that each fire service access elevator serves every floor of the building and that at least 1 fire service elevator car be of sufficient size to accommodate a 24 inch by 84 inch stretcher.

The Code Committee states in their reason statement that the option of three elevators in G49-09/10 is preferred to providing only two elevators with a higher capacity car as proposed. The Committee further state that if the trade-off is capacity vs. number of elevators the fire service would prefer to have available more elevators to allow for different elevators to be used for different purposes and to ensure an elevator car is available for fire department use.

It is our opinion, requiring a minimum of 3 fire service elevators for every building of 10 stories or more is not reasonable for all building designs and occupancy classifications. We strongly believe that without taking into consideration elevator capacity, a typical 10 story commercial office building having a small floor plate will lead to unintended architectural design consequences since each fire service elevator lobby will be required to have direct access to an exit stair. For example, a small floor plate building with two passenger elevator cars in one shaft and one service car/freight elevator car in another shaft would need both elevator lobbies providing direct access to the exit stairs while still meeting the exit remoteness requirements in the Code.

Typically in new commercial office buildings of this height, passenger elevator cars can range from a small 2,500 pound capacity elevator car, to a medium 3,500 pound capacity car, to larger 4,000 pound capacity elevator car. Therefore, the size of the available space within each car can range from 28 sq ft per car, 36 square feet per car, and to 41 sq ft per car, respectively. The premise of this code change is the larger the space within the elevator car the less number of trips and number of elevator cars the fire department may need to make to the staging floor on the upper floors of the building.

It should be noted that 2,500 pound capacity elevator cars can no longer accommodate the subject new stretcher dimensions and to our knowledge, a 3,500 pound capacity car can only accommodate the new stretcher dimensions if it is modified to a side door configuration opening. Whereas, the 4,000 pound elevator car will be able to accommodate the new stretcher dimensions without any door modifications.

We believe this revision will allow for maximum design flexibility as well as providing minimum requirements for the size and capacity of the fire service access elevators by correlating with Section 3002.4 and will improve the use of fire service access elevators across the country.

Lastly, it should be noted that a similar code change was submitted to the NFPA TC on Building Systems during the NFPA Code Development ROP phase and was approved.

Public Comment 3:

Lee J. Kranz, City of Bellevue, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, a minimum of two elevators, each having a minimum 3,500 pounds (1588 kilograms) capacity serving every floor within the subject building, shall be provided to serve as a fire service access elevators in accordance with Section 3007.

> ~~**Exception:** One elevator having a minimum capacity of 4,000 pounds (1814 kilograms) shall be permitted instead of 2 elevators of 3,500 pounds (1588 kilograms) capacity.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Washington Association of Building Official's Technical Code Development Committee (WABO-TCDC) agrees that more fire service access elevators (FSAE) in high-rise buildings greater than 120' in height will improve fire fighter and occupant safety by providing the ability to move suppression equipment and personnel to the fire location expediently. We believe that the economic impacts of increasing the number of FSAE from 1 to 2 (a 100% increase) is justified to provide improved safety for fire fighters and the public. WABO-TCDC recommends disapproval of proposal G-49 that requires an increase from 1 to 3 FSAE and supports the moderate increase provided in proposal G-48, as modified by this public statement. The exception to allow a single 4,000 lb. elevator instead two 3,500 lb. elevators was deleted to insure that at least 2 FSAE elevators would be installed so that if 1 were shut down there would be at least 1 available.

Final Action: AS AM AMPC____ D

G49-09/10
403.6.1

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry, Inc. (NEII), Sean DeCrane, representing International Association of Fire Fighters (IAFF), Jack Murphy, representing Fire Safety Directors of Greater New York (FSDAGNY)

Revise as follows:

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, a minimum of ~~one~~ <u>three</u> fire service access elevator<u>s, or all elevators, whichever is less,</u> shall be provided in accordance with Section 3007.

Reason: The proponents performed a survey of firefighters from across the country to explore the sufficiency of this current code requirement. Thirty-five responses were received from cities such as Charlotte, Orlando, San Francisco, Houston, Los Angeles, Fort Worth, Boston and Pittsburgh, all indicating that the number of elevators used for firefighting operations varies from 2 to 6. (Only one respondent, a suburban bedroom community indicated one elevator is sufficient for firefighting.) Firefighters experienced in high rise operations stated that the Fire Service must be able to count on **at least two** elevators at all times. They are necessary for 1) transporting firefighters to and from the staging area, usually located two floors below the fire floor; 2) moving firefighters to other floors for the purpose of search and rescue, fire extension, recon; hauling of equipment such as spare cylinders, exhaust fans, etc; and, 3) transporting those with disabilities to the building lobby.

Past experience during fires of this type (high-rise), is that on many occasions elevators are not available due to shut downs for various reasons, including problems in operation, routine maintenance, modernization programs, EMS operations in the building prior to firefighter arrival and other reasons. Without this change there will be a high chance that there will not be a Fire Service Access Elevator available for the firefighters' to perform their critical firefighting and life-saving rescue duties.

Cost Impact: This code change will increase the cost of construction.

ICCFILENAME: BLACK-G5-403.6.1

Public Hearing Results

Committee Action: **Approval as Submitted**

Committee Reason: Redundancy in the number of elevators available for fire department use is critical for effective fire fighting operations in buildings tall enough to need Fire Service Access elevators. Elevators size can be addressed in G157-09/10. While there are some issues of additional cost, small foot-print buildings are addressed in the additional language of "or all elevators, whichever is less."

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Modified by this Public Comment.

Modified proposal as follows:

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, a minimum of ~~three~~ <u>two</u> fire service access elevators, or all elevators, whichever is less, shall be provided in accordance with Section 3007. <u>Each fire service access elevator shall have a minimum capacity of 3500 pounds.</u>

Commenter's Reason: There were two code changes proposed to add elevator car size requirements for fire service elevators, namely:

G48: This code change proposed either two elevators (each 3500 pounds) or a single larger elevator (4000 pounds). This code change was disapproved.

G49: This code change proposed three fire service elevators but did not mandate a size. As such the typical size of 2500 pounds would be permitted. This code change was approved.

This public comment is a compromise between G48 which proposed 2 elevators and allowed an exception for 1 provided it could accommodate fire service needs such as a stretcher and this proposed change which requires 3. This comment further mandates a minimum size of 3500 pounds which is consistent with demands for fire service access and stretcher accommodation. There is no technical justification to require 3 fire service elevators.

Public Comment 2:

Dave Frable, representing U.S. General Services Administration, requests Disapproval.

Commenter's Reason: The proponents have stated that the intent of this code change is to increase the minimum number of fire service access elevators from 1 to 3 elevators based on 35 responses from a survey of firefighters who indicated that the number of elevators they used during an event ranged from 2 to 6. However, it should be noted that the survey did not indicate the size of the elevators used by the firefighters. Typically in commercial office buildings, elevator cars can range from 2,500 pound capacity elevator cars to 3,500 pound capacity elevator cars and the size of the available space within each car can range from 28 sq ft per car to 41 sq ft per car respectively. Therefore, in our opinion, the size of the car does matter and it is possible that the firefighters that responded to the survey and stated they utilized multiple elevators were using 2500 pound capacity cars.

In addition, we also believe that requiring all of the elevators in small floor plate building to be fire service access elevators will cause major unintended design consequences when trying to meet the requirement for providing direct access from the subject enclosed fire service access elevator lobbies to an exit stair. For example, a small foot-print building with two passenger elevators in one elevator lobby and a two service car elevators in another lobby would need to be designed such that the exit stairs where remote and still had direct access to each of the elevator lobbies.

We also feel that the proponent's statement that "past experience during fires of this type (high-rise), is that on many occasions elevators are not available due to shut downs for various reasons" is based on the older technology elevators and not elevators using state-of-the-art technology which the subject fire service access elevators will have incorporated into them. Based on our discussions with elevator industry representatives, elevators using today's technology are more reliable and require less maintenance that elevators in the past.

However, the most compelling reason for disapprove of this code change is that as currently written the subject proposal will not meet the intent stated in proponents reason statement. The proponents have stated that "without this change there will be a high chance that there will not be a fire service access elevator available for the firefighters' to perform their critical firefighting and life-saving rescue duties". However, even if one agrees with this statement; based on the requirements in 3007.1, only one (1) of the three (3) designated fire service access elevators will be required to serve every floor and therefore all three (3) designated fire service elevators may not serve every floor, and may lead to confusion during fire department operations as well as unintended consequences.

Lastly, it should be noted that a similar code change was submitted to the NFPA TC on Building Systems during the NFPA Code development ROP phase and was disapproved.

Public Comment 3:

Lee J. Kranz, City of Bellevue, representing Washington Association of Building Officials Technical Code Development Committee, requests Disapproval.

Commenter's Reason: Washington Association of Building Official's Technical Code Development Committee (WABO-TCDC) believes the proposed requirement to provide 3 fire service access elevators (FSAE) in high-rise buildings greater than 120' in height is excessive. This change could increase the cost of construction to the point where it may become economically unrealistic for many high-rise projects to proceed.

WABO-TCDC agrees that additional FSAE in high-rise buildings would improve fire fighter safety and the ability to move suppression equipment and personnel to the fire location expediently but the economic impacts of increasing the number from 1 to 3 (a 200% increase) is not justified. Requiring 3 FSAE would also have an adverse impact on small footprint high-rise buildings.

WABO-TCDC suggests disapproval of G-49 and supports a moderate increase provided in proposal G-48, as modified by our public statement.

Public Comment 4:

Michael Perrino, representing Code Consultants, Inc., requests Disapproval.

Commenter's Reason: This code change requires a single fire department elevator in buildings up to 120 feet. At that threshold the minimum number jumps to three. No justification was put forth for requiring a 200 percent increase in the number of elevators once an imaginary line in the sky is crossed.

While there may be validity to the need for increased fire fighter access, the code has generally addressed such needs through progressively increasing requirements. Should there be a threshold where two elevators are required? Then another where three are required?

This argument was never fully explained at the hearings. Without justification for the sudden jump in requirements (from one to three) there should be a review of what the proper thresholds may be and whether a progressive increase is a more appropriate method to address this issue.

Public Comment 5:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

Commenter's Reason: This code change proposal should be Disapproved for the following reasons:

1. There is inadequate technical justification to mandate three fire service access elevators, particularly in all buildings >120' in height.
2. The current, brand new provisions in the 2009 code require at least one fire service access elevator. While not required, the vast majority of designs would chose to also make this elevator the required ambulance stretcher elevator, since access to each floor of the building must be provided by each type.
3. The current provisions were specifically crafted to allow the use of either the 'general public' elevator lobby or a separate lobby to serve as the required fire service access lobby. By mandating multiple elevators, the size of the required lobby increases significantly, and the likelihood of a design choosing to use a separate lobby is significantly reduced. Combining this with the potential for very tall buildings to also use occupant evacuation elevators, their efficiency would be significantly impacted by multiple fire service access elevators and conflicting lobby uses.

4. A lot of the testimony provided in support of this change made it sound as if elevators are not ever used, and could not ever be used, by the fire service if not for the newly-added fire service access elevator provisions. This is contrary to current ongoing practice in virtually all major jurisdictions.

Final Action: AS AM AMPC____ D

G50-09/10
404.6

Proposed Change as Submitted

Proponent: Michael Perrino, representing Code Consultants, Inc.

Delete and substitute as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 712, or both.

Exceptions:

~~1. A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102mmand 305 mm) away from the glass and designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. The glass shall be installed in a gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.~~

1. A glass wall and doors forming a smoke partition in accordance with Section 711, constructed of a tempered, wired or laminated glass wall and doors, complying with all of the following:
   1.1. Automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102 mm and 305 mm) away from the glass. When activated the sprinkler system shall completely wet the entire surface of the glass.
   1.2. The glass shall be in a gasketed frame and installed in a manner that the framing system will deflect without breaking (loading) the glass before the sprinklers operate.
   1.3. Obstructions shall not be installed between the sprinklers and the glass wall or doors.
2. A glass-block wall assembly in accordance with Section 2110 and having a 3/4-hour fire protection rating.
3. The adjacent spaces of any three *floors* of the atrium shall not be required to be separated from the atrium where such spaces are accounted for in the design of the smoke control system.

Reason: The change brings to the atrium section the allowance for doors to be protected in the same manner as is permitted for walls and doors separating a pedestrian walkway from a building by Section 3104.5, exception 1. The allowances are almost identical as currently written, the only difference being the specific allowance for doors to be installed in the glass walls separating buildings, but not in glass walls separating atrium spaces.

Cost Impact: The code change proposal will not increase the cost of construction. The proposal will decrease the cost of construction.

ICCFILENAME: PERRINO-G2-404.5

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee liked the proposed reformatting of the provisions because it provided clarity to the existing requirements; however the change included some technical flaws. Therefore the committee felt that G51-09/10 better addressed the issue.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Don Davies, Salt Lake City Corporation, representing Utah Chapter, requests Approval as Submitted.

Commenter's Reason: This provision is far superior to G51. The current Ex.1 to I.B.C. Section 404.6 describes a smoke partition with glazing in gasketed frames. The proponent understood the concept that the separation was intended only to control smoke and need not be a fire barrier as is currently required in the code. Requiring a ¾ hour door next to a nonrated wall was always a difficult position to defend. Simply referring to Section 711 addresses the concern that the door be tested to meet the smoke and draft control requirements of U.L. 1784. This is a well thought out change which should have occurred years ago.

Final Action: AS AM AMPC____ D

G51-09/10
404.6

Proposed Change as Submitted

Proponent: Clay Aler, PE, representing Koffel Associates

Revise as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 712, or both.

Exceptions:

1. A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. The glass <u>wall</u> shall be installed in a gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system operates. <u>Self-closing glass doors shall be permitted in the glass wall.</u>
2. A glass-block wall assembly in accordance with Section 2110 and having a 3/4-hour *fire protection rating*.
3. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are accounted for in the design of the smoke control system.

Reason: Where glass walls are used as an atrium enclosure, it is typical to include glass doors in the glass walls to maintain material continuity. The current code text makes no reference to whether glass doors are permitted as part of the atrium enclosure. The proposed revised text will make it clear that glass doors are permitted in glass walls, so long as the glass doors are sprinkler protected in a manner consistent with that provided for the glass wall.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ALER-G1-404.5.doc

Public Hearing Results

Committee Action: **Approval as Submitted**

Committee Reason: The proposal provides a clear answer to the question of whether doors are allowed in the glass wall forming the separation between an atrium and adjoining spaces.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Clay Aler, representing Koffel Associates, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 712, or both.

Exceptions:

<u>1.</u> <u>A fire barrier is not required where</u> a glass wall forming a smoke partition ~~where~~ <u>is provided. The glass wall shall comply</u> ~~complying~~ with all of the following:

1.1 Automatic sprinklers are <u>provided</u> ~~spaced 6 feet (1829 mm) or less~~ along both sides of the separation wall <u>and doors</u>, or on the room side only if there is not a walkway on the atrium side. <u>The sprinklers shall be located</u> ~~and~~ between 4 inches and 12 inches (102 mm and 305 mm) away from the glass <u>and at intervals along the glass not exceeding 6 feet (1829 mm)</u>. <u>The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction</u>;

1.2 The glass wall shall be installed in a gasketed frame ~~so~~ <u>in a manner</u> that the framing system deflects without breaking (loading) the glass before the sprinkler system operates; <u>and</u>

~~1.3~~ ~~Self-closing or automatic-closing~~ <u>Where</u> glass doors ~~shall be permitted~~ <u>are provided</u> in the glass wall, <u>they shall be either self-closing or automatic closing.</u>

2\. A <u>fire barrier is not required where a</u> glass-block wall assembly, ~~in accordance~~ <u>complying</u> with Section 2110 and having a 3/4-hour *fire protection rating,* <u>is provided</u>.

<u>3.</u> <u>A fire barrier is not required between the atrium and</u> the <u>adjoining</u> ~~adjacent~~ spaces of any three floors of the atrium ~~shall not be required to be separated from the atrium where~~ <u>provided</u> such spaces are accounted for in the design of the smoke control system.

Commenter's Reason: The modification to proposal G51-09/10 addresses two issues. First it addresses the Committee's comment to rewrite the approved proposal, specifically item #1 of that proposal, to be in a format more consistent with proposal G50-09/10. In preparing the Exception #1 into its three subparts, it became clear that all three exceptions were unclear because of their format and, in some cases, lack of a complete sentence. The additional revisions to Exception 1 as well as the revisions to Exceptions 2 and 3 are intended to be purely editorial in order to provide the limits and requirements of the exceptions in clear language.

Public Comment 2:

Ali M. Fattah, City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 712, or both.

Exceptions:

1. A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. The glass wall shall be installed in a gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system operates. Self-closing glass doors shall be permitted in the glass wall <u>and shall be provided with smoke and draft control and shall comply with the air leakage rates in Section 715.4.3.1.</u>
2. A glass-block wall assembly in accordance with Section 2110 and having a 3/4-hour fire protection rating.
3. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are accounted for in the design of the smoke control system.

Commenter's Reason: This public comment adds more clarification that the glazed door requires smoke and draft control as is required for the glass wall that is required to be gasketed. It makes no sense to have a self closing glass door in a glass wall assembly that is constructed to prevent the passage of smoke. Sprinkler protection on the glass cools the glass so that it does not fracture due to fire but does not prevent the migration of smoke from the atrium into adjoining spaces that are required to be separated.

Public Comment 3:

Michael Perrino, representing Code Consultants, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 712, or both.

Exceptions:

1. A glass wall forming a smoke partition~~, where~~ complying with all of the following:
   - 1.1 Automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102 mm and 305 mm) away from the glass. The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction;
   - 1.2 The glass wall shall be installed in a gasketed frame ~~so~~ in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates; and
   - 1.3 Self-closing or automatic-closing glass doors shall be permitted in the glass wall.
2. A glass-block wall assembly in accordance with Section 2110 and having a 3/4-hour fire protection rating.
3. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are accounted for in the design of the smoke control system.

Commenter's Reason: The committee liked the proposed reformatting of the provisions in proposal G50-09/10, because it provided clarity to the existing requirements. However, the committee felt that G51-09/10 better addressed the question of whether doors are allowed in the glass wall forming the separation between an atrium and adjoining spaces.

This Public Comment incorporates the formatting of G50 with the technical elements of G51, to address all of the committee's comments on this section.

Public Comment 4:

Don Davis, Salt Lake City Corporation, representing Utah Chapter, requests Disapproval.

Commenter's Reason: Code change G50 correctly addresses the type of door which should occur at the separation of the atrium and adjoining spaces by requiring that the door meet the requirements of a smoke and draft control assembly, as required in U.L. 1784. This proposal allows glass pivoting doors with no mention of how smoke control will occur at that location. The adjoining sidelights and glazed walls are currently required to be in gasketed frames, as opposed to butt glazing which would allow smoke migration. While the door need not be required to be ¾-hour rated, allowing a door without smoke gasketing defeats the purpose of separating the surrounding areas from the atrium.

Final Action: AS AM AMPC____ D

G52-09/10
404.6 (New), 1022.1(IFC [B] 1022.1)

Proposed Change as Submitted

Proponent: David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects

1. Add new text as follows:

404.6 Exit Stairway. Up to 50 percent of the exits required by Section 1021 shall be permitted to be located within an atrium without enclosure required by Section 1022, provided:

1. The stairway discharges to the floor of the atrium;
2. The floor of the atrium is at the level of exit discharge and conforms with Section 1027.1; and
3. The footprint of the stairway when measured horizontally within the perimeter of the atrium floor opening shall not equal more than 25 percent of the area of the atrium on a per floor basis.

(Renumber subsequent sections)

2. Revise as follows:

1022.1 (IFC [B] 1022.1) Enclosures required. Interior exit stairways and interior exit ramps shall be enclosed with fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section

712, or both. Exit enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the exit enclosure shall include any basements but not any mezzanines. Exit enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. Exit enclosures shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An exit enclosure shall not be used for any purpose other than means of egress.

Exceptions:

1. In all occupancies, other than Group H and I occupancies, a stairway is not required to be enclosed when the stairway serves an occupant load of less than 10 and the stairway complies with either Item 1.1 or 1.2. In all cases, the maximum number of connecting open stories shall not exceed two.
   1.1. The stairway is open to not more than one story above its level of exit discharge; or
   1.2. The stairway is open to not more than one story below its level of exit discharge.

<u>2.</u> <u>Exit stairways in atriums conforming to Section 404.6 are not required to be enclosed.</u>

~~2~~<u>3.</u> Exits in buildings of Group A-5 where all portions of the means of egress are essentially open to the outside need not be enclosed.

~~3~~<u>4.</u> Stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.

~~4~~ <u>5.</u> Stairways in open parking structures that serve only the parking structure are not required to be enclosed.

~~5~~<u>6.</u> Stairways in Group I-3 occupancies, as provided for in Section 408.3.8, are not required to be enclosed.

~~6~~<u>7.</u> Means of egress stairways as required by Sections 410.5.3 and 1015.6.1 are not required to be enclosed.

~~7~~<u>8.</u> Means of egress stairways from balconies, galleries or press boxes as provided for in Section 1028.5.1 are not required to be enclosed.

Reason: The atrium enclosure provides adequate protection for occupants of the building by providing fire suppression, smoke removal systems and provides additional features that a stair enclosure lacks; the ability to observe the environment in which the stair is located. It would be a simple matter to glance down into the atrium prior to mounting the stairs to see if there are problems associated with the environment, making the decision to use the atrium stair much simpler than a stair whose environment is unknown beyond the one visible flight of stairs.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: COLLINS-G4-404.6.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal sets no limit on the number of stories or travel distance. In tall buildings the atrium could potentially fill up with smoke enough that some upper floors would have the use of the exit stairway jeopardized. It is not clear how this revision will coordinate with the committee's approval of E5-09/10 for open exit access stairways and open exit stairways.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David S. Collins, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

404.6 Exit stairway. Up to 50 percent of the exits required by Section 1021 shall be permitted to be located within an atrium without enclosure required by Section 1022, provided:

1. The stairway <u>or ramp</u> discharges to the floor of the atrium;
2. The floor of the atrium is at the level of exit discharge and conforms with Section 1027.1; and
3. The footprint of the stairway <u>or ramp</u> when measured horizontally within the perimeter of the atrium floor opening shall not equal more than 25 percent of the area of the atrium on a per floor basis.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The committee rejected this code change for three reasons:

1. *The proposal sets no limit on the number of stories or travel distance.*
   Travel distance is determined by the distance within the occupied space to the exit. With this change, the stair within the atrium would become the exit and the travel distance would be measured to it. An atrium is required to have significant features that provide a safe environment even when it may be involved in an event that would compromise this stair. 50% of the required stairs from any floor would not be permitted to be in the atrium, allowing alternate paths should the atrium stair be compromised.

2. *In tall buildings the atrium could potentially fill up with smoke enough that some upper floors would have the use of the exit stairway jeopardized.*
   It is possible for any exit to become compromised due to any number of circumstances, however a very tall atrium is required to have a smoke removal system capable of maintaining a viable environment at the highest occupied floor within the atrium enclosure. The smoke layer is designed to be at least 6' above the highest occupied floor when using the exhaust method for design (Section 909.8.1).
3. *It is not clear how this revision will coordinate with the committee's approval of E5-09/10 for open exit access stairways and open exit stairways.*
   In a separate comment I have submitted a change to E5-09/10 to incorporate the use of an atrium as an exit as part of Section 1022.2 when it conforms with Section 404.
   Atriums have proven to not create serious problems for building occupants. Because atriums are typically a significant part of the building configuration when they are incorporated into a building, use of an atrium as a part of the building exiting system will improve occupant awareness of at least the option to use the atrium stair as an exit in an emergency.

Final Action: AS AM AMPC____ D

G54-09/10
406.1 (New), 406.2 (New), 406.2.1, 406.3.1, 406.3.2

Proposed Change as Submitted

Proponent: Donald R. Monahan, PE, Walker Parking Consultants, representing the National Parking Association and the Automated & Mechanical Parking Association

1. Add new text as follows:

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

406.1 General. Motor –vehicle related occupancies shall comply with Sections 406.1 through 406.8 and other applicable provisions of this code, the *International Fire Code* and *International Mechanical Code.*

406.2 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

PARKING GARAGE. A building, structure, or portion thereof used for the parking, storage, or both, of motor vehicles less than 6500 lbs empty curb weight.

PARKING GARAGE, OPEN. A parking garage that meets the requirements of Section 406.3.

PARKING GARAGE, ENCLOSED. Any parking garage that is not an open parking garage.

PARKING GARAGE, RAMP TYPE. A parking garage that utilizes sloped floors for vertical vehicle circulation.

PARKING GARAGE, ASSISTED MECHANICAL TYPE. A parking garage that uses lifts or other mechanical devices to transport vehicles to the upper or lower floors of a parking garage, where the vehicles are then parked by an attendant.

PARKING GARAGE. AUTOMATED MECHANICAL TYPE. A parking garage that utilizes computer-controlled machines to store and retrieve vehicles, without drivers, in multi-level storage bays.

(Renumber subsequent sections)

2. Delete without substitution as follows:

406.2 Parking garage

~~**406.2.1 Classification.** Parking garages shall be classified as either open, as defined in Section 406.3, or enclosed and shall meet the appropriate criteria in Section 406.4. Also see Section 509 for special provisions for parking garages.~~

(Renumber subsequent sections)

3. Revise as follows:

406.3 Open parking garages.

406.3.1 Scope. Except where specific provisions are made in Sections 406.3.2 through ~~406.3.13~~ 406.3.12, other requirements of this code shall apply.

4. Delete text as follows:

~~**406.3.2 Definitions.** The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.~~

~~**MECHANICAL-ACCESS OPEN PARKING GARAGES.** *Open parking garages* employing parking machines, lifts, elevators or other mechanical devices for vehicles moving from and to street level and in which public occupancy is prohibited above the street level.~~

~~**OPEN PARKING GARAGE.** A structure or portion of a structure with the openings as described in Section 406.3.3.1 on two or more sides that is used for the parking or storage of private motor vehicles as described in Section 406.3.4.~~

~~**RAMP-ACCESS OPEN PARKING GARAGES.** *Open parking garages* employing a series of continuously rising floors or a series of interconnecting ramps between floors permitting the movement of vehicles under their own power from and to the street level.~~

(Renumber subsequent sections)

Reason: Section 406 applies to parking garages in general. Therefore, the different types of parking garages should be defined in this section. Listing the definitions under Section 406.3 is inappropriate as that section is a special subset of parking garages that only applies to Open Parking Garages. In particular, it is necessary to define the different types of mechanical access garages, as some types of mechanical access garages use freight elevators to lift a vehicle to another floor where it is then parked by an attendant. Therefore, ventilation of vehicle emissions is important for that type of garage. However, automated, mechanical access parking garages are finding their way into the U.S. market from Europe and Asia. These garages use computer-controlled machines to store and retrieve vehicles without the vehicle engine running and without human intervention. The vehicles are stored in an unoccupied, enclosed storage vault. Therefore, the life safety provisions inside that unoccupied storage vault are considerably different than in an occupied space. Only access by maintenance personnel and firefighter personnel is required in the storage vault. Ventilation of vehicle emissions is not required. These garages are not defined in the current building code. Further, up to double the number of vehicles can be accommodated in automated mechanical garages so they represent "Green" design in addition to the reduction in vehicle emissions that make this type of garage greener than traditional garages.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MONAHAN-G4-406.2.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The organization issues were resolved by approval of Item G53-09/10. The committee was uncertain that the revised definitions contained in this proposal were necessary or provided clear application to the rest of the section. In addition there was concern regarding adding a vehicle weight limit to the definition of a parking garage. The committee was concerned regarding its enforceability or that it was even necessary.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephen Thomas, Colorado Code Consulting, LLC, representing Automated Mechanical Parking Association (AMPA), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

~~**406.3.2**~~ **406.2 Definitions**. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

~~**MECHANICAL-ACCESS OPEN PARKING GARAGES.** Open parking garages employing parking machines, lifts, elevators or other mechanical devices for vehicles moving from and to street level and in which public occupancy is prohibited above the street level.~~

ASSISTED MECHANICAL PARKING GARAGE. A parking garage that uses lifts or other mechanical devices to transport vehicles to the upper or lower floors of a parking garage, where the vehicles are then parked by an attendant, and in which public occupancy is prohibited within the storage area.

AUTOMATED MECHANICAL PARKING GARAGE. A parking garage that utilizes computer-controlled machines to store and retrieve vehicles in multi-level storage bays without drivers or attendants, and in which public occupancy is prohibited within the storage bay levels.

OPEN PARKING GARAGE. A structure or portion of a structure with the openings as described in Section 406.3.3.1 on two or more sides that is used for the parking or storage of private motor vehicles as described in Section 406.3.4.

RAMP-ACCESS OPEN PARKING GARAGES. Open parking garages employing a series of continuously rising floors or a series of interconnecting ramps between floors permitting the movement of vehicles under their own power from and to the street level.

Commenter's Reason: This proposal is intended to introduce the concept of automated mechanical parking garages into the code. The first part of the change relocates the definitions in Section 406 to the front of the section in 406.2. This is consistent with code change G53-09/10 which was approved by the General Committee. The second portion of the change splits the definition of "Mechanical Access Open Parking Garages" into two different categories. The first is a garage that used attendants to park the vehicle and the second where a computer-controlled machine parks the vehicle. These types of garages are beginning to make their entry into the United States. Local code officials would prefer to accommodate these types of structures into the IBC.

This proposal is the first of two that introduce this concept into the code. Automated and mechanical parking alternatives have, over the years, become more and more in demand in the US as land becomes less available (and more expensive) and cars more plentiful. While a newly emerging industry in the US, in other parts of the world it has been established for almost half a century. Additional information on these types of parking garages can be found at www.ampapark.org

Final Action: AS AM AMPC____ D

G60-09/10
406.3.3.1.1 (New)

Proposed Change as Submitted

Proponent: Daniel E. Nichols, P.E., representing New York State Division of Code Enforcement and Administration

Add new text as follows:

406.3.3.1.1 Openings below grade. Where openings below grade provide required natural ventilation, the outside horizontal clear space measured perpendicular to the opening shall be one and one-half times the depth of the opening. The depth of the opening shall be measured from the average adjoining ground level to the bottom of the opening.

Reason: One of the main differences between open parking garages and enclosed garages is the ability of the openness on one or two walls to provide adequate natural ventilation. IBC Section 406.3.1.1 clearly states in the section that the openness is for natural ventilation purposes. This is supported by the IMC being completely silent on any requirements for ventilation in an open parking garage.

Open parking garages are generally separated from a surrounding structure due to limitations of fire separation distance (10 feet). However, fire separation distance isn't needed from grades and retaining walls. A condition has been experienced where an open parking garage has been built into a steep grade, and the openings are provided. In one case, a retaining wall is 5 feet away from the exterior wall of the open parking garage and the vertical distance from the lowest level of the open parking garage to the top of the wall is approximately 50 feet.

IBC Section 1203 has requirements for the use of below ground openings being used for natural ventilation. This proposal uses the exact language in Section 1203 to provide recognized design standards for below ground openings.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: NICHOLS-G1-406.3.3.1.1.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee found the text confusing and it would seem to require a below grade area that would have to be wider at the bottom than at the top of the opening at grade. There was debate whether the 1 - 1/2 factor was appropriate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Daniel E. Nichols, P.E., representing New York State Division of Code Enforcement and Administration, requests Approval as Modified by this Public Comment.

Replace the proposal as follows

<u>**406.3.3.1.1 Openings below grade.** Where openings below grade provide required natural ventilation, the outside horizontal clear space shall be one and one-half times the depth of the opening. The width of the horizontal clear space shall be maintained from grade down to the bottom of the lowest required opening.</u>

Commenter's Reason: The committee was concerned on how multiple levels would be measured and that they intended objective was not reflected in the original proposal. This public comment addresses the issue by basing the measurement point on the depth of the lowest required opening. The one and one-half is based on the requirement of openings below grade for providing natural ventilation for operable windows in occupied spaces.

Final Action: AS AM AMPC____ D

G64-09/10, PART I

IBC 406.7 (New), IFC 2303.2

NOTES: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING <u>ALL</u> OF PART I.

Proposed Change as Submitted

Proponent: Donald R. Monahan, PE, Walker Parking Consultants, representing the National Parking Association and the Automated & Mechanical Parking Association

PART I – IBC GENERAL

1. Add a new section as follows:

<u>**406.7 Parking garages, automated mechanical type.**</u>

<u>**406.7.1 General.** Automated mechanical type parking garages shall comply with Sections 406.7.1 through 406.7.3.</u>

<u>**406.7.2 Construction.** The storage vault enclosure is classified as a high-bay storage warehouse for motor vehicles, and shall meet the requirements of Chapter 23 of the *International Fire Code*.</u>

<u>**406.7.3 Storage Racks.** The storage racks shall consist of non-combustible construction. Steel storage racks shall designed in accordance with Section 2208.</u>

Reason: (IBC) Automated, mechanical-access parking garages are finding their way into the U.S. market from Europe and Asia. These facilities utilize computer-controlled machines and lifts to store and retrieve vehicles on a platform without the engine running and without human intervention in an unoccupied, high-bay storage vault. They have unique fire and life safety issues and as such need a separate code section to define the code requirements for these unique facilities.

References: *Parking Structure Fires* by the Parking Consultants Council of the National Parking Association, Washington, DC, December 2008

Cost Impact: None

ICCFILENAME: MONAHAN-G5-406.7 NEW (Pt II F2-2303.2)

Public Hearing Results

PART I- IBC GENERAL

Committee Action: **Disapproved**

Committee Reason: The committee felt that standards for automated garages eventually need to be in the code, however this proposal needs further refinement. Among the issues identified by the committee that need to be clarified are: How would sprinklers be provided; Should there be different criteria if these are in open versus enclosed garages; Egress and accessibility need to be addressed; While there may be limited occupant load, the occupancy is still a storage facility for cars, therefore a Group S occupancy. Clear provisions on structural requirements would need to be added.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephen Thomas, Colorado Code Consulting, LLC, representing Automated Mechanical Parking Association (AMPA), requests Approval as Modified by this Public Comment for Part I.

Modify the proposal as follows:

406.7 <u>Automated mechanical</u> parking garages~~, automated mechanical type~~.

406.7.1 General. Automated mechanical type parking garages shall comply with Sections 406.7.2 through 406.7.3.

406.7.2 Construction. The storage vault enclosure ~~is classified as a high-bay storage warehouse storage for motor vehicles, and~~ shall meet the requirements of Chapter 23 of the *International Fire Code*.

406.7.3 Storage Racks. The storage racks shall consist of non-combustible construction. Steel storage racks shall designed in accordance with Section 2208.

Commenter's Reason: This proposal is intended to introduce the concept of automated mechanical parking garages into the code. The jurisdictions that have reviewed these structures in the United States have required them to comply with the high-piled storage requirements of the IFC. The committee agreed that standards for automated garages need to be in the code. They had concerns about different aspects of the change. By requiring the storage vault to comply with Chapter 23 of the IFC, the fire protection requirements will be answered and generally the buildings will be required to be sprinklered or provided with draft curtains and smoke and heat vents. The committee also questioned whether the criteria should apply to both open and enclosed facilities. The proposed language does not differentiate between the two. It is designed for enclosed facilities and can be applied to open structures. An open structure would provide a safer condition from a fire and smoke standpoint, but the design would comply with an enclosed structure requirements. We believe that the egress and accessibility requirements are already handled in the code. There is no need to add specific requirements into the code for these types of buildings. The committee agreed that these buildings are classified as a Group S occupancy and therefore, all of the requirements for that use group would need to be met.

These types of garages are beginning to make their entry into the United States. Local code officials are would prefer to accommodate these types of structures into the IBC. This proposal is the second of two that introduce this concept into the code. Automated and mechanical parking alternatives have, over the years, become more and more in demand in the US as land becomes less available (and more expensive) and cars more plentiful. While a newly emerging industry in the US, in other parts of the world it has been established for almost half a century. Additional information on these types of parking garages can be found at www.ampapark.org

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

G64-09/10, PART II – IFC

Revise text as follows:

2303.2 Class I commodities. Class I commodities are essentially noncombustible products on wooden or nonexpanded polyethylene solid deck pallets, in ordinary corrugated cartons with or without single-thickness dividers, or in ordinary paper wrappings with or without pallets. Class I commodities are allowed to contain a limited amount of Group A plastics in accordance with Section 2303.7.4. Examples of Class I commodities include, but are not limited to, the following:

Alcoholic beverages not exceeding 20-percent alcohol
Appliances noncombustible, electrical
Cement in bags
Ceramics
Dairy products in nonwax-coated containers (excluding bottles)
Dry insecticides
Foods in noncombustible containers
Fresh fruits and vegetables in nonplastic trays or containers
Frozen foods
Glass
Glycol in metal cans
Gypsum board
Inert materials, bagged
Insulation, noncombustible
Motor vehicles less than 6500 pounds empty curb weight
Noncombustible liquids in plastic containers having less than a 5-gallon (19 L) capacity
Noncombustible metal products

Reason (IFC): Automated, mechanical-access parking garages are finding their way into the U.S. market from Europe and Asia. These facilities utilize computer-controlled machines and lifts to store and retrieve vehicles without the engine running and without human intervention in an unoccupied, high-bay storage vault. They have unique fire and life safety issues that are similar to high piled storage of commodities covered by Chapter 23 of the IFC and therefore should be included in this Chapter. The reference below indicates that the amount of combustibles in a typical passenger vehicle is less than 5 pounds per sf, which then classifies passenger vehicles as low hazard in accordance with NIST standards and qualifies as a Class I commodity in this section.

References: *Parking Structure Fires* by the Parking Consultants Council of the National Parking Association, Washington, DC, December 2008

Cost Impact: None

PART II- IFC

Committee Action: **Disapproved**

Committee Reason: The committee questioned the selection of the 6500 pound limit for the vehicles. Many common vehicles exceed that weight. The committee also felt there was not sufficient justification provided for listing these as a Class I commodity based on the fuel load present. Proponent should reconsider the classification.

Assembly Action: **None**

G70-09/10
[F] 410.6

Proposed Change as Submitted

Proponent: Bill Conner, representing American Society of Theatre Consultants

Revise as follows:

[F] 410.6 Automatic sprinkler system. Stages and associated dressing rooms, performer lounges, shops, storerooms and technical production areas located within and adjoining a stage shall be equipped with an automatic ~~fire-extinguishing~~ sprinkler system in accordance with ~~Chapter 9~~ Section 903.3.1.1. ~~Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.~~

Exceptions:

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height that are utilized exclusively for storage of tables and chairs, provided the concealed space is separated from the adjacent spaces by not less than 5/8-inch (15.9 mm) Type X gypsum board.

2. Sprinklers are not required for stages 1,000 square feet (93 m2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on stages.

Reason: Update language to be consistent with other parts of the code. This also provides a specific reference to Section 903.3.1.1 which contains the reference to the NFPA 13 requirements. The NFPA standard provides adequate information regarding the placement of sprinklers in the backstage and other technical production areas, and such language is not needed in the code.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: There is an MOE code change proposal that contains a definition of technical production areas.

ICCFILENAME: CONNER-G1-410.6

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it was felt it would eliminate sprinklers in critical areas such as gridirons.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce, Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

[F] 410.6 (IFC 914.6.1) Automatic sprinkler system. Stages shall be equipped with an automatic ~~fire-extinguishing~~ sprinkler system in accordance with ~~Chapter 9~~ Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

(Remaining text remains unchanged.)

Commenter's Reason: This Public Comment essentially retains the original text in Section 410.6 except for the reference to Chapter 9. The code change proposed to revise the vague Chapter 9 reference with a specific reference to Section 903.3.1.1.

This Public Comment intends to approve the proposed reference to Section 903.3.1.1, rather than a reference to Chapter 9. Section 903.3.1.1 is the correct reference for the sprinkler system design as this will refer to NFPA 13. Both NFPA 13R and NFPA 13D are inappropriate design standards for a fire sprinkler system over a stage. The change also maintains the update to consistent language referring to an automatic sprinkler system rather than a fire-extinguishing system.

Final Action: AS AM AMPC____ D

G80-09/10
419.9 (New)

Proposed Change as Submitted

Proponent: Tom Rubottom City of Westminster, Colorado representing the Colorado Chapter of ICC

Add new text as follows:

419.9 Plumbing facilities. The nonresidential area of the live/work unit shall be provided with minimum plumbing facilities as specified by Chapter 29, based on the function of the nonresidential area.

Reason: The current code requirements do not require toilet facilities for the work area of a live/work unit. Live/work units are classified as Group R-2 occupancies. The only toilet facilities now required are those for the dwelling unit which could be located on the upper floors and therefore there would be no requirements for any plumbing fixtures on the main level work area. The toilet room in the dwelling unit will not be accessible to the same standards as required for an accessible public toilet room in business and commercial occupancies. This code change would add language to make sure the work area would have the same minimum plumbing facilities (both for number of fixtures and for meeting accessibility requirements) as a typical commercial project.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: RUBOTTOM-G2-419.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The intent of the live/work provisions is small business oriented. The proposal is too far reaching for the limited size of live/work units. A valid concern is that the toilets required for the work area can be accessed from the work area.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tim Pate representing Colorado Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

419.9 Plumbing facilities. The nonresidential area of the live/work unit shall be provided with minimum plumbing facilities as specified by Chapter 29, based on the function of the nonresidential area. <u>Where the nonresidential area of the live/work unit is required to be accessible by Section 1103.2.13, the plumbing fixtures specified by Chapter 29 shall be accessible.</u>

Commenter's Reason: This public comment and modification will address the concerns of the General Committee that the original proposal was too far reaching for the limited sizes of live work units and that the live work provisions are small business oriented.

The live/work provisions allow the total square footage to be 3,000 and up to 50% of that can be the work area. In reality since the total square footage allowed for the work portion of a live work unit is 1,500 square feet only one bathroom would be required in almost every situation and you would rarely require a drinking fountain.

Section 2902.2 exception 2 only requires one bathroom when total occupant load (employees and customers) is 15 or less and Section 2902.2 exception 3 only requires one bathroom when occupant load is 50 or less. Therefore if a work portion is business you would have a maximum area of 1,500 square feet which would be an occupant load of 15 and if work area is mercantile you would have an occupant load of 50. In either case you would only be required to have one bathroom. If you had a coffee shop or food service you would need two bathrooms when square footage exceeded 195 square feet (assuming two employees and 15 square feet per occupant for seating).

Footnote f of Table 2902.1 says that you do not need drinking fountain when the occupant load is 15 or less and IPC section 4 says that you do not need drinking fountain in restaurant that serves water. Therefore in most cases you would not need a drinking fountain.

Table 2902.1 does require a service sink in all occupancies. This is always a challenge in the typical small commercial spaces and most AHJ's use proper discretion when enforcing this provision based on the type of use. One would make the case that a typical laundry sink that is in the living portion of the live/work unit could suffice. I believe that most Health Departments would require some sort of service sink anyway.

The live/work provisions allow up to 5 non residential workers and it does not make sense to not require bathrooms for the workers so that they would have to travel through the private living space to get to a bathroom not to mention the accessible route requirements.

A final item to keep in mind is that if the work area is an office and is less than 10% of total square footage it is not classified as live/work.

As can be seen having Section 419 refer to Chapter 29 for plumbing fixture requirements it will be rare to ever require more than one bathroom or even to require a drinking fountain. It does not make sense to treat this business use any differently than someone building under the IBC. The live/work provision already refer to ventilation provisions out of IMC and structural, means of egress, and accessibility provisions out of IBC. It should also refer to the plumbing fixture requirements.

Final Action: AS AM AMPC____ D

G81-09/10

420.2, Table 503, Table 508.4, 509.5, 509.6, 705.11, 707.3.10 (New), 709.3, 709.4, 717.3.2, 717.4.2

Proposed Change as Submitted

Proponent: Jason Thompson, National Concrete Masonry Association, representing the Masonry Alliance for Codes and Standards

1. Revise as follows:

420.2 Separation walls. Walls separating dwelling units in the same building, walls separating sleeping units in the same building, and walls separating dwelling units or sleeping units in the same building shall be constructed as fire ~~partitions~~ barriers in accordance with Section ~~709~~ 707.

> **Exception:** In Group R-3 occupancies, walls separating dwelling units in the same building, walls separating sleeping units in the same building, and walls separating dwelling units or sleeping units in the same building shall be constructed as fire partitions in accordance with Section 709.

TABLE 503
ALLOWABLE BUILDING HEIGHT AREAS[a]
Building height limitations shown in feet above grade plane. Story limitations shown as stories above grade plane
Building area limitations shown in square feet as determined by the definition of "Area, building", per floor.

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
	Hgt (ft)	UL	160	65	55	65	55	65	50	40
Group		STORIES (S) AREA (A)								
I-1	S A	UL UL	9 55,000	4 19,000	3 10,000	~~4~~ NP ~~16,500~~ NP	~~3~~ NP ~~10,000~~ NP	~~4~~ NP ~~18,000~~ NP	~~3~~ NP ~~10,500~~ NP	~~2~~ NP ~~4,500~~ NP
R-1	S A	UL UL	11 UL	4 24,000	4 16,000	~~4~~ NP ~~24,000~~ NP	~~4~~ NP ~~16,000~~ NP	~~4~~ NP ~~20,500~~ NP	~~3~~ NP ~~12,000~~ NP	~~2~~ NP ~~7,000~~ NP
R-2	S A	UL UL	11 UL	4 24,000	4 16,000	~~4~~ NP ~~24,000~~ NP	~~4~~ NP ~~16,000~~ NP	~~4~~ NP ~~20,500~~ NP	~~3~~ NP ~~12,000~~ NP	~~2~~ NP ~~7,000~~ NP

(Portions of table not shown are unchanged)

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

	A[d], E		I-1, R-1, R-2		~~I-1~~, I-3, I-4		I-2		R-3, R-4		F-2, S-2[b], U		B, F-1, M,S-1		H-1		H-2		H-3, H-4, H-5	
OCCUPANCY	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A[d], E	N	N	2	NP	1	2	2	NP	1	~~2~~ NP	N	1	1	2	NP	NP	3	4	2	3[a]
I-1, R-1, R-2			2	NP	2	2	2	NP	1	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
~~I-1~~, I-3, I-4					N	N	2	NP	1	NP	1	~~2~~ NP	1	~~2~~ NP	NP	NP	3	NP	2	NP
I-2							N	N	2	NP	2[e]	NP	2	NP	NP	NP	3	NP	2	NP
R-3, R-4									N	N	1[c]	~~2[e]~~ NP	1	~~2~~ NP	NP	NP	3	NP	2	NP
F-2, S-2[b], U											N	N	1	2	NP	NP	3	4	2	3[a]
B, F-1, M, S-1													N	N	NP	NP	2	3	1	2[a]
H-1															N	NP	NP	NP	NP	NP
H-2																	N	NP	1	NP
H-3, H-4, H-5																			1[ef]	NP

(Footnotes not shown are unchanged.)

2. Delete without substitution as follows:

~~**509.5 Groups R-1 and R-2 buildings of Type IIIA construction.** The height limitation for buildings of Type IIIA construction in Groups R-1 and R-2 shall be increased to six stories and 75 feet (22 860 mm) where the first floor assembly above the basement has a fire-resistance rating of not less than 3 hours and the floor area is subdivided by 2-hour fire-resistance-rated fire walls into areas of not more than 3,000 square feet (279 m^2).~~

~~**509.6 Groups R-1 and R-2 buildings of Type IIA construction.** The height limitation for buildings of Type IIA construction in Groups R-1 and R-2 shall be increased to nine stories and 100 feet (30 480 mm) where the building is separated by not less than 50 feet (15 240 mm) from any other building on the lot and from lot lines, the exits are segregated in an area enclosed by a 2-hour fire-resistance-rated fire wall and the first floor assembly has a fire-resistance rating of not less than 1$^1/_2$ hours.~~

3. Revise as follows:

705.11 Parapets. Parapets shall be provided on *exterior walls* of buildings.

Exceptions:

1. through 4. *(Exceptions not shown remain unchanged)*
5. In Group~~s R-2 and~~ R-3 where the entire building is provided with a Class C roof covering, the exterior wall shall be permitted to terminate at the underside of the roof sheathing or deck in Type III, IV and V construction, provided:
   5.1. The roof sheathing or deck is constructed of *approved* noncombustible materials or of *fire-retardant-treated wood* for a distance of 4 feet (1220 mm); or
   5.2. The roof is protected with 0.625-inch (16 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm).
6. *(Exceptions not shown remain unchanged)*

4. Add new text as follows:

<u>**707.3.10 Separation of dwelling units and sleeping units.** The fire-resistance rating of the separation between individual dwelling units and sleeping units, and between dwelling units and sleeping units and other spaces in the building shall comply with Table 707.3.9.</u>

<u>**Exception:** In Group R-3 occupancies, walls separating dwelling units in the same building, walls separating sleeping units in the same building, and walls separating dwelling units or sleeping units in the same building shall be a fire-resistance-rating in accordance with Section 709.3.</u>

5. Revise as follows:

709.3 Fire-resistance rating. Fire partitions shall have a fire-resistance rating of not less than 1 hour.

Exception~~s~~:

~~1.~~ Corridor walls permitted to have a ½ hour fire-resistance rating by Table 1018.1.

~~2. Dwelling unit and sleeping unit separations in buildings of Type IIB, IIIB and VB construction shall have fire-resistance ratings of not less than ½ hour in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

709.4 Continuity. Fire partitions shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above or to the fire-resistance-rated floor/ceiling or roof/ceiling assembly above, and shall be securely attached thereto. If the partitions are not continuous to the sheathing, deck or slab, and where constructed of combustible construction, the space between the ceiling and the sheathing, deck or slab above shall be fireblocked or draftstopped in accordance with Sections 717.2 and 717.3 at the partition line. The supporting construction shall be protected to afford the required fire-resistance rating of the wall supported, except for walls separating tenant spaces in covered mall buildings, ~~walls separating dwelling units,~~ ~~walls separating sleeping units~~ and corridor walls in buildings of Type IIB, IIIB and VB construction.

Exceptions:

1. through 4. *(Exceptions not shown remain unchanged)*
~~5. Fireblocking or draftstopping is not required at the partition line in Group R-2 buildings that do not exceed four stories above grade plane, provided the attic space is subdivided by draftstopping into areas not exceeding 3,000 square feet (279 m^2) or above every two dwelling units, whichever is smaller.~~
5.~~6.~~ *(Exceptions not shown remain unchanged)*

717.3.2 Groups ~~R-1, R-2~~, R-3 and R-4. Draftstopping shall be provided in floor/ceiling spaces ~~in Group R-1 buildings, in Group R-2 buildings with three or more dwelling units,~~ in Group R-3 buildings with two dwelling units and in Group R-4 buildings. Draftstopping shall be located above and in line with the dwelling unit and sleeping unit separations.

Exceptions:

1. Draftstopping is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Draftstopping is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2, provided that automatic sprinklers are also installed in the combustible concealed spaces.

6. Delete without substitution as follows:

~~**717.4.2 Groups R-1 and R-2.** Draftstopping shall be provided in *attics*, mansards, overhangs or other concealed roof spaces of Group R-2 buildings with three or more *dwelling units* and in all Group R-1 buildings. Draftstopping shall be installed above, and in line with, *sleeping unit* and *dwelling unit* separation walls that do not extend to the underside of the roof sheathing above.~~

~~**Exceptions:**~~

~~1. Where *corridor* walls provide a *sleeping unit* or *dwelling unit* separation, draftstopping shall only be required above one of the *corridor* walls.~~
~~2. Draftstopping is not required in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.~~
~~3. In occupancies in Group R-2 that do not exceed four *stories above grade plane*, the *attic* space shall be subdivided by draftstops into areas not exceeding 3,000 square feet (279 m^2) or above every two *dwelling units*, whichever is smaller.~~
~~4. Draftstopping is not required in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.2, provided that automatic sprinklers are also installed in the combustible concealed spaces.~~

Reason: Though the loss of life from fires affecting Group I-1, R-1 and R-2 occupancies is not high the amount of property damage continues to remain high. To reduce this loss this proposal modifies the requirements for Group I-1, R-1and R-2 occupancies to require that all buildings constructed for these occupancies shall be constructed of non-combustible construction and the fire rated separations between sleeping and dwelling units shall be a minimum of 2-hour fire resistance rating. The removal of combustible materials from the building construction and the increase in the fire resistance provides a much higher degree of protection to property in the event of a fire. In addition, when occupants in these types of buildings are sleeping they are less likely to be aware of conditions around them. Fires occurring during these times pose a high risk to the occupants. This increase in the fire resistance provides a higher degree of protection to sleeping occupants in reducing the spread of fire.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Thompson-G4-419

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposed change because it appeared by be addressing concerns of property protection and not life safety of the occupants of such buildings. Fire statistics cited were concentrating on buildings under construction, not those completed with required systems in place and occupied by residents. The committee concluded that the safeguards are adequate to continue to allow Group R occupancies to be located in buildings of combustible construction.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, National Concrete Masonry Alliance (NCMA), representing, Masonry Alliance for Codes and Standards (MACS), requests Approval as Submitted.

Commenter's Reason: The IBC General Code Development Committee's statement contained in their Committee Reason indicated that they recommended disapproval of this Code Change because it was more focused on addressing property protection rather than the life safety of the occupants of the Group I-1, R-1, and R-2 occupancy buildings addressed in this Code Change. They also stated that the fire statistics cited during the hearings concentrated more on buildings under construction rather than those completed with required systems in place and occupied by residents. So the Committee concluded that the safeguards were adequate to continue to allow Group R occupancies in buildings of combustible construction.

We have submitted this Public Comment because we disagree with the Committee's reasons for recommending disapproval of this Code Change Proposal. We are asking the Class A voting members to overturn that recommendation for disapproval and then approve this Public Comment as submitted for Code Change G81-09/10.

It is interesting to note that in the Committee Reason the Committee expressed its concerns that the information provided by us at the hearings was mainly about property loss and not threats to the life safety of the occupants. But that was precisely our point. Section 101.3 Intent of Part 1 – Scope and Application of the IBC clearly states that: "The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through… safety to life and property from fire…" Thus, property protection is clearly part of the purpose of the IBC. And it is especially important where property losses affect the overall general welfare of the public which could be seriously harmed by the loss of a significant amount of the housing stock in this country due to fire. As we all know, there is already a shortage of affordable housing in this country, so it should be incumbent upon the IBC to provide a sufficient level of fire and life safety for residential occupancies to minimize property losses to those occupancies that result in the significant loss of available housing units or future housing units due to fires that occur during construction. If this Code Change is approved, it will, in effect, prohibit the construction of Group R occupancy buildings to a height of five stories and 75 feet using one of the nonrated types of construction, i.e. Type IIB and IIIB, with the installation of an NFPA 13 sprinkler system. However, currently Table 503 of the IBC with an NFPA 13R automatic sprinkler system height increase will allow Group R occupancy buildings to be constructed as high as four stories and 60 feet in Types IIB and IIIB construction. These allowable building heights are greater than allowed for any other occupancy classification regulated by the code for these types of construction. Clearly, this does not make any sense since Group R occupancies contain people who are staying overnight sleeping and are thus more vulnerable to fires occurring during the night.

Furthermore, we have researched the last several years of large loss fires reported by the National Fire Protection Association (NFPA) and have discovered a very alarming and disturbing trend in such fires involving three and four story Group R occupancies. It should be noted that NFPA defines a large loss fire as any fire resulting in at least $5 million in property damage. In 2007 residential fires qualifying as large loss fires represented 11% of the number of large loss fires reported and 2% of the total loss with a reported loss for residential fires of $78.5 million. In 2008 residential fires represented 17% of the large loss fires reported to the NFPA which resulted in 7.2% of the total loss with a reported loss of $170.5 million for residential occupancies. Several of these fires involved residential occupancies protected with NFPA 13R sprinkler systems where the attics are allowed to remain unsprinklered, even though they are often constructed of combustible materials in these three and four story buildings as currently allowed by Table 503 of the IBC. And several of these fires occurred in buildings under construction which were to be sprinklered in accordance with NFPA 13R but burned down before the sprinkler system could be installed in an operational mode. Thus, a significant quantity of residential dwelling units and/or apartments have been lost in recent years in buildings allowed to be up to four stories in height of unprotected construction such as Type IIB and IIIB construction.

We should also point out that requiring these Group I-1 and R occupancies to be constructed of noncombustible construction with 2-hour fire-resistant separations between adjacent dwelling units and sleeping units will greatly improve the effectiveness of the NFPA 13R sprinkler systems allowed to be used in these buildings up to four stories in height. Such buildings will have a significantly higher degree of compartmentation and will not contain combustible concealed spaces such as attics which are not required to sprinklered per NFPA 13R. But if the attics are constructed of noncombustible materials, then there is a significantly less likelihood that a fire starting in or spreading into the attic would cause any significant property damage. This, in turn, will result in reduced insurance costs and make the cost of living in residential occupancies more affordable. This will also better assure a stable and sustainable housing stock that is less likely to be lost in significant fires since the fire will in all probability be contained to the unit of origin.

It should be noted that we have performed cost comparison studies throughout various regions of the country to demonstrate that this type of construction is cost effective not only in the short term but also in the long term, as compared to more traditional wood frame construction for such residential type occupancies. So approving this Code Change as submitted will greatly increase the general public welfare and achieve significant reductions in the overall property losses associated with residential type occupancies due to fire. This can all be accomplished without any significant increase in the cost of construction of these residential type occupancies. Therefore, we respectfully request the Class A voting members overturn the Committee's recommendation for disapproval and approve this Public Comment.

Final Action: AS AM AMPC____ D

G83-09/10
424 (New), Chapter 35

Proposed Change as Submitted

Proponent: Edward L. Repic, Architectural Refuse Solutions, LLC, representing self

Add new text as follows:

SECTION 424
RUBBISH CHUTES, RUBBISH COMPACTORS & LAUNDRY CHUTES

424.1 General. Rubbish and laundry chutes and rubbish compactors shall comply with the provisions of Section 424.1 through 424.7 and other applicable provisions of this code. Rubbish and laundry chutes shall comply with Sections 5.1 and 5.2 of NFPA-82, Rubbish compactors shall comply with Chapter 7 of NFPA-82.

424.2 Chute diameter. Chutes shall have a diameter of not less than 24 inches (610 mm). The diameter of the chute shall be maintained for the entire length of the chute,

424.3 Chute materials. The chute shall be constructed of aluminized steel, stainless steel, or galvanized steel of not less than 16 gage, (0.060 inches). The use of thinner materials shall be prohibited.

424.4 Vent. Chutes shall be provided with a vent of the same diameter of the chute. The vent shall extend through the roof. Reduced diameter vents shall be prohibited.

> **Exception.** Subject to the approval of the building official, where the building configuration constrains the continuation of a round vent, a round-to-rectangular transition shall be used above the highest intake allowing the use of a rectangular vent of equivalent, clear cross-sectional area of the round chute being vented. The rectangular vent may either extend to the top of the vent, or where allowed by the building configuration, the vent shall transition from rectangular-to-round before penetrating the roof to create the vent.

424.5 Shaft enclosure at rubbish and laundry chutes. The shaft enclosure containing a rubbish or laundry chute shall comply with Sections 424.5.1 through 424.5.3.

424.5.1 Single sided construction. The chute shaft enclosure shall be of a listed construction that can be fully assembled in accordance with its approved design, including all required drywall taping when required by the design, from one side after the chute has been installed, regardless of the presence of bearing walls supporting floor framing.

424.5.2 Identical floor and wall ratings. A chute shaft enclosure shall provide the required fire protection rating over its entire length. Fire ratings shall not be lower at floor, ceiling or roof framing intersections.

424.5.3 Extend shaft enclosure to roof. The shaft enclosure shall extend to the underside of the roof. Structural framing members supporting the roof shall be outside of the chute shaft enclosure and shall not be permitted inside the shaft enclosure.

424.6 Electric interlocks. Where used, electric interlocks shall be normally engaged. They shall disengage at the door which is signaled to be open. In the event of loss of power, all interlocks shall be in the engaged position.

424.6.1 Safety switch. Electric interlock safety switch shall be provided in the discharge room to permit maintenance of the chute or chute accessories.

424.6.2 Interconnection. Electric interlocks where used with a rubbish compactor shall be interconnected to the power pack of the rubbish compactor to go off line in the event of an alarm notification from the compactor. Such required notifications shall include: container away, emergency shutoff engaged, pressure overload, motor overheating

424.7. Rubbish compactors. Rubbish compactor provisions included in Section 424.6.2 shall apply to all apartment style compactors.

<u>**424.6.1 Power Pack**. Power packs for apartment-style rubbish compactors shall be UL approved.</u>

2. Add new standards to Chapter 35 as follows:

NFPA
<u>82-2004 Gravity Waste or Linen Chutes</u>

Reason: This submittal is part of four such proposals submitted as independent documents with the intent of adequately addressing Trash Chutes (which can include "recycling" chutes that simply redirect parts of the trash waste stream to locations other than a landfill) and Linen (or Laundry) Chutes. These proposals individually address Life Safety, Sprinkler Placement, Accessibility in new and existing facilities, and actual Chute Construction and a related component to Rubbish Chutes: Compactors. Codes generally address the shaft enclosure but ignore the actual chute being enclosed or the compactor it is feeding.

To quote from an authoritative source:

> *"Internationally, code officials recognize the need for a modern, up-to-date building code addressing the design and installation of building systems through requirements emphasizing performance. <u>The International Building Code®,</u> in this 2009 edition, is designed to meet these needs through model code regulations that safeguard the public health and safety in all communities, large and small. This comprehensive building code establishes minimum regulations for building systems using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and new building designs."*

The following information seeks to address the design and installation of a two specific building systems, Rubbish & Laundry Chutes and Rubbish Compactors, to enhance the comprehensive aspects of this code in the full spirit of this quoted material from the Preface of your document. As manufacturers of Chutes and Compactors, with distributors throughout the United States, we see the problems a lack of minimum regulation creates on a daily basis for design professionals. Without regulation design professionals resort to the talent they know best: Design. The problem lies in the fact that they undertake that design function without the benefit of knowing what the industry has learned over the last 90 or so years.

This is not to say that guidelines do not exist. In fact, they do. However, the NFPA-82 document is not a referenced standard to this Code. We are not qualified to recommend the adoption of that entire document as the document addresses items other than chutes and compactors (incinerators, for instance) that are beyond our areas of expertise. We can, however, comment upon and even improve upon the basics included in NFPA-82.

We recommend the addition of certain portions of NFPA-82, namely:
Sections: 5.1 General.
5.2 Gravity Waste or Linen Chutes
Chapter 7 Waste Compactors
(Please note that the words "waste" and "linen" in NFPA-82 correspond to the words "rubbish" and "laundry" in the IBC)
These sections cover several chute-related topics: Design, materials, intakes, discharges, offsets, and vents

Per the "Editor's Note" in section 424.1 These sections should be augmented in two ways:
First, we recommend the addition of certain provisions to NFPA-82 already presented/reasoned under separate proposals and obliquely referenced in Section 424.1, namely:
The Accessibility features outlined in our proposal for
1103.1, 1103.1.1 (new), 1103.1.2 (new);
The Latching and Closing features outlined in our proposal for
708.3.1 (new), 708.3.1.1 (new), 708.3.1.2 (new), 708.3.1.3 (new), 708.13.1, 708.13.3, 715.4.1 Exception (new), 715.4.2, 715.4.8, 715.4.8.1, and 715.4.8.3

Secondly, we recommend other modifications outlined in provisions 424.2 through 424.7. Our reasons for these are as follows:

424.2: Diameter lays the foundation for a common problem in chute design: vent diameter which becomes the subject of the paragraph that follows: 424.3.

424.3: Addresses a problem created by some industry participants who publicly claim adherence to the provisions of NFPA-82 and falsely advertise their material thickness as 16 gage material while actually using 18 gage material. The problem most commonly occurs in Spiral Chute construction. Lighter gage material is used on the premise that 18 gage material is stronger than non-spiraled 16 gage material. This is probably true, but the reasoning is, nonetheless, fallacious. At issue are the burn-through properties of the materials. Physical strength of the material is meaningless beyond the ability of the chute to be supported as chutes convey waste materials; they do not "hold" anything. Again, the issues are Life Safety and Fire Prevention, not Structural Strength.

424.4: Presented are an option (the rectangular-equivalent concept) to permit chutes and their enclosing walls to be installed without structural interference. The importance of venting cannot be over estimated as it provides rapid relief of steam buildup in the event of sprinkler activation during a fire. This prevents the intake doors from being blown open, thereby exposing other smoke protection zones from becoming engaged in the fire.

424.5 and subparagraphs: The proposed additions are designed to overcome common mistakes that most commonly, but not exclusively, occur in wood frame structures. The single side construction concept is crucial as most fire wall designs require full fire taping on both sides of the wall. It is impossible to properly install all required fire taping on the inside surface of a chute enclosure because the chute is in place, as is the chute intake door. Wood framing also commonly creates problems with fire ratings at wall and floor intersection as well as at roof framing interferences.

424.6 and sub paragraphs: Electric interlocks are an extremely popular chute accessory that permits all doors to lock when one door is opened to avoid rubbish from above falling on a depositor below if two or more people are depositing waste at the same time. This is a pretty common occurrence as people tend to throw out their garbage after feeding times, causing back-ups at the intake doors. Some interlocks are manufactured in such a way that they actually energize a downward moving locking mechanism to engage when a door is opened. Said another way the interlocks are held in a retracted position by a spring and then forced down to close all the doors not in use. The problem is that these doors are not protected by the electric interlocks when power drops as it does in a fire emergency. Other manufacturers utilize a common power source ... gravity ... to engage their interlocks and retract a single interlock when the system is activated for a deposit at a specific location. In the power loss scenario, these interlocks are engaged and act as a back up system that protects the firewall penetration from unnecessary exposure in the event of the latch failure scenario described in an another proposal submitted as part of this whole chute discussion. The provisions of Section 424.6.2 is designed to provide protection to maintenance personnel in the event of compactor trouble and during the correction of that trouble.

424.7 and sub paragraph: Rubbish compactor provisions establishes the need to interconnect the electric interlock system and this common piece of equipment for the protection of both the equipment and the personnel involved. The UL standardization is a simple protective feature for building owners, residents, and maintenance personnel.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, NFPA 82, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: REPIC-G1-424 New

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria. . The standard is currently referenced in the IMC code change referenced the 2004 edition, however the 2009 was reviewed anticipating a modification request from the proponent.

Committee Action: Disapproved

Committee Reason: Without the modification that was offered by the proponent, the change would conflict with provisions approved by the Fire Safety Committee for inclusion in Chapter 7. The provisions regarding electrical interlocks are unclear regarding where the interlocks are to be provided.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edward L. Repic, Architectural Refuse Solutions, LLC, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

715.4.8.3 Smoke-activated doors. Automatic-closing doors installed in the following locations shall be automatic-closing by the actuation of smoke detectors installed in accordance with Section 907.3 or by loss of power to the smoke detector or hold-open device. Doors that are automatic-closing by smoke detection shall not have more than a 10-second delay before the door starts to close after the smoke detector is actuated:

(Items 1 through 7 - No changed in the text.)

8. Doors installed in ~~refuse and laundry chutes and~~ <u>chute intake</u> access <u>rooms</u> and termination rooms in accordance with Section 708.13.

(Items 9 through 11 – no change in the text.)

708.13.3 Refuse and laundry chute access rooms. *(No change in the text).*

<u>**708.13.3.1 Chute intake doors.** Chute intake doors installed in refuse and laundry chutes shall comply with the following:</u>

1. <u>The chute intake doors shall be automatic closing by the actuation of an approved automatic heat detector installed in the chute above the highest intake door and complying with the follo;</u>
   - <u>1.1. The approved automatic heat detector shall be heat responsive to a maximum temperature of 135° F. (57° C.); and</u>
   - <u>1.2. The heat detector shall be connected to the building's fire alarm control units where a fire alarm systems is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at a constantly attended location.</u>
2. <u>The chute intake doors shall be connected to an electronic interlock system complying with the following:</u>
   - <u>2.1. The interlock system shall be normally engaged when the intake doors are in a closed position;</u>
   - <u>2.2. The interlock system shall be provided with a manually controlled safety switch in the termination room;</u>
   - <u>2.3. When a refuse compactor is utilized in conjunction with a refuse chute, the manually controlled safety switch shall be interconnected with the automatic alarm circuits of the refuse compactor that initiate compactor shutdown; and</u>
   - <u>2.4. The interlock system components shall be labeled as appropriate for such systems. The interlock system shall utilize a Class 2, low-voltage circuit in accordance with NFPA 70.</u>

Commenter's Reason: *TRASH & LINEN CHUTES ARE ONLY INSTALLED IN BUILDINGS WHERE PEOPLE SLEEP*. Few things are more disorienting than being awakened by a fire alarm and exiting through a darkened, smoke-filled corridor. While Codes do a good job of addressing chute enclosures, the chute itself is almost completely ignored. As chute manufacturers, Life Safety Enhancement of a chute installation for the protection of its end users has become our core value. Nothing in this proposal will sell a single chute for us or anyone else. This proposal introduces applications of chute products and accessories common to all chute manufacturers. These applications are a compilation of the best information we have gained from our experiences and interactions with architects, builders, and fire marshals from across the entire country representing hundreds of installations.

FIRST, SOME CHUTE BACKGROUND IS IN ORDER:

Codes primarily discuss "fire doors" in terms of man doors. However, chute intakes are fire doors that have very different characteristics, functions and life safety impacts than man doors. This proposal begins with the intent of addressing those issues by differentiating between these two types of fire rated doors. Further, this proposal addresses the functional realities of the impact the provisions of Section 715.4.8.3 have on the safety of building maintenance personnel.

While both are fire doors, Chute Intake Doors must be differentiated from Man Doors for at least four major reasons ... each of which can have a critical impact on Life Safety:

1: Chute intake doors are part of a conveyance system (the vertical chute itself) that intersects every single fire containment zone through which that vertical chute passes. We have installed chutes in 60-story buildings. Except at stairwells, man doors simply separate one fire containment zone from another on the same floor.

2: Additionally, chute intake doors are subjected to far more use than most man-type fire doors. The labeled corridor door with a hold open device is closed infrequently ... maybe as little as once a year when it's inspected by a fire marshal. Labeled chute intake doors on each floor of a building with 20 units per floor can be used 20 times a day ... more than 7,000 times per year. In hospital environments we have doors utilized more than three times that often. The need for reliability under high use conditions is crucial, even in the absence of good maintenance because chute doors, like all fire doors, have as their primary purpose, the protection of a fire wall penetration.

3: Further, because refuse chutes use bottom hinged doors with vertical latches at the top of the door panel that extend into the door frame ... a *major* difference in hinge and latch positions from man doors ... the potential for failure during a fire emergency, especially in the presence of poor maintenance, is very high. Labeled chute intake doors can actually fall open, permitting fire to spread up the chute to the next poorly maintained door. There are many documented incidents of trash or laundry room (termination room) fires spreading up a poorly maintained chute five, ten or more stories and doing millions of dollars worth of property damage at incredible distances from the initial blaze location.

4: Finally, because chutes are gravity-driven conveyances, falling debris can reach incredible speeds: up to and including terminal velocity. This combination of mass and speed can create a clear and present danger to those responsible for chute or refuse compactor maintenance under a chute. The most common maintenance action is the replacement of full containers (usually attached to refuse compactors) with empty containers. Unless the intake doors are deactivated during these container changes, anyone dropping something down the chute can seriously endanger maintenance personnel. The use of the word "anyone" is accurate and appropriate when you consider that refuse chutes in residential buildings are typically designated as "General Access Chutes"... chutes open to the public ... by the provisions of NFPA 82 (the standard for waste and linen chutes which was adopted in November 2009 as part of this code).

SECONDLY, LET US LOOK AT THE PARTICULARS OF THIS PROPOSAL:

Section 715.4.8.3, Item 8: is modified to limit its application to Man Doors associated with the access rooms and termination rooms.

Section 708.13 provides requirements of trash and laundry chutes as a specific type of shafts. The new proposal contained in the public comment creates a new subsection within Section 708.13 to provide specific requirements for the small doors – or hatches – that provide access to the chutes. The intent of the provisions of the new 708.13.3.1 is as follows:

Sec. 708.13.3.1: Beginning text specifies what the following standards apply to.

Item #1. This Section directs that a heat detector instead of a smoke detector to address the fact that the environment of the chute interior is filled with dust and vapor that can negatively affect the performance of a smoke detector which is an ion-detection device. The substitution under these conditions is discussed in Section 907.2.3, Exception 2.3. The installation of a detector in the chute is found in NFPA 82 and is recommended because a fire in the chute can be very difficult to detect.

Item #1.1: This provision for the activating temperature of the heat detector is to insure that its alarm precedes the activation of the sprinkler system at which occurs at about 165° F. (73.8° C.). This provides an earlier warning and may also prevent or minimize the water damage common to sprinkler system activations.

Item #1.2: This provision serves two purposes: 1: Augmentation of the early warning mentioned above, and 2: rapid identification of the location of the fire. Chutes are not usually the first place people look for a fire.

Item 2 specifically requires an interlock system for the chute access doors and specifies how such system should operate and be built. It recognizes the fact that a component known in the chute industry as an "Electric Interlock" is required to meet the automatic-closing provisions of 715.4.8.3. All chute manufacturers offer electric interlocks as optional equipment for a different purpose. This information is necessary because no one in the chute industry actually installs electric interlocks as standard equipment.

To Clarify: Electric Interlocks (EI's) were designed by the chute industry as a safety feature to protect someone depositing waste or linen into a chute from being hit by materials being dropped from above. Electric interlocks typically include a latch bolt that is supplementary to the primary latch. In refuse chutes the primary latch is mounted in the top of the door panel and extends into the frame above. It is held in its extended position by a spring. In laundry chutes, which utilize side hinged doors, the primary latch extends into the door frame at the side of the door. In both door types, the latch bolt of the electric interlock is mounted in a box above the frame and extends down into the top of the door panel. It is activated by an electric solenoid. The solenoids are interconnected from floor-to-floor so that when one interlock is activated at the intake door of a given floor ... the remaining intake doors remain locked until the door in use signals it is closed. The act of closing activates a switch which resets the system. The system is controlled from a panel in the termination room that includes a manual, on-off safety switch

Item 2.1: Recognizes that gravity is a dependable, low-cost, power source that can be counted upon to hold the interlock system's latch bolts in place. This means that the solenoid is used to raise the activated latch bolt. It also means that in the event of a power loss (as can occur in a fire emergency when normal house power drops out as the emergency generator shunts into action) the interlock's latch bolt is in its latched position. This allows the interlock system to act as a reliable back-up for the primary latch bolt.

To Clarify: This redundancy is valuable because under certain circumstances, the intake door's closer can be disabled ... it actually loses its hydraulic fluid and the cylinder cover melts (at about 350°) ... and the spring holding the primary latch up loses its tension (at about 600°). In tandem, these events can result in the intake door falling open *during a fire.* We have actually demonstrated this under UL fire test conditions. We have also made a related proposal to the ICC (with UL's encouragement and assistance) that received committee approval last November. That proposal requires chute intakes doors, which, as fire doors must be self-closing and self-latching, to *remain* closed and to *remain* latched. The required electric interlock system with normally engaged interlocks provides a simple, safe and effective redundancy to the primary latch.

Item 2.2: Recognizes that the maintenance personnel in the termination room are at risk of injury from falling debris. It further recognizes that the addition of a manual control ... a simple ON-OFF switch ... is all that is needed to protect those people from unnecessary injury.

Item 2.3: Recognizes that refuse compactors are common to trash discharge (termination) rooms. It also recognizes that refuse compactors are commonly equipped with multiple, automatic alarm circuits (shut-off features) that protect maintenance employees from accidental compactor activation during servicing activities, i.e., access door open; container full; and/or motor overload.

To Clarify: The extension of two wires from the compactor's power pack to the automatic shut off switch for the Electric Interlocks is all that is necessary to deactivate the intake doors during any one of these compactor alarm events as a means of protecting employees from falling debris during servicing activities. This provision also reduces the potential for fire when a compactor has been filled, but not serviced. We have seen trash backed up as high as six stories in a chute. We have also seen buildings destroyed when kids decide to drop a lighted cigarette into backed-up chutes as a "joke".

Item 2.4: Establishes a safety standard for the electric interlock circuit in that it is low-voltage (typically 12 or 24 volt), installed in conformance with the provisions of the National Electrical Code (NEC), and provided with tested product components for the safety of the end users. The low voltage condition also provides: 1: ease of installation (conduit is not required for Class 2 circuits); 2: lower electrical operating costs; and 3: protection for the end user or repair personnel from accidental electrocution.

In terms of component labeling, we believe that UL 508 which addresses "Industrial Control Equipment" and, more specifically to that category, "Definite Purpose Controllers" might be a good reference. In the instance of electric interlocks, the definite purpose is Life Safety. The electric interlock is an assembly of several listed components mounted in a box on the top frame of an individual door, which has been assembled to UL 508 manufacturing criteria. The interlock assembly becomes part of a "system" when connected to other components assembled to UL 508 criteria whether they are door interlocks on other floors, heat or smoke detectors, or refuse compactor control panels, or any combination thereof, designed to close the doors for the protection of users and/or maintenance personnel.

Analysis: The standard, UL 508, is already a referenced standard in the *International Mechanical Code* and *International Residential Code*.

Final Action: AS AM AMPC____ D

G83-Revised 3/2.doc

G85-09/10
503.1, Table 503, 507.1

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing self.

Revise as follows:

503.1 General. The building height and area shall not exceed the limits specified in Table 503 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified ~~hereafter~~ <u>by Sections 503.1.1 through 503.1.5 and Sections 504, 506.2 and 506.3</u>. Each portion of a building separated by one or more fire walls complying with Section 706 shall be considered to be a separate building.

503.1.1 Special industrial occupancies. Buildings and structures designed to house special industrial processes that require large areas and unusual building heights to accommodate craneways or special machinery and equipment, including, among others, rolling mills; structural metal fabrication shops and foundries; or the production and distribution of electric, gas or steam power, shall be exempt from the building height and area limitations of Table 503.

503.1.2 Buildings on same lot. Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the building height of each building and the aggregate building area of the buildings are within the limitations of Table 503 as modified by Section 504 and 506. The provisions of this code applicable to the aggregate building shall be applicable to each building.

503.1.3 Type I construction. Buildings of Type I construction permitted to be of unlimited tabular building heights and areas are not subject to the special requirements that allow unlimited area buildings in Section 507 or unlimited building height in Sections 503.1.1 and 504.3 or increased building heights and areas for other types of construction.

503.1.4 Unlimited area buildings. The area of buildings complying with Section 507 shall not be limited by Table 503.
503.1.5 Special provisions. The height and area of buildings complying with Section 509, as applicable, shall not be limited by Table 503.

TABLE 503
ALLOWABLE BUILDING HEIGHTS AND AREAS[a]
(Portions of Table not shown remain unchanged)

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2
A = building area per story. S= stories above grade plane, UL = Unlimited, NP = Not permitted.

~~a.~~ ~~See the following sections for general exceptions to Table 503:~~
~~1.~~ ~~Section 504.2, Allowable building height and story increase due to automatic sprinkler system installation.~~
~~2.~~ ~~Section 506.2, Allowable building area increase due to street frontage.~~
~~3.~~ ~~Section 506.3, Allowable building area increase due to automatic sprinkler system installation.~~
~~4.~~ ~~Section 507, Unlimited area buildings.~~
~~b.~~ a. For open parking structures, see Section 406.3.
~~c.~~ b. For private garages, see Section 406.1.
~~d.~~ c. See Section 415.5 for limitations.

507.1 General. The area of buildings of the occupancies and configurations specified herein shall not be limited by Table 503.

Reason: This code change proposal is editorial. Basically, it deletes Footnote a from Table 503 and incorporates it into the text of the code. We believe that code requirements are better addressed in the body of the code rather than as footnotes to a table unless the footnotes are very specific to the table and not general in nature. However, Footnote a is somewhat broad and can be better handled, in our opinion, by relocating the text to Section 503.1 and making a clarification to Section 507.1. And in order to make Section 503.1 more comprehensive regarding how Table 503 is intended to regulate the allowable building heights and areas, we have incorporated new Subsection 503.1.4 addressing unlimited area buildings regulated by Section 507 and Subsection 503.1.5 Special Provisions regulating heights and areas of buildings complying with Section 509. Thus, the user of the code can find all he or she needs to know regarding the determination of building height and area limitations based on the application of Table 503 and the cases where modifications and/or exceptions are made to that table in accordance with the applicable provisions of the sections referenced in Section 503.1 including its subsections.

The proposed revision to Section 507.1 merely correlates with the revisions made to Section 503.1 to indicate that the building area is not limited by Table 503 for these unlimited area buildings.

In conclusion, we believe that these editorial revisions will provide for better code interpretation, application, and enforcement.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Thornberry-G1-503

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee disapproved the proposal, preferring the existing format of footnotes which quantify and limit the application of Table 503. The phrasing of Section 503.1 was awkward and unclear. Section 503.1.5 is misleading regarding the interaction of Table 503 and Section 509.1

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE, The Code Consortium, Inc., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

503.1 General. The building height and area shall not exceed the limits specified in Table 503 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified by Sections 503.1.1 through 5.3.1.~~5~~3, ~~and Sections~~ 504~~, 506.2~~ and 506~~.3~~. Each portion of a building separated by one or more fire walls complying with Section 706 shall be considered to be a separate building.

503.1.1 Special industrial occupancies. (*No change in text.)*

~~**503.1.4**~~ **<u>503.1.2</u> Unlimited area buildings.** The area of buildings complying with Section 507 shall not be limited by Table 503.

~~**503.1.5**~~ **<u>503.1.3</u> Special provisions.** The height ~~and area~~ of buildings complying with Section 509<u>.5 or Section 509.6</u>~~, as applicable,~~ shall not be limited by Table 503.

~~**503.1.2**~~ **<u>503.1.4</u> Buildings on same lot.** Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the building height of each building and the aggregate building area of the buildings are within the limitations of Table 503 as modified by Section 504 and 506. The provisions of this code applicable to the aggregate building shall be applicable to each building.

~~**503.1.3**~~ **<u>503.1.5</u> Type I construction.** Buildings of Type I construction permitted to be of unlimited tabular building heights and areas are not subject to the special requirements that allow unlimited area buildings in Section 507 or unlimited building height in Sections 503.1.1 and 504.3 or increased building heights and areas for other types of construction.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: We believe that the revisions proposed in this Public Comment to revise our original code change proposal G85-09/10 respond to some of the IBC General Committee's concerns expressed during the hearings when the Committee recommended disapproval. The revisions clarify any direct references to the sections in Chapter 5 that modify Table 503 for height and area. This will eliminate regulation by the footnotes in Table 503 and instead rely directly upon the code text for those sections that are intended to modify Table 503 for determining the maximum allowable building height and area.

Final Action: AS AM AMPC____ D

G86-09/10

503.1.4 (New)

<u>Proposed Change as Submitted</u>

Proponent: Sarah A. Rice, C.B.O., representing self

Add new text as follows:

<u>503.1.4 Occupancies on roofs.</u> <u>Open-air roofs occupied by an occupancy different than the primary occupancy of the building shall not be required to be taken into account when determining the minimum type of construction for the building when the means of egress system from the open-air roof complies with Chapter 10.</u>

> **<u>Exception:</u>** <u>Open-air roofs of buildings of Groups A, B, E, F-2, I, M, R and S-2 occupancies shall not be occupied by Group S-1, F-1 or H occupancies.</u>

Reason: Occupied roof gardens, pool levels and similar uses are literally classified as Group A-3 occupancies but the hazard they present to the building is minimal. So this change proposes that even though their occupancy is Group A-3 (assembly) for determining the minimum level of means of egress from that level, the building not be penalized for their location.

Should a fire incident occur, the very openness of the space will provide venting of any smoke or hot gases that may be generated, in other words it will offer the perfect smoke control system.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-G6-503.1.4.doc

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The proposal is written too broadly and would have a greater impact than the issues discussed by the proponent. At the same time the proposal doesn't really resolve the issues raised. Chapter 9 requires floors below an assembly occupancy to be sprinkler protected, such would not be guaranteed by this proposal. Reference to the means of egress requirements is redundant. This might be more acceptable if it specifically addressed the height and area issues and didn't try to redefine an occupancy.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, CBO, The Preview Group, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

503.1.4 Occupancies on roofs. Open-air roofs ~~occupied by~~ classified as a Group A-3 occupancy ~~an occupancy different than the primary occupancy of the building~~ shall not be required to be taken into account when determining the minimum type of construction for the building when the means of egress system complies with Chapter 10 from the open-air roof to the public way, and the building is equipped with an automatic sprinkler system in accordance with Section 903.1.1 or 903.1.2 ~~complies with Chapter 10~~.

> ~~**Exception:** Open-air roofs of buildings of Groups A, B, E, F-2, I, M, R and S-2 occupancies shall not be occupied by Group S-1, F-1 or H occupancies.~~

Commenter's Reason: The Committee Reason stated that "The proposal is written too broadly" and that "Chapter 9 requires floors below an assembly occupancy to be sprinkler protected." In response to these concerns the scope of the original proposal has been modified so to only address the occupancy which initially prompted the code change, open-air roofs with roof gardens, patios, swimming pools, and other similar functions – Group A-3 occupancies.

The hazards typically associated with open-air assembly spaces are those that are related to the means of egress from such spaces. Thus this provision would require that the means of egress from the open-air roof must comply with Chapter 10 for the Group A-3 occupancy, regardless of the occupancy(s) in the rest of the building, and that it be maintained from the roof to the public way. In addition the building on top of which these open-air assembly spaces would be located is required to be sprinklered.

Final Action: AS AM AMPC____ D

G87-09/10
503.1.4 (New)

Proposed Change as Submitted

Proponent: Ken Kraus, Los Angeles Fire Department

Add new text as follows:

503.1.4 Occupancy location. An occupancy shall not be located above the story or height limit set forth in Table 503. Where Section 504.2 allows modifications to limits of Table 503, occupancies shall not located above the additional story or increased height limit.

Reason: This proposed addition to the Code is intended to clearly disallow the occupancy of roof areas and stories above the height and story limits prescribed in Table 503 and Section 504.2.

As written, the code can be misapplied if areas above the floor level of the highest story allowed (roof and floor surfaces) are considered part of the highest story allowed for occupant use.

This is due to misinterpretation of the definition of Story which states, in part "The portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above".

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KRAUS-G1-503.1.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt this proposal was the opposite extreme from G86-09/10 and was too restrictive. The committee would like to see something in the middle ground between the two code changes.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, representing National Concrete Masonry Alliance (NCMA), Masonry Alliance for Codes and Standards (MACS), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

503.1.4 Allowable height of occupancies. No occupancy shall be located above the maximum allowable building height for that occupancy as determined by Table 503 for the type of construction of the building including any height increases allowed by Sections 504.2, 509.5 and 509.6.

Commenter's Reason: We are submitting this Public Comment because we agree with the proponent's intent to limit the height of occupancies in buildings based upon the building's type of construction and the maximum allowable heights allowed for that type of construction for the occupancy that would be located therein. However, we believe that the requirement can be better stated as indicated by the substitute language for the proposed new Section 503.1.4 Allowable Height of Occupancies. We believe the revised text makes it clear that no occupancy is allowed to be located above the maximum allowable building height which includes both number of story limits and height limits in feet above grade plane for the specific occupancy as determined using Table 503 for the type of construction of the building with any allowable height increases included based on the height increases in Sections 504.2, 509.5 and 509.6.

We believe this is totally consistent with the intent of the code for regulating the allowable height and area of buildings containing various occupancies. This is reinforced by requirements in Section 508.2.3 Allowable Building Height and Area which applies to accessory occupancies. In fact, this section would limit the accessory occupancy height to that of the tabular values in Table 503 without any increases allowed in accordance with Section 504. Of course, this is a more specific requirement so it would take precedence over the more general requirement in this new Section 503.1.4.

Section 508.3.2 Allowable Building Area and Height applies to the nonseparated occupancies option for mixed use and occupancy buildings. It states "The allowable building area and height of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1."

And, finally, Section 508.4.3 Allowable Height which applies to the separated occupancies option for mixed use in occupancy buildings states: "Each separated occupancy shall comply with the building height limitations based on the type of construction of the building in accordance with Section 503.1." It also has an Exception for the special provisions permitted by Section 509 which include Sections 509.5 and 509.6 noted in the proposed new Section 503.1.4.

But common sense should also apply since the allowable building height based on Table 503 with any increases allowed is determined by not only the type of construction of the building but also by the occupancy of the building. This certainly implies that no occupancy should be located to a height greater than that allowed by Table 503 (with any appropriate increases allowed for the building height) based on the building's type of construction. This proposed new section simply states the obvious and correlates with the other requirements in the code for those sections previously noted above. Therefore, we encourage the Class A voting members to overturn the Committee recommendation for disapproval and approve this Code Change Proposal as modified by this Public Comment.

Final Action: AS AM AMPC____ D

G89-09/10
Table 503

Proposed Change as Submitted

Proponent: Jason Thompson, National Concrete Masonry Association, representing the Masonry Alliance for Codes and Standards

Revise as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]

GROUP		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	HEIGHT (feet)	A	B	A	B	A	B	HT	A	B
		UL	160	65	55	65	55	65	50	40
		STORIES (S) AREA (A)								
R-1	S	UL	11	4	~~4~~ 3	4	~~4~~ 3	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
R-2	S	UL	11	4	~~4~~ 3	4	~~4~~ 3	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
R-4	S	UL	11	4	~~4~~ 3	4	~~4~~ 3	4	3	2
	A	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000

(Portions of table and footnotes not shown remain unchanged.)

Reason: One area of concern identified for study by the ICC Code Technology Committee's Height and Area Study Group was 4 and 5 story buildings of non-fire-resistance-rated types of construction. The table below shows the occupancies in the 2006 International Building Code (IBC) where that condition existed for sprinklered buildings of Types IIB and IIIB construction. In addition, the table shows the sprinklered height allowances for these occupancies in the legacy codes.

Type IIB and Type IIIB Construction
Story Comparison (w/ NFPA 13 Sprinkler System)

	SBC	NBC	UBC	2006 IBC
B	5	4	2	**5**
F-2	4	4	2	**4**
M	5	3	2	**5**
S-1	4	3	2	**4**
S-2	4	4	2	**5**
R* (NFPA 13)	5	4	4	**5**
R* (NFPA 13R)	4	4	3	**4**

* - Applies for R-1, R-2 and R-4 Use Groups

The Study Group noted that for Use Group B, M, S-1, and R buildings of Type IIB and Type IIIB construction, the allowance for 4 or 5 stories in the IBC was premised on the story heights allowed in the SBCCI Standard Building Code (SBC). In all these instances, the SBC sprinklered height allowance for those Use Groups was based on a multiple story sprinkler increase. For example, for Use Group R, the SBC allowed 2 stories for unsprinklered construction and 5 stories for sprinklered construction. This exceeded the consistent one story sprinkler height increase incorporated in the IBC height and area provisions. Based on this review, the Study Group identified two anomalies from what was permitted by the legacy codes. First, the story height allowance for S-2 use groups was not based on any of the legacy code allowances. Second, for Use Groups B, M, S-1, and R in Types IIB and IIIB construction, the IBC story height allowance for unsprinklered buildings exceeded what was allowed by any of the legacy codes. For example, the largest height allowed for an unsprinklered Type IIB construction apartment building (Group R-2 occupancy) in any of the legacy codes was the BOCA National Building Code (NBC) allowance for 3 stories. Currently, the IBC allows 4 stories for this condition. Rather than modify the sprinkler increase in the IBC, the Study Group suggested the following recommended story heights for Table 503:

Unsprinklered 2006 IBC Table 503 Values (Revised)

Use Group	IIB	IIIB
B	3	3
M	2	2
S-1	2	2
S-2	3	3
R*	3	3

* - Applies for R-1, R-2 and R-4 Use Groups

In essence, these reductions would eliminate the anomalies created by the multi-story SBC sprinkler increase and drop the IBC values back to the next least restrictive legacy code (in these cases, the NBC). It should be noted that during the ICC Final Action Hearings in Minneapolis for the last code cycle, all of the code changes submitted by the Study Group to reduce the allowable story heights were approved by the ICC Class A voting members with a greater than two-thirds majority vote except for one. That one was Code Change G118-07/08 which is identical to this code change proposal. Although the voting members were able to overturn the Committee's recommendation for disapproval, the code change was subsequently disapproved because the two-thirds (67%) majority vote could not be achieved. The final vote was 243 in favor and 163 opposed (60%). Since a significant majority of the Class A voters wanted to see that code change approved, the change is being resubmitted for reconsideration by the IBC General Committee.

Although the proposal will reduce the allowable height of Group R buildings of Types IIB and IIIB construction by one story, the maximum area (total of all stories) of the tallest building that will then be permitted will generally still be considerably greater than that permitted by any of the legacy codes (see table below). For example, consider a residential building (Group R occupancy) of Type IIB construction, which does not have an NFPA 13 sprinkler system, with a height of 3 stories; the tallest permitted by any of the legacy codes. If less than 20 feet of open space is provided around the building, the IBC permits the total area of all three stories to be 108% greater than the largest total area permitted by the legacy codes. If the width of the open space is increased to 40 feet, the IBC's total area allowed is still 27% greater than the largest area allowed by any of the legacy codes. If an NFPA 13 sprinkler system is provided in a Group R residential building of Type IIB construction, the height of the building can be increased to four stories. If the building has less than 20 feet of open space, the maximum area allowed by the IBC is 50% greater than the largest area allowed by any of the legacy codes. Although allowable heights are proposed to be reduced, the foregoing illustrates that residential buildings will still be able to have total areas that are comparable to or greater than that permitted by the largest areas allowed by any of the legacy codes.

It should be noted that this proposal has no impact on residential buildings equipped with NFPA 13R or NFPA 13D sprinklers since they are not currently allowed to use the height increase for sprinklers.

Occupancy Group	Type of Construction	NFPA 13 Sprinklers – Yes/No	Width of Open Space (ft.)[a, b]	Ratio of IBC Maximum Building Area to the Largest Maximum Building Area Permitted by Legacy Codes				
				Number of Stories				
				1	2	3	4	5
R-1 R-2 R-4	IIB	No	< 20	1.33	1.33	2.08	NPLC	NP
			40	1.17	1.17	1.27	NPLC	NP
		Yes	< 20	1.78	1.67	2.00	1.50	1.20
			40	1.39	1.39	1.67	1.25	1.00
	IIIB	No	< 20	1.33	1.33	2.08	NPLC	NP
			40	1.17	1.17	1.27	NPLC	NP
		Yes	< 20	1.78	1.67	2.00	1.50	1.20
			40	1.39	1.39	1.67	1.25	1.00

NPLC means not permitted by any of the legacy codes, but permitted by the IBC.
NP means not permitted by any of the legacy codes or the IBC.

If this code change is approved, building heights represented by shaded cells will not be permitted by the IBC.
a. Width of open space around 100% of building perimeter.
b. 40 feet was used because the ICBO Uniform Building Code (UBC) required a minimum 40 feet of open space on all sides of the building in order to qualify for a 100% area increase; the maximum permitted by that code. The NBC and SBC permitted maximum open space increases of 150% and 100%, respectively, at 30 feet.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Thompson-G2-T503

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proponent did not provide technical information justifying the reduction of allowable height for these occupancies. The information that was provided was about property loss, not threats to life safety of the occupants.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, National Concrete Masonry Alliance (NCMA), representing Masonry Alliance for Codes and Standards (MACS), requests Approval as Submitted.

Commenter's Reason: We are submitting this Public Comment to our Code Change G89-09/10 requests Approval as submitted because we believe the ICC Class A voting members should have the opportunity to once again vote on this very important issue regarding the reduction by one story of the story height limits in Table 503 for Group R occupancies in buildings of Types IIB and IIIB construction. Approval of this Public Comment will also close the last chapter in the ICC Code Technology Committee's Height and Area Study Group's efforts to revise the height and area requirements of the International Building Code (IBC). The Group R occupancies are the only occupancy classification that did not achieve the two-thirds majority vote needed to approve the series of Code Changes submitted by the Study Group to reduce the allowable story heights for buildings of Types IIB and IIIB construction.

As noted in our Reason Statement for this Code Change, the vote taken during the last ICC Final Action Hearing to overturn the IBC General Code Development Committee's recommendation for disapproval fell slightly short of the two-thirds majority needed by a vote of 243 in favor to 163 opposed for a 60% majority vote. Clearly, this is a significant majority but not enough to achieve that necessary to be successful at the ICC Final Action Hearings. Once again, the IBC General Code Development Committee has recommended this Code Change for disapproval but on a much closer vote of 7 to 5. Thus, we believe the Class A voting members should have this one last chance to complete the ICC Code Technology Committee's Height and Area Study Group Code Change packet to make the building height limits in Table 503 more consistent in relationship to the relative hazards of the other occupancy classifications for the 2012 edition of the IBC. This will be our only opportunity to accomplish such a revision until the next 3 year code cycle for the 2015 edition.

Contrary to the Committee's Reason Statement that no technical information was provided to justify the proposed reduction in the allowable height for these Group R occupancies, we believe that our Reason Statement contains substantial technical justification.

Furthermore, we have researched the last several years of large loss fires reported by the National Fire Protection Association (NFPA) and have discovered a very alarming and disturbing trend in such fires involving three and four story Group R occupancies. It should be noted that NFPA defines a large loss fire as any fire resulting in at least $5 million in property damage. In 2007 residential fires qualifying as large loss fires represented 11% of the number of large-loss fires reported and 2% of the total loss with a reported loss for residential fires of $78.5 million. In 2008 residential fires represented 17% of the large loss fires reported to the NFPA which resulted in 7.2% of the total loss with a reported loss of $170.5 million for residential occupancies. Several of these fires involved residential occupancies protected with NFPA 13R sprinkler systems where the attics are allowed to remain unsprinklered, even though they are often constructed of combustible materials in these three and four story buildings as allowed by Table 503 of the IBC. And several of these fires occurred in buildings under construction which were to be sprinklered in accordance with NFPA 13R but burned down before the sprinkler system could be installed in an operational mode. Thus, a significant quantity of residential dwelling units and/or apartments have been lost in recent years in buildings allowed to be four stories in height of unprotected construction such as Type IIB and IIIB construction.

By reducing the allowable story heights for these types of construction from four stories to three stories, it would only be possible to utilize an NFPA 13R sprinkler system to allow the buildings to be increased in height to four stories. However, buildings greater than four stories in height would be required to be protected with an automatic sprinkler system designed in accordance with NFPA 13 which mandates protection of combustible attic spaces with sprinklers. This would significantly reduce the likelihood of a large-loss fire occurring in these buildings should the fire get into the attic space.

It is interesting to note that in the Committee Statement the Committee expressed its concerns that the information provided by us at the hearings was mainly about property loss and not threats to the life safety of the occupants. But that was precisely our point. Section 101.3 Intent of Part 1 – Scope and Application of the IBC clearly states that: "The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through… safety to life and property from fire…" Thus, property protection is clearly part of the purpose of the IBC. And it is especially important where property losses affect the overall general welfare of the public which could be seriously harmed by the loss of a significant amount of the housing stock in this country due to fire. As we all know, there is already a shortage of affordable housing in this country, so it should be incumbent upon the IBC to provide a sufficient level of fire and life safety for residential occupancies to minimize property losses to those occupancies that result in the significant loss of available housing units or future housing units due to fires that occur during construction. If this Code Change is approved, it will, in effect, prohibit the construction of Group R occupancy buildings to a height of five stories and 75 feet using one of the nonrated types of construction, i.e. Type IIB and IIIB, with the installation of an NFPA 13 sprinkler system. However, currently Table 503 of the IBC with an NFPA 13R automatic sprinkler system height increase will allow Group R occupancy buildings to be constructed as high as four stories and 60 feet in Types IIB and IIIB construction. These allowable building heights are greater than allowed for any other occupancy classification regulated by the code for these types of construction. Clearly, this does not make any sense since Group R occupancies contain people who are staying overnight sleeping and are thus more vulnerable to fires occurring during the night.

It should also be pointed out that there is another anomaly in Chapter 5 as it relates to determining the maximum allowable building area based on automatic sprinkler system protection being provided. Exception 2 to Section 506.4.1 Area Determination allows a four story Group R occupancy building protected with an automatic sprinkler system designed in accordance with NFPA 13R to have its maximum building area determined by multiplying the allowable area per story as determined by Section 506.1 by the number of stories above grade plane. That means that the allowable building area could be four times that allowed for a single story building. This should be compared to the maximum building area allowed for all other occupancy buildings sprinklered in accordance with NFPA 13 which by Item 2 of Section 506.4.1 are only allowed to be three times that allowed for the single story building area for any building three or more stories in height above grade plane. Thus, a Group R occupancy sprinklered with an NFPA 13R sprinkler system (which is not a true property protection system) is allowed to have a greater total building area than a Group R occupancy building, or any other occupancy building for that matter, protected with an NFPA 13R sprinkler system which is both a life safety and a property protection system. So there is less of an incentive to install an NFPA 13 sprinkler system in Group R buildings that are four stories in height.

We intend to provide the Class A voting members at the ICC Final Action Hearings in Dallas with a more detailed analysis of the large loss fire statistics for Group R residential occupancies to support this Code Change Proposal from a property loss/loss of housing stock perspective which we believe is significant and which we believe this Code Change will help to mitigate. Therefore, we urge the Class A voting members to overturn the Committee's recommendation for disapproval and vote for approval as submitted of this Code Change G89-09/10.

Final Action: AS AM AMPC____ D

G90-09/10
Table 503

Proposed Change as Submitted

Proponent: A. Hal Key, PE, Mesa, AZ Fire Department

Revise as follows:

TABLE 503
ALLOWABLE BUILDING HEIGHTS AND AREAS[a]
Building height limitations shown in feet above grade plane. Story limitations shown as stories above grade plane.
Building area limitations shown in square feet, as determined by the definition of "Area, building," per story

		TYPES OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
	Height(feet)	UL	160	65	55	65	55	65	50	40
GROUP	STORIE(S) AREA (A)									
S-1[e]	S A	UL UL	11 48,000	4 26,000	2 17,500	3 26,000	2 17,500	4 25,500	3 14,000	1 9,000

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929m2.
A = building area per story, S = stories above grade plane, UL = Unlimited, NP = Not permitted.

a. See the following sections for general exceptions to Table 503:
   1. Section 504.2, Allowable building height and story increase due to automatic sprinkler system installation.
   2. Section 506.2, Allowable building area increase due to street frontage.
   3. Section 506.3, Allowable building area increase due to automatic sprinkler system installation.
   4. Section 507, Unlimited area buildings.
b. For open parking structures, see Section 406.3.
c. For private garages, see Section 406.1.
d. See Section 415.5 for limitations.
<u>e. For aircraft hangars, see Section 412.2.</u>

(Portions of table not shown remain unchanged)

Reason: During the last cycle, changes were made to Section 412.2 classifying aircraft hangars by the NFPA 409 classifications to determine the fire suppression requirements. These changes created area limitations that a user of the Building Code may not find without going to Section 412.2. The addition of footnote "e" sends the user of the Building Code to this section similarly to other footnotes found in this table.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KEY-G1-TABLE 503.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Committee felt the added reference was not needed because designers and building officials would find the aircraft use special provisions without the assist of this footnote. Committee members expressed concern of starting another laundry list of references.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

A. Hal Key, PE, representing self, requests Approval as Submitted.

Commenter's Reason: The committee disapproved this proposal for the following reason: "Committee felt the added reference was not needed because designers and building officials would find the aircraft use special provisions without the assist of this footnote. Committee members expressed concern of starting another laundry list of references." I disagree with the committee's statement. There already is list with footnotes b and c for Group S-2 occupancies and footnote d for Group H occupancies. This pointer to Chapter 4 is necessary so the designer knows to also look in Chapter 4 for area requirements contained there. Without this footnote, the designer may use only the area limits from Table 503 without realizing that Section 412.2 also limits the area of an aircraft hangar based on its classification as an aircraft hangar and the type of fire protection system installed in that hangar. In fact, none of the S-1 area limitations in Table 503 apply to an aircraft hangar. All the area limitations are now contained in Section 412.2. Note that all aircraft hangars are now S-1 occupancies with the 2009 Edition of the IBC. There are no longer aircraft hangars that are S-2 occupancies. The designer could be severely misled on the area limitations listed in Table 503 for just an S-1 occupancy.

Aircraft hangars are one of those occupancies that are not built very often and as a result most designers will go to the IBC and research this occupancy and not find all the references to it without some help. This proposal is intended to assist both the "once and a while" aircraft hangar designer and the code official in locating the requirements for this special occupancy.

Public Comment 2:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

TABLE 503
ALLOWABLE BUILDING HEIGHTS AND AREAS[a, b]
Building height limitations shown in feet above grade plane. Story limitations shown as stories above grade plane.
Building area limitations shown in square feet, as determined by the definition of "Area, building," per story
(Remove all footnotes from body of table)

a. See the following sections for general exceptions to Table 503:
 1. Section 504.2, Allowable building height and story increase due to automatic sprinkler system installation.
 2. Section 506.2, Allowable building area increase due to street frontage.
 3. Section 506.3, Allowable building area increase due to automatic sprinkler system installation.
 4. Section 507, Unlimited area buildings.

b. ~~For open parking structures, see Section 406.3.~~ See Chapter 4 for specific exceptions to the allowable height and areas in Chapter 5.

~~c. For private garages, see Section 406.1.~~

~~d. See Section 415.5 for limitations.~~

Commenter's Reason: This code change was intended to add a reference note sending the code user to the criteria for aircraft hangers that had been added to the code and placed in Chapter 4. The concern expressed by the committee in rejecting this proposed change was that a list of various conditions would be created. They are right, but lacking a general reference to Chapter 4 exceptions to height and area, the code user would not know that such exceptions exist or that they are exceptions in the first place. This change will send the code user to Chapter 4 for all special occupancy conditions.

Final Action: AS AM AMPC____ D

G91-09/10
504.2

Proposed Change as Submitted

Proponent: Jason Thompson, National Concrete Masonry Association, representing the Masonry Alliance for Codes and Standards

Revise as follows:

504.2 Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story. These increases are permitted in addition to the area increase in accordance with Sections 506.2 and 506.3. ~~For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four stories or 60 feet (19 288 mm), respectively.~~

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. *Fire-resistance rating* substitution in accordance with Table 601, Note d.

Reason: This code change proposes to eliminate the special allowances given for Group R occupancy buildings that are protected with an NFPA 13R automatic sprinkler system as specified in Section 903.3.1.2. Currently, Section 504.2 will allow an increase in the building height of one story and 20 feet where an NFPA 13R sprinkler system is provided, as long as the building does not exceed a total height of four stories or 60 feet. Furthermore, Section 506.4 allows an area increase for the installation of an NFPA 13R sprinkler system for Group R buildings that are greater than three stories in height. It is not appropriate to provide for both an allowance of an area increase and height increase for the types of construction. Where an NFPA 13R sprinkler system is installed the net result in the overall level of safety is a lessening of the passive built-in fire resistance that would be required if one of the NFPA 13R reductions (area or height) were not permitted.

NFPA 13R sprinkler systems primarily provide for life safety in buildings. They were developed for that purpose as clearly stated in Section 1.2 of the 2002 edition of the standard. It is interesting to note the Annex A discussion of the purpose of NFPA 13R which states: “Various levels of sprinkler protection are available to provide life safety and property protection. This standard is designed to provide a high, but not absolute, level of life safety and a lesser level of property protection. Greater protection to both life and property could be achieved by sprinklering all areas in accordance with NFPA 13… it should be recognized that the omission of sprinklers from certain areas could result in the development of untenable conditions in adjacent spaces. Where evacuation times could be delayed, additional sprinkler protection and other fire protection features, such as detection and compartmentation, could be necessary.” That statement says it all about an NFPA 13R sprinkler system.

The intent of the IBC as expressed in Section 101.3 Intent is as follows: “The purpose of this code is to establish the minimum requirements to safeguard the public health, safety, and general welfare… and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.” Allowing the use of an NFPA 13R sprinkler system to increase the size of a building is counter to the intent and purpose of the IBC. Types of construction are designed to limit the height and area of buildings based on the occupancy and the degree of built-in fire-resistive protection and use of combustible or noncombustible construction materials. Buildings are allowed to get larger in area and taller in height with more fire-resistance built in and the reduced use of combustible construction for the building’s structural elements. Therefore, property protection is a primary outcome of the types of construction used. Of course, type of construction also plays a role in life safety, especially in multi-story buildings, and has an impact on fire fighter safety as well. But an NFPA 13R sprinkler system is basically a partial sprinkler system because the standard does not require sprinklers in many concealed combustible areas including attics. So why should a building protected with an NFPA 13R sprinkler system be given the same credit for a building with more complete protection based on NFPA 13 sprinkler system?

Within the last few years there have been many fires involving buildings protected with NFPA 13R sprinkler systems which have burned to the ground. In most of those cases, the fire was able to get into the unprotected combustible attic space and spread throughout the building and then burn downward, overpowering the sprinkler system. It is not logical to allow increases in height and area for sprinkler systems that can not reduce the risk of a building being burned to the ground.

There have been several code changes in the recent two cycles to eliminate this height increase for NFPA 13R sprinkler systems. Though not previously approved the Masonry Alliance for Codes and Standards (MACS) still agrees with the previous proponents’ supporting statements on why this reduction is not warranted. The issues have been clearly stated and adequate reasons given to support this particular code change proposal. Therefore, we respectfully request the Committee approve this code change proposal as submitted for the reasons stated.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Thompson-G6-504.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Fire statistics do not support the reduction of the allowance. There is no data that the fire loss experience is different for three story versus four story building. The NFPA 13R systems are adequate. While there are fires in attics, they rarely result in loss of the building.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jason Thompson, National Concrete Masonry Association (NCMA), representing the Masonry Alliance for Codes and Standards (AMCS), requests Approval as Submitted.

Commenter's Reason: We believe that the large-loss fire statistics compiled by the National Fire Protection Association (NFPA) clearly show a trend in Group R residential occupancies constructed three or four stories in height and protected with NFPA 13R sprinkler systems. The indication that we've been able to conclude from our analysis of the NFPA large-loss fire data for losses greater than $5 million in property damage seems to indicate that fires in Group R occupancies protected with NFPA 13R sprinkler systems are more likely to result in a large loss fire if the fire originates in the attic space or is able to get into the attic space before the sprinkler system below can control it. We intend to provide a detailed analysis of the NFPA large loss fire statistics compiled over the last several years for Group R residential occupancies to support this conclusion which will be made available at the ICC Final Action Hearings for the Class A voting members to review prior to the vote on this Code Change Proposal. We believe that the fire data alone will support this Code Change Proposal which eliminates the allowable height increase of one story and 20 feet for Group R occupancies protected with an NFPA 13R sprinkler system.

We are also concerned that the NFPA 13R sprinkler system is actually being used to "double dip" by allowing both a height increase, as indicated in this section we are trying to revise, as well as an area increase. The area increase is allowed for four story Group R occupancy buildings protected with NFPA 13R sprinkler systems in accordance with Exception 2 to Section 506.4.1 Area Determination. This Exception will allow such a four story building to have a total building area determined by multiplying the number of stories (four) by the allowable area per floor. This, in essence, is an area increase since the total building area allowed for all other occupancies and for all other buildings protected with an NFPA 13 sprinkler system is based on a maximum of three times the area allowed for a single story for buildings three or more stories in height. Thus, a four story building under Item 2 of Section 506.4.1 would only be allowed to have a total building area equal to three times that of a single floor area.

It is interesting to note that this height increase allowance would actually only be used under the current IBC for Group R occupancies of Types VA and VB construction. Type VB construction would be allowed to be increased in building height of two stories/40 feet to three stories/60 feet and a Type VA construction building would be allowed to be increased in the building height from three stories/50 feet to four stories/60 feet where an NFPA 13R sprinkler system is provided. In terms of allowable building height, this would make a Type VA building comparable to a Type IIA or IIIA building when protected with an NFPA 13R sprinkler system. We don't believe that is a reasonable allowance for Type VA construction using a primarily life safety sprinkler system to achieve the increased allowable building height.

We also ask the question: "Is it reasonable to allow a Type VB construction building of a Group R occupancy to be three stories/60 feet in height?" These buildings would have no requirement for fire-resistance ratings of the bearing walls and columns and, of course, would be allowed to have attics unprotected with sprinklers. In essence, this equates a Type VB construction building of a Group R occupancy to a Type VA construction building of the same occupancy classification with the installation of an NFPA 13R sprinkler system. Again, we do not believe this is a reasonable allowance for a life safety type sprinkler system which is being equated to providing 1-hour fire-resistive protection for the structural elements supporting the building.

In conclusion, we believe we have adequately substantiated why the Committee recommendation for disapproval of this Code Change Proposal should be overturned by the Class A voting members at the ICC Final Action Hearings so this Code Change can then be Approval as Submitted to eliminate the allowable building height increase for Group R occupancies protected with an NFPA 13R sprinkler system.

Public Comment 2:

Jason Thompson, National Concrete Masonry Association (NCMA), representing the Masonry Alliance for Codes and Standards (AMCS), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

504.2 Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story. These increases are permitted in addition to the area increase in accordance with the Sections 506.2 and 506.3. For Group R buildings <u>of Type VA</u> construction equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four stories or 60 feet (19 288 mm), respectively.

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. *Fire-resistance rating* substitution in accordance with Table 601, Note d.

Commenter's Reason: This Public Comment is being submitted to offer a compromise to the Class A voting members regarding the sprinkler trade-off for a building height increase of one story and 20 feet to a maximum height of four stories and 60 feet for Group R buildings protected with an NFPA 13R sprinkler system.

The revisions in this Public Comment will limit the application of this automatic sprinkler system trade-off for an NFPA 13R sprinkler system to allow the increased one story and 20 feet in building height to Group R occupancy buildings of Type VA construction only. So, in other words, an NFPA 13R sprinkler system could not be used in a Group R occupancy building of Type VB construction to get an increase in building height. It should be noted that only Type V construction buildings can currently take advantage of this building height increase for an NFPA 13R sprinkler system since it is limited to a maximum building height of four stories and 60 feet. All the other building construction types for Group R occupancies allow a maximum story height of four stories and at least 55 feet without considering any sprinkler increases.

Does this appear to be a reasonable compromise? We believe that it is not as desirable as eliminating the building height increase altogether for NFPA 13R sprinkler systems, but it at least would not allow the trade-off to be used in a type of construction that does not provide for any fire-resistive protection for the building's structural elements. Thus, approval of this Public Comment that revises Section 504.2 would not allow a Group R occupancy building of Type VB construction to have its building height increased from two stories/40 feet to three stories/60 feet. Without this modification, the code is basically equating an NFPA 13R sprinkler system to 1-hour fire-resistive protection of the building structural elements that carry the loads of the building to ground. This would appear reasonable given the fact that an NFPA 13R sprinkler system, as indicated in our Reason Statement, is not primarily a property protection system, but rather a life safety protection system. We believe this is especially important given the fact that attics are not required to be sprinklered in an NFPA 13R sprinkler system. Therefore, if a fire gets out of control in a Type VB construction building protected with an NFPA 13R sprinkler system, it is very likely that it will burn to the ground, resulting in a total loss.

This could conceivably have an impact on firefighter safety as well since, as noted previously, the vertical bearing elements of the building would not have any fire-resistive protection so a concealed fire could cause premature structural collapse of the building while the fire department was still inside trying to make an internal attack to control and eventually extinguish the fire. Certainly this would be a detriment to the public welfare with a loss of all of the dwelling units which would render many people temporarily homeless. So we would much more prefer to see the NFPA 13R sprinkler system height increase trade-off allowed for Type VA buildings, if it is to be allowed at all, since these buildings provide a minimum 1-hour fire-resistive protection throughout including all structural bearing elements. This will certainly provide for greater property protection, as well as enhance firefighter safety and improve public welfare by minimizing the chance that the building would be totally destroyed by a fire that is able to overcome the NFPA 13R sprinkler system.

In conclusion, we urge the Class A voting members to consider this Public Comment as a reasonable compromise for allowing the NFPA 13R sprinkler trade-off for increased building height in Group R occupancy buildings to remain in the IBC should the Class A members concur with this Public Comment. Although our choice would be for this Code Change Proposal to be approved, we believe this to be an acceptable compromise. However, in order for this Public Comment to be approved as revised for Code Change G91-09/10, it will be necessary for the Class A voting members to overturn the Committee's recommendation for disapproval. Then a two-thirds majority vote would still be required to approve this Code Change as modified by this Public Comment.

Final Action: AS AM AMPC____ D

G92-09/10
504.2, 506.3

Proposed Change as Submitted

Proponent: Robert J Davidson, Code Consultant, Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

Revise as follows:

504.2 Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. These increases are permitted in addition to the area increase in accordance with Section~~s~~ 506.2 ~~and 506.3~~. For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.

Exception~~s:~~ The use of an automatic sprinkler system to increase building heights shall not be permitted for the following conditions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. ~~Fire-resistance rating substitution~~ Buildings where an automatic sprinkler system is substituted for fire-resistance rated construction in accordance with Table 601, Note d.
4. Buildings where an automatic sprinkler system is used to increase the building height or number of stories accordance with Section 506.3.

506.3 Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional 200 percent (I_s = 2) for buildings with more than one story above grade plane and an additional 300 percent (I_s = 3) for buildings with no more than one story above grade plane. ~~These increases are permitted in addition to the height and story increases in accordance with Section 504.2.~~

Exception: The use of an automatic sprinkler system to increase the building area limitation ~~increases~~ shall not be permitted for the following conditions:

1. ~~The automatic sprinkler system increase shall not apply to Buildings with an occupancy in Group H-1~~. Buildings classified as a Group H-1 occupancy.
2. ~~The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3~~. Buildings, or portions of buildings, classified as either a Group H-2 or H-3 occupancy. For buildings containing such occupancies, the allowable area shall be determined in accordance with Section 508.4.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.
3. Buildings where an automatic sprinkler system is substituted for fire-resistance rated construction ~~Fire-resistance rating substitution~~ in accordance with Table 601, Note d.
4. Buildings where an automatic sprinkler system is used to increase the building height or number of stories in accordance with Section 504.2.

Reason: In reviewing this comment we ask that you keep in mind that when the IBC was created, there was a policy decision made that when merging the three legacy codes into one, any conflict between legacy code provisions would default to the lesser requirement. This reportedly was done to avoid adoption problems for jurisdictions when moving to the IBC from a legacy code, i.e., if the new code was more restrictive there could be opposition to adoption. The concept of balance is constantly bandied about when examining specific code provisions in that when looking at the code as a whole, one requirement balances out the other. This concept is spoken of specifically when dealing with automatic sprinkler system trade offs. If we accept the fact that the three separate legacy codes were balanced, i.e., they had some requirements less restrictive than the same topic in another legacy code but they had other topics that were more restrictive, what happened when we merged the three codes? We went through and took the lowest requirement from each code without taking the more restrictive. What happened to the balancing effect that each legacy code had developed over the years? It does not exist in the IBC.

Another way to look at this issue is that in many jurisdictions the building code is the minimum standard to apply, in some it is the minimum and the maximum standard, (mini-max code). In any jurisdiction that previously applied one of the legacy codes, at the time they had a legacy code effective, the current IBC provisions would be less than that applicable code permitted. In other words, application of many of the provisions in the

IBC would be illegal. It is for that reason we seek to reduce the size of some of the buildings permitted to be built under the IBC to start to bring balance back to the code.

Those of us that have been proposing to modify some of the height and area requirements have been asked by opponents why we are so focused on this issue, what is so wrong with the height and areas. To be honest, we are not focused on this one issue. We have been active in many areas of the code we felt need clarification or tightening of requirements. But our specific interest in the height and area is because of the cumulative effect of the process we describe in the first two paragraphs of this reasoning statement.

We not only get bigger buildings under the IBC as compared to various legacy codes, we get them with less protective features and a reduced ability to withstand attack by fire. In much of the country Type 1A construction required 4 hour protection. Now it only requires 3 hour protection. So the buildings are bigger and when attacked by fire they may come down quicker.

The size of the buildings directly relates to how much area a responding fire department must deal with and possibly how much area must be searched. No one checked with the fire service to see if their manning levels could handle the increased size allowance coupled with the reduction in protection features. Take a look at the legacy codes and compared the restrictions on communicating floor levels with what the IBC allows now. So not only are the buildings bigger with reduced fire resistance requirements, we now allow the smoke and heat to travel to more of the building.

The answer we get on this topic is that the buildings in question will have an automatic fire suppression system and that takes care of all of your concerns. Though we are strong believers in the installation of automatic sprinkler systems and we would like to eventually see them installed in all buildings and structures, we also believe in striking a balance. Being safe means not relying on a single method of protection, or in this case a single protective system.

This position is supported by the recent NFPA report, "U.S. Experience with Sprinklers and Other Automatic Fire Extinguishing Equipment", http://www.nfpa.org/assets/files//PDF/OSsprinklers.pdf . Though overall sprinklers operate in 95% of all reported structure fires and are effective 96% of that time, resulting in a combined overall effectiveness of 91%. The actual percentage changes based upon occupancy with warehouses at the 78% level.

They are out of service for maintenance, construction, (tenant improvements), unintentional human error. There is also a vulnerability factor- besides seismic, we have experience where systems were taken out by vehicle crash or explosion. In instances of improper design/use or arson, the system can be overcome. Most sprinkler systems as designed don't extinguish the fire, they only control it and there can be tremendous smoke generation and spread (particularly smoldering or shielded fires, etc). In fact, sprinklers drive the smoke lower and impede visibility, building size becomes more of an issue to both rescue (panic) and firefighting.

To balance this out we seek buildings to have increased fire-resistive design and they get larger. The larger the building the more time the fire service needs to deal with rescue and fire extinguishment. The more time the fire service needs to be in the building during adverse conditions, the better protected the building needs to be.

This proposal seeks to strike a balance. An increase would still be permitted based upon the presence of the automatic sprinkler protection, but a choice would have to be made to take either an area increase or a height increase, not both.

This proposal does not stop larger buildings from being constructed, what it does is change the trigger for the use of non-combustible versus combustible types of construction and changes the trigger of when protected types of construction would be required and at what fire resistance rating to building a larger building.

As already stressed fire departments suffer through wave after wave of cut backs in staff, equipment and fire stations, this issue increases in importance every day.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: DAVIDSON-SHUMAN-G4-504.2.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proponent provided no new data or information to provide technical justification for this change. The committee felt that the issues of height and area have been more than adequately reviewed both during the original drafting of the code and through the subsequent studies of the CTC. This proposal provided no information that distinguished it from past proposals that were disapproved in the past code development cycles.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert J Davidson, Davidson Code Concepts, LLC, representing self, requests Approval as Submitted.

Commenter's Reason: The committee disapproved the proposal by a narrow vote with the following reason statement:

The proponent provided no new data or information to provide technical justification for this change. The committee felt that the issues of height and area have been more than adequately reviewed both during the original drafting of the code and through the subsequent studies of the CTC. This proposal provided no information that distinguished it from past proposals that were disapproved in the past code development cycles.

That is an incorrect assessment by some of the committee members. New information is included below and new testimony was provided. It is disingenuous of some committee members to refer to "subsequent studies of the CTC". Everyone that followed that process knows that CTC recommended a change, a big change concerning height and area. The problem is the majority of the ICC membership did not agree with the change that was proposed. This proposal is an alternate recommendation and deserves equal consideration, not simply brushed off because another group already looked at the issue.

As fire departments across the nation continue to suffer layoffs and cutbacks of staff responsible for firefighting and fire inspections there has to be acknowledgement that we cannot balance the code on the backs of emergency responders. We need realistic balance that recognizes that sprinkler systems, though effective when properly installed, inspected and maintained, are not 100% perfect. The fire service needs time to perform their duties safely and effectively and that equates to a higher fire resistance rating of structural support as buildings get larger. This proposal does not stop large buildings from being built, it will only modify the threshold at which the higher levels of construction are required. The original reason statement is included for information and background.

Final Action: AS AM AMPC____ D

G99-09/10
506.3

Proposed Change as Submitted

Proponent: Sam Francis, representing American Forest & Paper Association

Revise as follows:

506.3 Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, in addition to the height and story increases in accordance with Section 504.2, the building area limitation in Table 503 is permitted to be increased by the amounts specified in either Item 1 or Item 2 as follows: ~~the building area limitation in Table 503 is permitted to be increased by an additional 200 percent (I_s = 2) for buildings with more than one story above grade plane and an additional 300 percent (I_s = 3) for buildings with no more than one story above grade plane. These increases are permitted in addition to the height and story increases in accordance with Section 504.2,~~

1. An additional 200 percent ($I_s = 2$) for buildings with more than one story above grade plane or an additional 300 percent ($I_s = 3$) for buildings with no more than one story above grade plane.
2. An additional 100 percent ($I_s = 1$) for buildings up to four stories above grade plane when the automatic sprinkler system is omitted from the unoccupied attic space and the roof is sheathed with fire retardant treated wood structural panels,

Exception: ~~The~~ Building area limitation increases shall not be permitted for the following conditions:
1. The automatic sprinkler system increase shall not apply to buildings with an occupancy in Group H-1.
2. The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3. For buildings containing such occupancies, the allowable building area shall be determined in accordance with Section 508.4.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.
3. Fire-resistance rating substitution in accordance with Table 601, Note d.

Reason: AF&PA commissioned testing of three roof attic assembly configurations[1]:
1) FRT wood trusses and FRT wood sheathing
2) Untreated wood trusses and untreated wood sheathing
3) Untreated wood trusses and FRT wood sheathing.

These tests were conducted to the same ad-hoc test protocol[2] used to modify sprinkler head spacing and water pressure requirements in NFPA 13.

AF&PA tests demonstrated that the fire performance of a roof assembly constructed with fire retardant treated (FRT) wood trusses and FRT wood sheathing (Configuration 1) resulted in no fire growth which is better performing than a roof assembly protected with a NFPA 13 sprinkler system. This configuration is exempt from attic sprinkler systems in NFPA 13.

Configuration 2, a roof assembly constructed with untreated wood trusses and untreated wood sheathing, had sustained fire growth when using the ad-hoc test protocol.

Configuration 3, a roof assembly constructed with untreated wood trusses and FRT wood sheathing, had similar results to Configuration 1 affording better protection than the NFPA 13 attic sprinkler system. This code change proposal recognizes the improved fire performance demonstrated by this configuration. The area limitation in Table 503 for buildings using this configuration and otherwise sprinklered throughout in accordance with NFPA 13 are permitted to be increased 100%.

1. “Flammability of Full Scale Roof Attic Assemblies by Ignition with 6 lb and 35 lb Wood Crib and Measurement of Heat Release,” Omega Point Maboratories, Project 15475-117047, November 2004.

2. “Spray Sprinklers Installed in Sloped Combustible Concealed Spaces,” Underwriters Laboratories Inc., Project 01NK32756, EX5985, September 2001

Cost Impact: The code change proposal will not increase the cost of construction. Will reduce cost of construction by approximately $3/sq.ft. of roof area.

ICCFILENAME:FRANCIS-G1-506 3.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that while the code often has provisions different than, and superseding of, referenced standards, the departure from the NFPA standard contained in this proposal would be better reviewed by NFPA in the context of revising the sprinkler standard. While the proposal concentrated on the make-up of the roof sheathing, the committee noted the presence of other combustible materials in attics, especially structural framing supporting the roof, that would be unprotected.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sam Francis, representing American Wood Council (FF&PA), requests Approval as Submitted.

Commenter's Reason: AF&PA commissioned testing of three roof attic assembly configurations[1]:
1) FRT wood trusses and FRT wood sheathing
2) Untreated wood trusses and untreated wood sheathing
3) Untreated wood trusses and FRT wood sheathing.

These tests were conducted to the **same ad-hoc test protocol**[2] used to modify sprinkler head spacing and water pressure requirements in NFPA 13. AF&PA tests demonstrated that the fire performance of a roof assembly constructed with fire retardant treated (FRT) wood trusses and FRT wood sheathing (Configuration 1) resulted in no fire growth which is better performing than a roof assembly protected with a NFPA 13 sprinkler system. **This configuration is currently exempt from attic sprinkler systems in NFPA 13**.

Configuration 2, a roof assembly constructed with untreated wood trusses and untreated wood sheathing, had sustained fire growth when using the ad-hoc test protocol.

Configuration 3, a roof assembly constructed with untreated wood trusses and FRT wood sheathing, had <u>similar results to Configuration 1</u> affording better protection than the NFPA 13 attic sprinkler system.

The report of the tests can be viewed at
http://www.awc.org/fire/testreport.html
username: guest
password: awc

This code change proposal recognizes the improved fire performance demonstrated by this configuration. The area limitation in Table 503 for buildings using this configuration and otherwise sprinklered throughout in accordance with NFPA 13 are permitted to be increased 100%. The question left for the membership to decide is this: do we wish to control the locations where we will require sprinklers to be place and where we will permit them to be omitted reserving the installation and design information to a standard. OR do we wish to revise this code and other codes which currently have similar execptions for sprinkers which allow omission of heads in certain specified spaces. As an example, the omission of heads in bathrooms and/or closets of come buildings is a condition decided by this membership.

AF&PA commissioned testing using the exact same ad hoc test protocol used by others to create the current exemption in the sprinkler standard: NFPA 13. Despite AF&PA's efforts, the committee ignored the alternate configurations which resulted in equally good fire performance when compared to either of the other configurations. This should be corrected.

1. "Flammability of Full Scale Roof Attic Assemblies by Ignition with 6 lb and 35 lb Wood Crib and Measurement of Heat Release," Omega Point Maboratories, Project 15475-117047, November 2004.
2. "Spray Sprinklers Installed in Sloped Combustible Concealed Spaces," Underwriters Laboratories Inc., Project 01NK32756, EX5985, September 2001

Final Action: AS AM AMPC____ D

G100-09/10
506.4.1, 506.5.2

Proposed Change as Submitted

Proponent: Dennis Richardson PE, dbr Group Inc., representing self

Revise as follows:

506.4 Single occupancy buildings with more than one story. The total allowable *building area* of a single occupancy building with more than one *story above grade plane* shall be determined in accordance with this section. The actual aggregate *building area* at all *stories* in the building shall not exceed the total allowable *building area*.

Exception: A single basement need not be included in the total allowable *building area*, provided such basement does not exceed the area permitted for a building with no more than one *story above grade plane*.

506.4.1 Area determination. The total allowable *building area* of a single occupancy building with more than one *story above grade plane* shall be determined by multiplying the allowable *building area* per *story* (*Aa*), as determined in Section 506.1, by the number of *stories above grade plane* as listed below:

1. For buildings with two *stories above grade plane*, multiply by 2;
2. For buildings with three or more *stories above grade plane*, multiply by 3; and
3. No *story* shall exceed the allowable *building area* per *story* (A_a), as determined in Section 506.1, for the occupancies on that *story*.

   Exceptions:

   1. Unlimited area buildings in accordance with Section 507.
   2. The maximum area of a building equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per *story (Aa),* as determined in Section 506.1, by the number of *stories above grade plane*.
   3. The first story of a single occupancy building with more than one *story above grade plane* shall not exceed the allowable *building area* permitted for a building of the same occupancy with one *story above grade plane* when all of the following criteria are met:
      - 3.1. The allowable area (A_a) of the first *story above grade plane* shall be determined individually based on the provisions in Section 506.1 for a building with no more than one *story above grade plane*.
      - 3.2. Each additional *story* shall not exceed the allowable *building area* per *story* (A_a), as determined in Section 506.1 for the occupancies on that *story*.
      - 3.3. The total allowable *building area* shall comply with Items 1 or 2 of Section 506.4.1 computed based on a building with more than one story above grade plane.

506.5 Mixed occupancy area determination. The total allowable *building area* for buildings containing mixed occupancies shall be determined in accordance with the applicable provisions of this section. A single basement need not be included in the total allowable *building area*, provided such basement does not exceed the area permitted for a building with no more than one *story above grade plane*.

506.5.1 No more than one story above grade plane. For buildings with no more than one *story above grade plane* and containing mixed occupancies, the total *building area* shall be determined in accordance with the applicable provisions of Section 508.1.

506.5.2 More than one story above grade plane. For buildings with more than one *story above grade plane* and containing mixed occupancies, each *story* shall individually comply with the applicable requirements of Section 508.1. For buildings with more than three *stories above grade plane*, the total *building area* shall be such that the aggregate sum of the ratios of the actual area of each *story* divided by the allowable area of such *stories* based on the applicable provisions of Section 508.1 shall not exceed 3.

Exception: The first story of a multi-story building shall not exceed the area permitted for a building with no more than one story above grade plane when all of the following criteria are met:

1. The allowable area of the first story above grade plane shall be determined individually in accordance with the applicable total building area provisions of Section 508.1 and comply with the building area provisions for a building with no more than one story above grade plane.
2. Each additional story shall individually comply with the applicable requirements of Section 508.1.
3. For buildings with two stories above grade plane, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such story, computed based on a building with more than one story above grade plane, based on the applicable provisions of Section 508.1, shall not exceed 2.
4. For buildings with three or more stories above grade plane, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such story, computed based on a building with more than one story above grade plane, based on the applicable provisions of Section 508.1, shall not exceed 3.

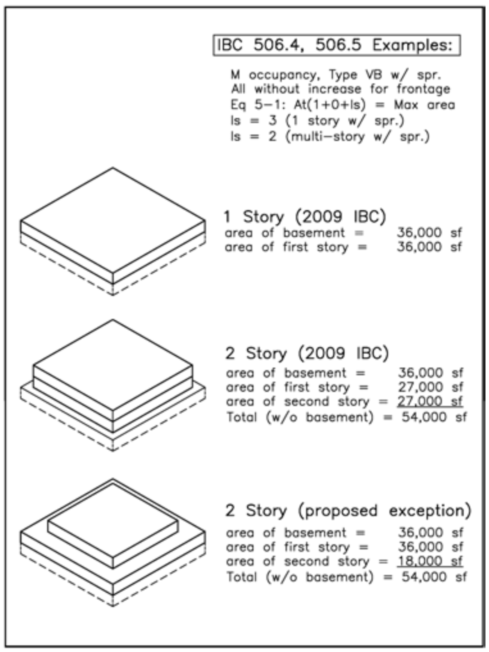
Reason: The proposed change would provide an exception allowing the first floor of a multi story building to be as large as a single story building which could be constructed on the same site as long as the total building area does not exceed the applicable code maximum allowable floor area.

Currently, based on Equation 5-1 and Section 506.3, a one story building with fire sprinklers throughout is permitted to be 4 times the Table 503 tabular area before considering any available area increase for frontage. However the first story of a multi-story building is limited to three times the tabular building area without consideration of any increase for frontage, even if the upper story levels are less than the maximum permitted area. The step function in the value of I_S between a one story building and all multistory buildings effectively limits the first story of multi-story buildings to 75% of the area allowed on that level for a one story building. This is true regardless of how small the second story is.

The current Section 506.4.1, item 3 indicates: No *story* shall exceed the allowable *building area* per *story* (Aa), as determined in Section 506.1 for occupancies on that *story*. This provision of the code encourages the construction of buildings that are box like in order to maximize building area with similar sized floors instead of allowing the flexibility for the designer to step back the upper floors giving the building the appearance of less mass and allowing more light to the street.

The exception to Section 506.4 and the last sentence in Section 506.5 each allow a single basement not to be included in the area calculation so long as the "basement area does not exceed the area permitted for a building with no more than one story above grade plane." Since a building with no more than one story above grade plane can be larger than the first floor of a similar multi-story building, this exception has the effect of allowing the basement to be larger in area than the area of first floor above it on a multi-story building.

The proposed code change is formatted as an exception so that it clear it does not change the existing code provisions unless utilized. When it is utilized it is intended to merely allow the first floor to be as large as it would otherwise be as a single story building without creating an increase in the total floor area of the entire building. As such the area of upper floors may have to be decreased from the maximum area that would otherwise be allowed so the total floor area is less than or equal to the total allowable building area. See attached example for a Group M occupancy, Type VB construction building. Similar examples would occur with other occupancies.



Cost Impact: The code change proposal will not increase the cost of construction. Because this exception does not have to be utilized by the designer and since it has the effect of allowing more construction to occur at grade where it is less expensive this proposed change would have the effect of decreasing construction cost if utilized by the designer.

ICCFILENAME: Richardson-G1-506.4.1 and 506.5.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Although the committee thought the concept included in the proposal may be an appropriate option to add to the code, it found the language of the proposal unclear and misleading. The committee expressed concern that the resulting building would potentially have first stories approaching unlimited area scale without any provision to improve firefighter access surrounding the building. Significantly smaller upper stories could also be set back a significant distance from the walls of lower story, again providing a challenging firefighter access issue. There appeared to be a potential that under a mixed occupancy scenario that an even larger building than intended could be achieved.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David S. Collins, The Preview Group, LLC, representing The American institute of Architects, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

506.4.1 Area determination. The total allowable *building area* of a single occupancy building with more than one *story above grade plane* shall be determined by multiplying the allowable *building area* per *story* (A_a), as determined in Section 506.1, by the number of *stories above grade plane* as listed below:

1. For buildings with two *stories above grade plane*, multiply by 2;
2. For buildings with three or more *stories above grade plane*, multiply by 3; and
3. No *story* shall exceed the allowable *building area* per *story* (A_a), as determined in Section 506.1, for the occupancies on that *story*.

Exceptions:

1. Unlimited area buildings in accordance with Section 507.
2. The maximum area of a building equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per *story (A_a),* as determined in Section 506.1, by the number of *stories above grade plane*.
3. ~~The first story of a single occupancy building with more than one *story above grade plane* shall not exceed the allowable *building area* permitted for a building of the same occupancy with one *story above grade plane* when all of the following criteria are met:~~

~~3.1.~~ 3. The allowable area (A_a) of the first *story above grade plane* shall be determined individually based on the provisions in Section 506.1 for a building with no more than one *story above grade plane*, when all of the following criteria are met.

- ~~3.2~~ 3.1. Each additional *story* shall not exceed the allowable *building area* per *story* (A_a), as determined in Section 506.1 for the occupancies on that *story*.
- ~~3.3~~ 3.2. The total allowable *building area* shall comply with Items 1 or 2 of Section 506.4.1 computed based on a building with more than one story above grade plane.

506.5.2 More than one story above grade plane. For buildings with more than one story above grade plane and containing mixed occupancies, each *story* shall individually comply with the applicable requirements of Section 508.1. For buildings with more than three stories above grade plane, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such stories based on the applicable provisions of Section 508.1 shall not exceed 3.

Exception: ~~The first story of a multi-story building shall not exceed the area permitted for a building with no more than one story above grade plane when all of the following criteria are met:~~

~~1.~~ The allowable area of the first story above grade plane shall be permitted to be determined individually in accordance ~~with the applicable total building area provisions of Section 508.1 and comply~~ with the building area provisions for a building with no more than one story above grade plane per Section 508.1, provided the following are met:

~~2.~~ 1. Each additional story shall individually comply with the applicable requirements of Section 508.1.
~~3.~~ 2. For buildings with only two stories above grade plane, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such story, computed based on a building with more than one story above grade plane, ~~based on the applicable provisions of~~ per Section 508.1, shall not exceed 2.
~~4.~~ 3. For buildings with three or more stories above grade plane, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such story, computed based on a building with more than one story above grade plane, ~~based on the applicable provisions of~~ per Section 508.1, shall not exceed 3.

Commenter's Reason: The committee disapproved this code change proposal even though there was no testimony against the proposal from the floor. The proposed change allows the first story above grade plane of a building with multiple stories above grade plane to be the same size as a building with only one story above grade plane as long as the total building area (including all stories) does not exceed the applicable total maximum floor area.

This comment has editorially changed the original proposal to reduce redundant language while keeping the intent and meaning intact.

Currently a sprinklered, single story building with the maximum floor area for a given occupancy, type of construction and site configuration could not have a second story addition of any size. This is because a second floor addition would change the sprinkler increase (Is) from a factor of 3 (for a building with only one story above grade plane) to an Is factor of 2 (for a building with multiple stories). A code compliant second story could not be constructed no matter how small unless 25% of the first floor is removed. This defies common sense and should be fixed in the code.

For multiple occupancy buildings, G135-07/08 clarified and simplified the allowable area provisions for multi-story mixed occupancy buildings in Section 506.5.2. In doing so the 09 IBC acknowledged all three mixed occupancy design options (accessory occupancies, non-separated occupancies and separated occupancies).

The intent of this code change is to allow the first story above grade plane to be as large as a building with only one story above grade plane. The "sum of the ratios method of each story divided by the allowable maximum for that story as determined by any of the applicable methods" is used to ensure that the total building area does not exceed the maximum allowable area for the building.

Similar to single occupancy, multistory buildings, these mixed occupancy, multistory provisions only apply to buildings not permitted to be of unlimited area (unless of Type I and allowed to be unlimited by Table 503). As such, no reference to Section 507 was needed.

One final concern expressed by a committee member was that this could compromise firefighters due to building access and building step backs. This change does nothing to reduce the required yards and building access provisions and allows building step backs as is currently allowed by the code. Given total building area and access, most firefighters when asked would rather fight a fire close to the ground rather than having to shuttle air tanks up a stair for breathing apparatus.

In summary, this code change proposal resolves a disconnect in the code which defies common sense. The code change proposal does nothing to decrease firefighter access and, for the same maximum size building, results in more of the overall building area to be located closer to the ground.

Final Action: AS AM AMPC____ D

G101-09/10
507.1.1 (New)

Proposed Change as Submitted

Proponent: Sarah A. Rice, C.B.O., representing self

Add new text as follows:

507.1.1 Accessory occupancies. Occupancies not specifically listed in Section 507 shall be allowed to be located in unlimited area buildings provided the occupancy complies with Section 508.2 for an accessory occupancy.

Reason: The current text of Section 507 has been interpreted that unless an occupancy is specifically listed in that section it cannot be located within an unlimited area building. Unlimited area buildings are subject to the same guidelines as other buildings when it comes to 'accessory occupancies'. If the occupancy is one that is allowed and the area it occupies meets the size limitations of 508.2 they are allowed to be in an unlimited area building. The proposed language makes clear that occupancies which are not specifically listed in Section 507 are not prohibited from being in an unlimited area building as long as they meet the accessory occupancy provisions (including the 10% area limit in Section 508.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-G10-507.1.1.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee understood the concept of the proposal, but felt it needed to be more specific as to the accessory occupancies of concern or how they be applicable in the various unlimited area building scenarios. The use of the term 'listed' is not as the term is defined. The committee speculated that because 10% of an unlimited area building could be quite a large area whether a limit to the tabular value of Table 503 might not be appropriate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**507.1.1 Accessory occupancies.** Occupancies not specifically listed in Section 507 shall be allowed to be located in unlimited area buildings provided the occupancy complies with Section 508.2 for an accessory occupancy.~~

507.1 General. The area of buildings of the occupancies and configuration specified herein shall not be limited.

Exception: Other occupancies shall be permitted in unlimited area buildings in accordance with the provisions of Section 508.2.

Commenter's Reason: In its published reason for disapproval of G101-09/10, the ICC General Code Committee stated, "The committee understood the concept of the proposal, but felt it needed to be more specific as to the accessory occupancies of concern or how they be applicable in the various unlimited area building scenarios. The use of the term 'listed' is not as the term is defined. The committee speculated that because 10% of an unlimited area building could be quite a large area whether a limit to the tabular value of Table 503 might not be appropriate."

To simplify the concept of the inclusion of other occupancies in unlimited area buildings, the provision is relocated in context in the general charging language for unlimited area buildings as an exception to Section 507.1. Acknowledging the committee's concern about the term "listed," it has been removed.

As regards the committee's concern that limiting the accessory occupancy(s) to the tabular value(s) of Table 503 might be appropriate, Section 508.2.1 currently limits the area of the accessory occupancy to 10 percent of the floor area or the tabular limit without area increases.

Inasmuch as Section 507.8 allows for high hazard Group H occupancies in certain unlimited area buildings, it only stands to reason that ordinary hazard occupancies be permitted in unlimited area buildings under prescribed accessory mixed occupancy provisions. The clarification provided by this modification will greatly assist code users with this fairly obscure mixed occupancy condition. The Boeing Company has numerous two-story, unlimited area factories with additional occupancies such as cafeterias and day care facilities based on the requirements and limitations of Section 508.2. This is a common design practice nationwide.

Final Action: AS AM AMPC____ D

G103-09/10
507.3

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, representing Joint Fire Service Review Committee

Revise as follows:

507.3 Sprinklered, one story. The area of a Group B, F, M or S building no more than one *story above grade plane*, or a Group A-4 building no more than one *story above grade plane* of other than Type V construction, shall not be limited when the building is provided with an *automatic sprinkler system* throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

Exception~~s~~:

~~1.~~ Buildings and structures of Type I and II construction for rack storage facilities that do not have access by the public shall not be limited in height, provided that such buildings conform to the requirements of Sections 507.3 and 903.3.1.1 and Chapter 23 of the *International Fire Code*.

~~2. The *automatic sprinkler system* shall not be required in areas occupied for indoor participant sports, such as tennis, skating, swimming and equestrian activities in occupancies in Group A-4, provided that:~~

~~2.1. *Exit* doors directly to the outside are provided for occupants of the participant sports areas; and~~

~~2.2. The building is equipped with a *fire alarm system* with *manual fire alarm boxes* installed in accordance with Section 907.~~

Reason: Code change F132-07/08 deleted the exception which allowed the elimination of a fire sprinkler system over participant sport areas in Group A-4 occupancies (See Section 903.2.1.4). However, when that code change was approved, a corresponding section in the IBC was overlooked. IBC 507.3 contains a similar exception to the item that was deleted in Chapter 9. Therefore, Exception 2 is proposed for deletion to be consistent with the action take last cycle in F132-07/08.

Section 507.3 allows for unlimited area buildings. Exception 2 would allow for an unlimited area Group A-4 occupancy and yet not require sprinklers over a major portion of the building.

The intention of the exception was for gymnasiums and similar areas where the probable occupant load was significantly less than what would be determined based on a square footage per occupant factor. However, these facilities have become multi-use and the occupant load is frequently higher than what was anticipated or expected when the exception was developed, and the fire load can vary based on the used to far exceed what would be expected for a sporting area.

For example, a community recreation center is constructed with no sprinklers over the gymnasium floor. The same area is also utilized for receptions and various community activities such as work fairs, rummage sale, art exhibits, emergency shelters for persons displaced by natural disasters, etc. Such uses could even include eating, sleeping, and fire loads far in excess of a few uniforms and leather volleyballs.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: LARIVIERE-G3-507.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded that retaining this exception was not in conflict with the general limitations of Chapter 9 of the IBC and IFC because it was a specific provision that would take precedence over the general. The concerns expressed by supporters of the code change that these facilities get used for activities other than those listed were felt to be enforcement issues and should not be the basis of a code change. The listed activities are clearly those which have very limited fuel load on the sporting surface. The committee acknowledged that an amendment that would clarify that the exception applies to just the sporting area and not surrounding support functions such as spectator seating, locker or dressing facilities or concession areas would be appropriate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce, Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Submitted.

Commenter's Reason: The code change was Disapproved at the Code Development Hearing because the Code Development Committee felt that the exception applied in this case.

In the last code change cycle, Item F132-07/08 deleted the exception which allowed the elimination of a fire sprinkler system over participant sport areas in Group A-4 occupancies (See Section 903.2.1.4). This code change is merely a clean-up item that was missed in the original proposal. Therefore this Public Comment is suggesting that Approval as Submitted is the appropriate solution.

Item F132-07/08 removed this exception from the general sprinkler requirements. The approved revision in Section 903.2.1.4 applies to all situations regardless of the size of the building. This follow-up code change only applies to IBC Section 507.3, and is specific for unlimited area buildings. Exception 2 currently allows unlimited area A-4 occupancies without providing fire sprinklers over a major portion of the buildings.

The assembled membership decided that this exception is not appropriate for smaller Group A-4 occupancies when they approved F132-07/08. It is consistent with that thinking to eliminate the allowance for unlimited area buildings.

Final Action: AS AM AMPC____ D

G104-09/10
507.8

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

507.8 Group H occupancies. Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited areas buildings containing Group F and S occupancies~~,~~ in accordance with Sections 507.3 and 507.4 and the provisions ~~limitations~~ of ~~this section~~ Sections 507.8.1 through 507.8.3.

507.8.1 Allowable area. The aggregate floor area of ~~the~~ Group H occupancies located ~~at the perimeter of the~~ in an unlimited area building shall not exceed 10 percent of the area of the building nor the area limitations for the Group H occupancies as specified in Table 503 as modified by Section 506.2.

507.8.1.1 Located on building perimeter. Except as provided for in Section 507.8.1.2, Group H occupancies shall be located on the perimeter of the building. ~~,based upon the percentage of the perimeter of each Group H floor area that fronts~~ In Group H-2 and H-3 occupancies, not less than 25 percent of the perimeter of such occupancies shall front on a public way or open ~~street or other unoccupied~~ space.

507.8.1.2 Located within the building. The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the area limitations for the Group H occupancies as specified in Table 503.

507.8.1.2.1 Liquid use, dispensing and mixing rooms. Liquid use, dispensing and mixing rooms having a floor area of not more than 500 square feet (46.5m^2) need not be located on the outer perimeter of the building where they are in accordance with the International Fire Code and NFPA 30.

507.8.1.2.2 Liquid storage rooms. Liquid storage rooms having a floor area of not more than 1,000 square feet (93 m^2) need not be located on the outer perimeter where they are in accordance with the *International Fire Code* and NFPA 30.

507.8.1.2.3 Spray paint booths. Spray paint booths that comply with the *International Fire Code* need not be located on the outer perimeter.

507.8.2 Occupancy separations. Group H occupancies shall be separated from the remainder ~~rest~~ of the unlimited area building and from each other in accordance with Table 508.4.

507.8.3 Height limitations. For two-story unlimited area buildings, ~~the~~ Group H occupancies shall not be located more than one story above grade plane unless permitted based on ~~by~~ the allowable height in stories and feet as set forth in Table 503 for ~~based on~~ the type of construction of the unlimited area building.

Reason: This proposal is intended to clarify the provisions governing the placement of Group H occupancies in certain unlimited area buildings. Currently, all requirements are placed within a single run-on paragraph that does not separate thoughts or provisions. In its present format, it is easy to attempt to overlay requirements that are intended to address different design conditions. Additionally, Section 507.8 contains a very vague provision in that it states that Group H occupancies shall be located on the perimeter of the building based upon the "percentage of the perimeter" of each Group H floor area. No percentage figure is provided. Presumably, that is an indirect reference to Section 415.3. For purposes of continuity, Section 415.3 requirements have been incorporated into Section 507.8, including allowances for certain interior spaces. The format and clarity provided in this proposal will assist code users in the proper identification of requirements in this fairly rare, but very important provision.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KEITH-G3-507.8.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee found the format of the proposal very appealing in the clarity it would bring to these provisions, however it appeared that the reformat includes a technical change in the relationship of the hazardous material area located at the building perimeter and the measurement of that perimeter.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

507.8 Group H occupancies. Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited areas buildings containing Group F and S occupancies, in accordance with Sections 507.3 and 507.4 and the provisions of this section~~s 507.8.1 through 507.8.3~~.

507.8.1 Allowable area. The aggregate floor area of Group H occupancies in an unlimited area building shall not exceed 10 percent of the area of the building nor the area limitations for the Group H occupancies as specified in Table 503 as modified by Section 506.2, based upon the perimeter of each Group H floor area that fronts on a public way or open space.

~~507.8.1.2~~ 507.8.1.1 Located within the building. The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the area limitations for the Group H occupancies as specified in Table 503.

~~507.8.1.2.1~~ 507.8.1.1.1 Liquid use, dispensing and mixing rooms. Liquid use, dispensing and mixing rooms having a floor area of not more than 500 square feet ($46.5 m^2$) need not be located on the outer perimeter of the building where they are in accordance with the International Fire Code and NFPA 30.

~~507.8.1.2.2~~ 507.8.1.1.2 Liquid storage rooms. Liquid storage rooms having a floor area of not more than 1,000 square feet ($93 m^2$) need not be located on the outer perimeter where they are in accordance with the *International Fire Code* and NFPA 30.

~~507.8.1.2.3~~ 507.8.1.1.3 Spray paint booths. Spray paint booths that comply with the *International Fire Code* need not be located on the outer perimeter.

~~507.8.1.1~~ 507.8.2 Located on building perimeter. Except as provided for in Section ~~507.8.1.2~~ 507.8.1.1, Group H occupancies shall be located on the perimeter of the building. In Group H-2 and H-3 occupancies, not less than 25 percent of the perimeter of such occupancies shall be an exterior wall ~~front on a public way or open space~~.

~~507.8.2~~ 507.8.3 Occupancy separations. Group H occupancies shall be separated from the remainder rest of the unlimited area building and from each other in accordance with Table 508.4.

~~507.8.3~~ 507.8.4 Height limitations. For two-story unlimited area buildings, Group H occupancies shall not be located more than one story above grade plane unless permitted based on the allowable height in stories and feet as set forth in Table 503 for the type of construction of the unlimited area building.

Commenter's Reason: In its published reason statement for the disapproval of Item G104-09/10, the ICC General Code Committee stated, 'The committee found the format of the proposal very appealing in the clarity it would bring to these provisions, however it appeared that the reformat includes a technical change in the relationship of the hazardous material area located at the building perimeter and the measurement of that perimeter." The committee was correct and the technical error has been corrected. The error was that the procedure for determining the allowable area in Section 507.8.1 did not specify that Group H allowable area increases are based on the perimeter of the Group H occupancy as opposed to the unlimited area building as a whole. With this correction, the improved format recognized by the committee will greatly assist code users in the proper determination of these important provisions.

Final Action: AS AM AMPC____ D

G105-09/10
507.10

Proposed Change as Submitted

Proponent: Joe Holland and Dave Bueche, representing Hoover Treated Wood Products

Revise as follows:

507.10 Group E buildings. The area of a Group E building no more than one *story above grade plane*, of Type II, ~~IIIA~~ III or IV construction, shall not be limited when all of the following criteria are met:

1. Each classroom shall have not less than two *means of egress*, with one of the *means of egress* being a direct *exit* to the outside of the building complying with Section 1020.
2. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
3. The building is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

Reason: The exterior wall fire resistance required in Table 601 is greater for Type III than what is required for Type II and is equal to what is required for Type IV. The interior fire resistance in Type III construction is equivalent to Type II and therefore should be allowed. In addition, in Table 503 for E occupancies, the code recognizes that Type IIB and IIIB are equivalent in overall height, number of stories, and allowable area.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HOLLAND-BUECHE-G2-507.10

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent did not provide sufficient technical support to justify reducing the allowed Type IIIA allowed unlimited area building to the unrated Type IIIB. This could result in a significant increase in combustible materials in the building construction that would not be protected by one hour assemblies.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche, representing Hoover Treated Wood Products, Inc., requests Approval as Submitted.

Commenter's Reason: The provisions for a one story unlimited area Group E building of Type II, IIIA or IV construction require that 1) each classroom have not less than two means of egress with one being a direct exit to the outside of the building: 2) The building is equipped through with a sprinkler system; and 3) the building is surrounded and enjoined by public ways or yards not less than 60 feet. The exterior fire resistance required in Table 601 is greater for Type III than what is required for Type II and is equivalent for what is required for Type IV. The interior fire resistance in Type III construction is equivalent to Type II and should therefore be allowed. In addition, in Table 503 for E occupancies, the code recognizes that Type IIB and IIIB are equivalent in overall height, number of stories, and allowable area. This unlimited area building is required to be protected by an approved automatic sprinkler system in accordance with Section 903.3.1.1. The code in footnote d of Table 601 recognizes that this type of sprinkler system can be substituted for 1-hour fire-resistance-rated construction provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted. A Type IIB building with no exterior wall fire protection is allowed to be of unlimited area.

The committees concern (see below) that that TYPE IIIB construction would result in a significant increase in combustible materials in the building construction that would not be protected by one hour assemblies is unfounded. The current code allows TYPE IV construction of unlimited area which has similar or greater fixed fire loads and does not need to be protected by one hour assemblies (Section 602.4.6, Partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction 4 inches (102 mm) thick, or of 1-hour fire-resistance-rated construction.

For consistency in the code, a Type IIIB building with 2-hour fire-resistance-rated exterior walls should be allowed to be of unlimited area.

Final Action: AS AM AMPC____ D

G106-09/10
507.11

Proposed Change as Submitted

Proponent: Joe Holland and Dave Bueche, representing Hoover Treated Wood Products

Revise as follows:

507.11 Motion picture theaters. In buildings of Type II or III construction, the area of a motion picture theater located on the first *story above grade plane* shall not be limited when the building is provided with an *automatic sprinkler system* throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

Reason: This change recognizes that Type III offers equivalent or superior fire resistance to Type II construction. The exterior wall fire resistance required in Table 601 is greater for Type III than what is required for Type II (2 hours versus 1 hour or none). The interior fire resistance in Type III construction is equivalent to Type II. In Table 503 for Group A-1 occupancies, the code recognizes that Type IIB and IIIB are equivalent in overall height, number of stories, and allowable area.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HOLLAND-BUECHE-G3-507.11

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee disapproved this change because there was not justification that allowing motion picture theaters of unlimited size in a combustible building construction type where they are now only allows in non-combustible construction types.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche, representing Hoover Treated Wood, Inc., requests Approval as Submitted.

Commenter's Reason: The provisions for a one story unlimited area motion picture building of Type II construction requires that 1) The building is equipped through with a sprinkler system; and 2) the building is surrounded and enjoined by public ways or yards not less than 60 feet. The exterior fire resistance required in Table 601 is greater for Type III than what is required for Type II. The interior fire resistance in Type III construction is equivalent to Type II and should therefore be allowed. In addition, in Table 503 for A-1 occupancies, the code recognizes that Type IIB and IIIB are equivalent in overall height, number of stories, and allowable area. This unlimited area building is required to be protected by an approved automatic sprinkler system in accordance with Section 903.3.1.1. The code in footnote d of Table 601 recognizes that this type of sprinkler system can be substituted for 1-hour fire-resistance-rated construction provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted. A Type IIB building with no exterior wall fire protection is allowed to be of unlimited area. For consistency in the code, a Type IIIA or IIIB building with 2-hour fire-resistance-rated exterior walls should be allowed to be of unlimited area as well.

Final Action: AS AM AMPC____ D

G107-09/10
508, 509 (New)

Proposed Change as Submitted

Proponent: Maureen Traxler, City of Seattle, Seattle Dept of Planning & Development

Revise as follows:

SECTION 508
MIXED USE AND OCCUPANCY

508.1 General. Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section ~~509~~ 510.
2. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a separate and detached building or structure.
3. Uses within live/work units, complying with Section 419, are not considered separate occupancies.

508.2 Accessory occupancies. Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections 508.2.1 through 508.2.4 ~~508.2.5.3~~.

508.2.1 Area limitations. Aggregate accessory occupancies shall not occupy more than 10 percent of the *building area* of the *story* in which they are located and shall not exceed the tabular values in Table 503, without *building area* increases in accordance with Section 506 for such accessory occupancies.

508.2.2 Occupancy classification. Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

508.2.3 Allowable building area and height. The allowable *building area and height* of the building shall be based on the allowable *building area and height* for the main occupancy in accordance with Section 503.1. The height of each accessory occupancy shall not exceed the tabular values in Table 503, without increases in accordance with Section 504 for such accessory occupancies. The *building area* of the accessory occupancies shall be in accordance with Section 508.2.1.

508.2.4 Separation of occupancies. No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Incidental ~~accessory occupancies~~ uses required to be separated or protected by Section ~~508.2.5~~ 509.
3. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.

(Relocate Section 508.2.5 through 508.2.5.3 to new Section 509)

508.3 Nonseparated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

508.3.1 Occupancy classification. Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space except that the most restrictive applicable provisions of Section 403 and Chapter 9 shall apply to the building or portion thereof in which the nonseparated occupancies are located.

508.3.2 Allowable building area and height. The allowable *building area and height* of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1.

508.3.3 Separation. No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from other occupancies contiguous to them in accordance with the requirements of Section 420.

508.4 Separated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

508.4.1 Occupancy classification. Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building.

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)
[No change proposed to Table 508.4]

508.4.2 Allowable building area. In each *story*, the *building area* shall be such that the sum of the ratios of the actual *building area* of each separated occupancy divided by the allowable *building area* of each separated occupancy shall not exceed 1.

508.4.3 Allowable height. Each separated occupancy shall comply with the *building height* limitations based on the type of construction of the building in accordance with Section 503.1.

Exception: Special provisions permitted by Section ~~509~~ 510.

508.4.4 Separation. Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4.

508.4.4.1 Construction. Required separations shall be fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both, so as to completely separate adjacent occupancies.

SECTION 509
INCIDENTAL USES

~~508.2.5~~ 509.1 Separation of incidental uses ~~accessory occupancies~~. The incidental uses ~~accessory occupancies~~ listed in Table ~~508.2.5~~ 509.1 shall be separated from the remainder of the building or equipped with an automatic fire-extinguishing system, or both, in accordance with Table ~~508.2.5~~ 509.1.

Exception: Incidental uses ~~accessory occupancies~~ within and serving a *dwelling unit* are not required to comply with this section.

~~508.2.5.1~~ 509.2 Fire-resistance-rated separation. Where Table ~~508.2.5~~ 509.1 specifies a fire-resistance-rated separation, the incidental uses ~~accessory occupancies~~ shall be separated from the remainder of the *building* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 712, or both. Construction supporting 1-hour fire-resistance-rated *fire barriers* or *horizontal assemblies* used for incidental use ~~accessory occupancy~~ separations in buildings of Type IIB, IIIB and VB construction are not required to be fire-resistance rated unless required by other sections of this code.

TABLE ~~508.2.5~~ 509.1
INCIDENTAL ~~ACCESSORY OCCUPANCIES~~ USES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic fire-extinguishing system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen cutoff rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing system
Laboratories and vocational shops, not classified as Group H, located in a Group E or I-2 occupancy	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Group I-3 cells equipped with padded surfaces	1 hour
Group I-2 waste and linen collection rooms	1 hour
Waste and linen collection rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons, or a lithium-ion capacity of 1,000 pounds used for facility standby power, emergency power or uninterrupted power supplies	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Rooms containing fire pumps in nonhigh-rise buildings	2 hours; or 1 hour and provide automatic sprinkler system throughout the building
Rooms containing fire pumps in high-rise buildings	2 hours

For SI: 1 square foot = 0.0929 m_2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

~~508.2.5.2~~ 509.2.1 Nonfire-resistance-rate separation and protection. Where Table ~~508.2.5~~ 509.1 permits an automatic fire-extinguishing system without a *fire barrier*, the incidental uses ~~accessory occupancies~~ shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor assembly below to the underside of the ceiling that is a component of a fire-resistance-rated floor assembly or roof assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic closing upon detection of smoke in accordance with Section 715.4.8.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80. Walls surrounding the incidental use shall not have air transfer openings unless provided with smoke dampers in accordance with Section 711.7.

~~508.2.5.3~~ 509.2.2 Protection. Except as specified in Table ~~508.2.5~~ 509.1 for certain incidental uses ~~accessory occupancies~~, where an automatic fire-extinguishing system or an *automatic sprinkler system* is provided in accordance with Table ~~508.2.5~~ 509.1, only the space occupied by the incidental use ~~accessory occupancy~~ need be equipped with such a system.

(Renumber subsequent sections.)

Reason: A change occurred in the 2009 IBC that we believe has unintended consequences. As written, "incidental accessory occupancies" are only required to be separated when they are part of an accessory occupancy. They are mentioned only in Section 508.2.5, and, since it is a subsection of Section 508.2, it only applies where 508.2 applies.

This proposal creates a separate section so that the incidental use provisions will apply in all buildings, including single use buildings. The rooms and areas listed in the incidental use table present special hazards that require special protection. They should be separated from other occupancies and uses regardless of whether the other occupancies in the building are treated as separated or nonseparated occupancies.

We are also proposing to change the term to "incidental uses" instead of "incidental accessory occupancies". Many of the items listed in the table are not occupancies in themselves—they are special uses that don't fall neatly into any occupancy category. The use of this term should be changed throughout the code if this code change proposal is approved.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Traxler-G5-508.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee found the code change appropriate because it clarifies that the activities and facilities listed in Table 508.2.5 present a special hazard regardless whether the building is a single occupancy or a mixed occupancy. The change would make sure that these standards are met regardless of the approach taken to address mixed occupancies. These things are uses or building support facilities and not occupancies unto themselves. The committee expressed concern that divorcing these provisions form the accessory use provisions would allow these features to exceed the 10% area limitation of accessory occupancy. While this part of the provision could be refined by public comment, the committee was comfortable that the term incidental was sufficiently clear that were such features/uses to become the primary or only use of a building, that it would judged to be not 'incidental'.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

508.2.4 Separation of occupancies. No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
~~2.~~ ~~Incidental uses required to be separated or protected by Section 509.~~
2~~3~~. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.

SECTION 509
INCIDENTAL USES

509.1 General ~~Separation of incidental uses.~~ Incidental uses located within single occupancy or mixed occupancy buildings shall comply with the provisions of this section. Incidental uses are ancillary functions associated with a given occupancy that generally pose a greater level of risk to that occupancy and are limited to those uses listed in Table 509.4. ~~The incidental uses listed in Table 509.1 shall be separated from the remainder of the building or equipped with an automatic fire- extinguishing system, or both, in accordance with Table 509.1.~~

Exception: Incidental uses within and serving a *dwelling unit* are not required to comply with this section.

509.2 Occupancy classification. Incidental uses shall not be individually classified in accordance with Section 302.1. Incidental uses shall be included in the building occupancies within which they are located.

509.3 Area limitations. Incidental uses shall not occupy more than 10 percent of the *building area* of the *story* in which they are located.

509.4 Separation and protection. The incidental uses listed in Table 509.4 shall be separated from the remainder of the building or equipped with an automatic fire-extinguishing system, or both, in accordance with the provisions of that table.

TABLE ~~509.1~~ 509.4
INCIDENTAL USES

(No change to table contents)

~~509.2~~ 509.4.1 ~~Fire-resistance-rated~~ Separation. Where Table ~~509.1~~ 509.4 specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the *building* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 712, or both. Construction supporting 1-hour fire-resistance-rated *fire barriers* or *horizontal assemblies* used for incidental use separations in buildings of Type IIB, IIIB and VB construction are not required to be fire-resistance rated unless required by other sections of this code.

~~509.2.1~~ 509.4.2 ~~Nonfire-resistance-rate separation and~~ Protection. Where Table ~~509.1~~ 509.4 permits an automatic fire-extinguishing system without a *fire barrier*, the incidental use shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor assembly below to the underside of the ceiling that is a component of a fire-resistance-rated floor assembly or roof assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic closing upon detection of smoke in accordance with Section 715.4.8.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80. Walls surrounding the incidental use shall not have air transfer openings unless provided with smoke dampers in accordance with Section 711.7.

~~509.2.2~~ 509.4.2.1 Protection limitation. Except as specified in Table ~~509.1~~ 509.4 for certain incidental uses, where an automatic fire-extinguishing system or an *automatic sprinkler system* is provided in accordance with Table ~~509.1~~, 509.4 only the space occupied by the incidental use need be equipped with such a system.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: The ICC General Code Committee approved Item G107-09/10 as submitted as they found the code change appropriate "because it clarifies the activities and facilities listed in Table 508.2.5 present a special hazard regardless whether the building is a single occupancy or a mixed occupancy." This proposed modification further clarifies the comments or concerns expressed during discussion of the item in Baltimore. As approved, the proposal contained no formal charging language. This public comment adds "General" provisions to Section 509.1 that include general applicability requirements.

Also mentioned in the committee reason statement was, "These things are uses or building support facilities and not occupancies unto themselves." This point has been clarified in new Section 509.2. Also mentioned was, "The committee expressed concern that divorcing these provisions form the accessory use provisions would allow these features to exceed the 10% area limitation of accessory occupancy. While this part of the provision could be refined by public comment, the committee was comfortable that the term incidental was sufficiently clear that where such features/uses become the primary or only use of a building, that it would be judged to be not "incidental." This public comment addresses the committee concern and the limitation is clearly stated in new Section 509.3.

A technical inconsistency has been eliminated by the deletion of Exception 2 to Section 508.2.4. Incidental uses are not accessory occupancies and therefore should not be referenced in that section.

Lastly, the provisions of Section 509 for incidental uses have been organized in a format similar to the various mixed occupancy design options contained in Section 508. This consistent format should assist users in determining applicable incidental use requirements. Approval of this public comment for approval as modified will address all committee concerns while placing the provisions in a logical format.

Final Action: AS AM AMPC____ D

G109-09/10
508.2, 508.2.1, 508.2.2, 508.2.3, 508.2.4

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

508.2 Accessory occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as accessory occupancies. Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Section 508.2.1 through ~~508.2.5.3~~ 508.2.4.3.

~~**508.2.1 Area limitations.** Aggregate accessory occupancies shall not occupy more than 10 percent of the area of the story in which they are located and shall not exceed the tabular values in Table 503, without area increases in accordance with Section 506 for such accessory occupancies.~~

~~508.2.2~~ 508.2.1 Occupancy classification. Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

~~508.2.3~~ 508.2.2 Allowable area and height. The allowable area and height of the building shall be based on the allowable area and height for the main occupancy in accordance with Section 503.1. Aggregate accessory occupancies shall not occupy more than 10 percent of the area of the story in which they are located and shall not exceed the tabular values in Table 503, without area increases in accordance with Section 506 for such accessory occupancies. The height of each accessory occupancy shall not exceed the tabular values in Table 503, without increases in accordance with Section 504 for such accessory occupancies. ~~The area of the accessory occupancies shall be in accordance with Section 508.2.1~~

~~508.2.4~~ 508.2.3 Separation of occupancies. No separation is required between accessory occupancies and the main occupancy or each other.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.

2. Incidental accessory occupancies required to be separated or protected by Section ~~508.2.5~~.508.2.4.
3. Group I-1, R-1, R-2 and R-3 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.

~~508.2.5~~ 508.2.4 Separation of incidental accessory occupancies.

(The text of this and following sections are not changed; renumbering is shown for context of number changes in preceding sections.)

TABLE ~~508.2.5~~ 508.2.4
INCIDENTAL ACCESSORY OCCUPANCIES

~~508.2.5.1~~ 508.2.4.1 Fire-resistance-rated separation.

~~508.2.5.2~~ 508.2.4.2 Nonfire-resistance-rated separation and protection.

~~508.2.5.3~~ 508.2.4.3 Protection.

Reason: This proposal is intended to clarify accessory occupancy mixed occupancy provisions. Charging language has been added to Section 508.2 to duplicate that contained in Sections 508.3 and 508.4 for purposes of editorial and legal consistency. The area provisions in current Section 508.2.1 have been placed in context in proposed Section 508.2.2, “Allowable area and height.” Having accessory occupancy allowable area provisions in two different sections could result in oversight. Proposed Section 508.2.3 clarifies that no occupancy separation is required between adjacent accessory occupancies, the exceptions notwithstanding. Approval of this proposal will result in more consistent application of IBC accessory occupancy provisions.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KEITH-G5-508.2.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: While the intent of the proponent was to clarify the section, the committee felt that it did the opposite. Specifically the committee found the first sentence of new Section 508.2 could be read to imply that an accessory occupancy could be a total building, not a small area of a larger building. They found that the wording of Section 508.2.2 confused the determination of aggregate areas of accessory occupancies.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

508.2 Accessory occupancies. ~~Buildings or portions of buildings that comply with the provisions of this section shall be considered as accessory occupancies.~~ Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Section 508.2.1 through 508.2.4.3.

(Portion of proposal not shown remain unchanged.)

Commenter’s Reason: In the ICC General Code Committee’s published reason statement for disapproval of Item G109-09/10, it was stated that, “the committee found the first sentence of new Section 508.2 could be read to imply that an accessory occupancy could be a total building, not a small area of a larger building.” Not wanting to create or add to any confusion, Section 508.2 has been returned to original 2009 IBC language. The reason statement also noted that, “the wording of Section 508.2.2 confused the determination of aggregate areas of accessory occupancies.” This comment is somewhat confusing due to the fact that the accessory occupancy area limitations were moved verbatim from Section 508.2.1 to Section 508.2.2 simply to consolidate allowable area provisions, in context, in the appropriate location. The technical provision is unchanged. The location is consistent with mixed occupancy design option formatting contained throughout Section 508. Approval of this public comment will result in more consistent application of IBC accessory occupancy provisions.

Final Action: AS AM AMPC____ D

G111-09/10
508.2.3

Proposed Change as Submitted

Proponent: Todd Andersen, representing self

Revise as follows:

508.2.3 Allowable building area and height. The allowable building area and height of the building <u>containing accessory occupancies</u> shall be based on the allowable building area and height for the main occupancy in accordance with Section 503.1. ~~The height of any accessory occupancy shall not exceed the tabular values in Table 503, without height and area increases in accordance with Sections 504 and 506 for such accessory occupancies. The building area of the accessory occupancies shall be in accordance with Section 508.2.1.~~

Reason: The current text would limit the location of an accessory occupancy within a building such that it could not be located any higher in a building than the building area and height limits of Table 503 for the accessory would allow. From the Reason statement and testimony by the proponent this was never the intent. Code Change G14-04/05 relocated and rewrote the provisions for Mixed Occupancies in the 2006 IBC to move from Section 302 to new Section 508.

In the Reason statement the proponent wrote – "The purpose of this proposal is to organize and clarify the requirements for the various mixed occupancy and use design options recognized in the International Building Code…The various technical requirements for each design option have been articulated using consistent terminology and style. These requirements generally parallel current intent."

As stated in the Reason statement to Code Change G14-04/05, the intent of code change was to relocate the provisions in Section 302.2 of the 2003 IBC and put their requirements in a consistent format, not to make technical changes. Therefore to understand that the current language was never part of the requirements we need to look at the language in Section 302.2 of the 2003 IBC – it reads:

> **302.2 Accessory use areas.** A fire barrier shall be required to separate accessory use areas classified as Group H in accordance with Section 302.3.1, and incidental use areas in accordance with Section 302.1.1. Any other accessory use area shall not be required to be separated by a fire barrier provided the accessory use area occupies an area not more than 10 percent of the area of the story in which it is located and does not exceed the tabular values in Table 503 for the allowable height or area for such use.
> **302.2.1 Assembly areas.** Accessory assembly areas are not considered separate occupancies if the floor area is equal to or less than 750 square feet (69.7 m2). Assembly areas that are accessory to Group E are not considered separate occupancies. Accessory religious educational rooms and religious auditoriums with occupant loads of less than 100 are not considered separate occupancies.

Nowhere in Section 302.2 (2006 IBC) was there ever a limit on the location of an accessory use area within a building, and it was not the intent of the proponents of Code Change G14-04/05 to ever impose one in the 2006 IBC nor to carry over to the 2009 IBC.

Without this code change building design as we know it today would literally not be allowed.

Without this code change a conference room would never be allowed to be located on the top story in a office building (Group B) of Type IIA construction because the building height limit (in stories) for a Group A-3 occupancies is 3 stories, where the Group B building would be allowed to be 5 stories in building height (or 6 stories if sprinklered). The current language would limit the location of any conference room to not more than the 3rd story.

Another example would be storage rooms (Group S-1). Based on Table 503 the building height limit (in stories) for a Group S-1 occupancy is 4 stories, again where the Group B building would be allowed to be 5 stories in building height (or 6 stories if sprinklered). The current language would limit the location of any store rooms to not more than the 4th story.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Andersen G-1(former RICE-G9)-508.2.3.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the change because they did not find it solved the issue raised by the proponent that of limiting accessory occupancy location in a building based on its tabular value in Table 503 rather than the tabular value of the primary occupancy of the building.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, The Preview Group, representing self, requests Approval as Modified by this Public Comment.

508.2.3. Allowable building area and height.. The allowable building area and height of the building containing accessory occupancies shall be based on the allowable building area and height for the main occupancy in accordance with Section 503.1. The building area occupied by accessory occupancies shall be in accordance with Section 508.2.1.

Commenter's Reason: As the proponent indicated in the original reason statement the current text would literally limit the vertical location of an accessory occupancy within a building to only the limits of Table 503.

For example, a building housing mostly offices (classified as Group B) and constructed of Type IIA construction is allowed by Table 503, when sprinklered, to be 6 stories in height. Most office building have small dining rooms, conference rooms and storage rooms dispersed throughout the building and these spaces are typically of such a size that they qualify as "accessory uses." If literally applied, current Section 508.2.3 would not allow small dining rooms (Group A-2) and small conference rooms (Group A-3) to be located above the 4th story, and small storage rooms would not be allowed to be located above the 5th story. Because Section 508.2.3 says that "The height of any accessory occupancy shall not exceed the tabular values in Table 503…"

Research into the development of current Section 508.2.3 finds its roots in one of the legacy codes, the 1996 BOCA National Building Code (Section 302.1.2). Members of the original Development Committee for Chapter 3 of the Working Draft for the 1st edition of the International Building Code indicated that the provisions for the section that would become Section 302.2 Accessory use areas in the 2000 IBC were essentially taken Section 302.1.2 of the 1996 BOCA National Building Code, which read:

> *302.1.2 Accessory uses. Except for accessory areas of Use Group H in accordance with Section 302.1.2.1 and specific occupancy areas indicated in Section 302.1.1, a fire separation assembly shall not be required between the main use group and accessory areas when the aggregate area devoted to all accessory occupancies does not occupy more than 10 percent of any fire area; the aggregate area devoted to all accessory occupancies within a story does not exceed 10 percent of the area of the story and the aggregate area devoted to an accessory occupancy is not more than 10 percent of the allowable area permitted by Section 503.0 based on the accessory use group. The required type of construction and the automatic fire suppression requirements of Section 904.0 shall be based on the main use group of the fire area.*

No where in Section 302.1.2 is the relative vertical location of an accessory occupancy limited within a building? Only the amount of area occupied by accessory occupancies is regulated.

This comment also seeks to keep the last sentence of current 508.2.3 which reads "The building area occupied by accessory occupancies shall be in accordance with Section 508.2.1."

Final Action: AS AM AMPC____ D

G118-09/10
Table 508.4

Proposed Change as Submitted

Proponent: Tony Crimi, A.C., Consulting Solutions Inc., representing North American Insulation Manufacturers Association

Delete the entire Table 508.4 and substitute as follows:

Errata: The table, as published with the proposed code changes had errors in two cells. An errata note was included in the Report of Hearings which showed the table corrected. The intent of the proponent is to replicate Table 302.3.2 from the 2003 IBC without change. The two cells are shown below, with their proper values (E and H-5; F-2 and U).

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

Use	A-1	A-2[e]	A-3	A-4	A-5	B[b]	E	F-1	F-2	H-1	H-2	H-3	H-4	H-5	I-1	I-2	I-3	I-4	M[b]	R-1	R-2	R-3, R-4	S-1	S-2[c]	U
A-1	--	2	2	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
A-2[e]		--	2	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
A-3			--	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
A-4				--	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
A-5					--	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
B[b]						--	2	3	2	NP	2	1	1	1	2	2	2	2	2	2	2	2	3	2	1
E							--	3	2	NP	4	3	2	3	2	2	2	2	2	2	2	2	3	2	1
F-1								--	3	NP	2	1	1	1	3	3	3	3	3	3	3	3	3	3	3
F-2									--	NP	2	1	1	1	2	2	2	2	2	2	2	2	3	2	1
H-1										--	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
H-2											--	1	2	2	4	4	4	4	2	4	4	4	2	2	1
H-3												--	1	1	4	3	3	3	1	3	3	3	1	1	1
H-4													--	1	4	4	4	4	1	4	4	4	1	1	1
H-5														--	4	4	4	3	1	4	4	4	1	1	3
I-1															--	2	2	2	2	2	2	2	4	3	2
I-2																--	2	2	2	2	2	2	3	2	1
I-3																	--	2	2	2	2	2	3	2	1
1-4																		--	2	2	2	2	3	2	1
M[b]																			--	2	2	2	3	2	1
R-1																				--	2	2	3	2	1
R-2																					--	2	3	2	1
R-3, R-4																						--	3	2[d]	1[d]
S-1																							--	3	3
S-2[c]																									1
U																									--

For SI: 1 square foot = 0.0929 m^2.
NP = Not permitted.

a. Except for Group H and I-2 occupancies, where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the fire-resistance ratings shall be reduced by 1 hour but to not less than 1 hour and to not less than the required floor construction according to the type of construction.
b. Occupancy separation need not be provided for storage areas within Groups B and M if the:
   1. Area is less than 10 percent of the floor area;
   2. Area is provided with an automatic sprinkler system and is less than 3,000 square feet; or
   3. Area is less than 1,000 square feet.
c. Areas used only for private or pleasure vehicles shall be allowed to reduce separation by 1 hour.
d. See Section 406.1.4. for private garages and carports.
e. Commercial kitchens need not be separated from the restaurant seating areas that they serve.

Reason: This proposal aims to restore the previous Table 302.3.2 from the 2003 IBC, but retain the modified text of section 508 on Mixed Use & Occupancy. In addition to restoring the separated uses (occupancies) concept previously prescribed in Section 302 of the 2003 IBC (and 2003 Supp), the proposal clarifies the distinction between separated uses and the non-separated use options. During the 2006 cycle the separated uses section of the IBC was changed based on public proposal G32-04/05 on the basis that it presented no significant technical changes. To the contrary, there are more than 100 changes in fire resistance ratings resulting from this proposal, most without justification or supporting rationale. The result of this Code change is to reduce the level of protection provided by the IBC over any of the previous Legacy Codes.

Approximately 40% of the jurisdictions who have adopted the IBC are now using the 2006 (or later) edition. In contrast, when this Code change was first accepted in the 2006 IBC, few jurisdictions had any history with the lack of fire resistance rated construction between occupancies which the 2006 and 2009 IBC now permits. As a result, there is a growing level of concern with the reductions in fire resistance ratings between separated occupancies in mixed occupancy buildings in the 2006 IBC. The adoption of this Code change in the 2006 and 2009 IBC arbitrarily reduced fire resistance ratings to levels significantly below most of the Legacy Codes, without providing any compensating safety measures. The full impact of this change has not yet been felt. This change needs to be corrected, and a selective process of review, consideration, and justification undertaken to determine which, if any, of these changes are desirable and justifiable.

The concept of separation of major occupancies exists in Building regulations throughout the world. Certainly, those occupancy separations requirements used in the separated occupancies option have stood the test of time. There continues to be a critical need to separate adjacent major occupancies of dissimilar use, with fire-resistance rated construction. This proposal would delete the current Table 508.4 in its entirety and substitute the previous Table 302.3.2 which was replaced in Code Change G32-04/05. The previous Table 302.3.2 had been is use for the three plus years it existed in the 2000 and 2003 editions of the IBC. Furthermore, the occupancy separation fire resistance ratings from this predecessor table were taken directly from the BOCA National Building Code, along with the entire concept of the non-separated and separated occupancies in mixed occupancy buildings. The occupancy separation Table had existed in the BOCA National Building Code for a very long time, and was incorporated into the first edition of the IBC. The concept of separation of major occupancies exists in Building regulations throughout the world. Certainly, those occupancy separations requirements used in the separated occupancies option have stood the test of time. There continues to be a

In the published "Report of the Public Hearing on the 2003 editions of the International Building Code", the committee's published reason for recommending adoption of G32-04/05 is reported as follows: "The proposal does not have any significant technical changes from the current requirements." In reality, this code change proposals has lead to over 100 changes to required fire resistance ratings for occupancy separation, in both sprinklered and unsprinklered occupancies, without providing individual justifications of any kind.

To illustrate some specific examples, this change has unilaterally reduced the fire separation between a mixed use office and a moderate hazard warehouse from the previously existing 3-hour minimum fire separation to zero, while providing no technical justification or compensating measures. Table 302.3.2 of the 2003 IBC, as well as the Exception to Section 302.2.3 (IBC 2003 Supplement), specified a minimum fire resistance for every occupancy separation and did not permit a fire resistance rating to be less than one hour, even when an automatic sprinkler system was provided. In contrast, the new Table 302.3.2 allows numerous instances where the fire resistance ratings are waived entirely. Further, while Exception 1 of the old section 302.3.2 did not apply to Group H and I-2 areas, the revised Table in the new section 508 shows a reduction of 1-h in fire resistance rating between all I occupancies and for F-2, S-2, U, B, F-1, M, and S-1 without any justification or compensation. While it has been argued that a number of these separated use combinations are unrealistic, an equal number are very realistic and represent an unjustified reduction from current code requirements for fire-resistant construction. To unilaterally propose that a mixed use office and moderate hazard warehouse be reduced from the current 3-hour minimum fire separation to a zero separation is unjustifiable.

Bibliography & References:
[1] 2003 IBC, International Codes Council, Table 302.3.2
[2] 1996 BOCA National Building Code, BOCA
[3] 1997 Standard Building Code, SBCCI
[4] 1997 Uniform Building Code, ICBO

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: Alternative locations for allowance in the footnotes to the table would be as exceptions to Sections 508.3.3 and 508.4.4.

ICCFILENAME: CRIMI-G3-TABLE 508.4.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved the table as providing a better format for the information for occupancy separation requirements. It allows a simple reading of the table for the intersection each possible combination of occupancies. The values quickly force someone to consider the non-separated mix occupancy option. There was discomfort that the existing Table 508.4 combines in the same column and row occupancies that are distinctly different. It was acknowledged that the values contained in the table are still the subject of considerable debate but the format provides a clear route to consider different values. The committee intends that existing Table 508.4 be replaced by Table 302.3.2 from the 2003 Edition of the IBC, with no changes to the tabular values in the 2003 Table.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gerald Anderson, City of Overland Park, representing self, requests Disapproval.

Commenter's Reason: It would be my opinion that the committee's reason statement gives no justification at all for this code change. You would think that this code change is nothing but a re-organization of existing data. But that is not the case. This code change represents a major reversal in thought process. I would also note that I don't see where the committee, supported any on the proponents reason for the change. I have to wonder why the committee did not latch on to some of the proponents reasons if they really believed in the code change. Below I have outlined the committee's reasoning statement and provided comment.

Committee Reasons:
I. The committee approved the table as providing a better format for the information on occupancy separation. It allows for a simple reading of the table for the intersection each possible combination of occupancies. In reading this reason one is led to believe that the change is more editorial in nature. That is not true this code change is a major role back.
2. The values quickly force someone to consider the non-separated mix occupancy option. Why is. this important? Is the committee suggesting that the non-separated use is the preferred method for dealing with mixed occupancies? Or are they suggesting the separation requirements are so stringent that one is automatically forced to use the non-separated use option.

3. There was discomfort that the existing table 508.4 combines the same column and row occupancies that are distinctly different. This is a comment concerning the format *or* readability of the table. It would be an appropriate comment if this code change simply re-arranged existing data but that is not the case.
4. It was acknowledged that the values contained in the table are still the subject of considerable debate but that format provides a clear route to consider different values. I am not sure what this reasoning statement is telling us other than the fact that the committee is acknowledging that the values in the table are still up for debate.

In the proponents reasoning statement, it is stated that the new proposed table is right out of the BOCA code and that the stated occupancy separations have stood the test of time. I am not going to dispute that statement. However, the problem with the proponents reasoning is that he is once again wishing to mix two very different concepts. Those concepts are separating are based on "occupancy" and separating occupancies and/or spaces into "fire areas". Fire Areas are closely associated with and can establish a threshold for the need for fire protection system. The need for occupancy separation is based on the inherent risk that one occupancy may pose to an adjacent occupancy. Fire Areas are based on potential fuel loading amongst one or a multitude of occupancies. Currently, the code adequately and correctly addresses occupancy separation in Table 504.8. Separating mixed occupancies into fire areas is addressed in Section 707.3.8. If one would go back and look at the proponents reasoning statement for G32·04/05 the explanation for the way the code currently exists is explained in great detail.

Furthermore, concerning the fact that the proponent is trying to address two very different concepts in One table" one only has to look the title of the BOCA Table 313.1.2 that the proponent wishes to bring into the code. That table is titled "Fire-resistance Separation Requirements for Fire Separation Assemblies of Fire Areas". Table 508.4 of the IBC is attempting to address occupancy separation.

There is no question that some dissimilar occupancies by themselves present a possible hazard to an adjacent occupancy. Table 508.4 currently recognizes this fact and does provide separation when needed. If the proponent really believes that all occupancies are such a hazard to one another that they need to be separated with these enhanced fire barriers then I think that begs the question as to why they support the concept of "non-separated mixed use".

I would also add that Table 508.4 is a heavily used table. It is not a table that we as code users can afford to be changing every other code cycle. The table as it currently exists adequately addresses occupancy separation. There is no need or justification to revert back to an old table in one of the legacy codes. Proper justification and reasoning was given and accepted when the existing table was brought forth. I urge your disapproval.

Public Comment 2:

Gene Boecker, Code Consultants, Inc., representing The National Association of Theatre Owners, requests Disapproval.

Commenter's Reason: The original code change that brought the current table into the code was an attempt to modernize the concept of separation of occupancies. Rather than consider each individual occupancy based simply on its being designated as a different occupancy from others, this change categorized occupancies according to relative levels of risk, a valid concept that is used in Chapter 8 of the IEBC. This concept better expresses the hazards shared among different occupancies, and rationally allows similar hazards and risks to be grouped together and therefore unseparated one from another. Based on this, the current language should be retained.

Public Comment 3:

Ron Clements, representing Chesterfield County Building Inspection Dept., requests Disapproval.

Commenter's Reason: The proponent of G118-09/10 would have you believe that the ICC General Code Committee for the 2004/2005 code cycle that voted to approve G32-04/05 and the membership at the final action hearings for the 2004/2005 code cycle that voted in support of the committee and against the public comment to deny G32-04/05 did not know what they were doing. And then again in the 2006/2007-code cycle this issue was brought up with G148-06/07, which attempted to do the same thing as the current G118-09/10 and return the old table and reverse the action of the membership during the 2004/2005 code cycle. Again the committee and the membership voted in support of the current mixed occupancies table and concept and denied change G148-06/07. I would suggest that since this has been voted on twice by two separate General Committees and twice by the membership that it is a flimsy argument to suggest that all those people did not understand what they were doing. I served on the ICC General Code Committee from 2003 to 2006. I served as Vice-Chair of the committee in for the last two cycles of those terms. In my opinion, every member of the committee understood G32-04/05 and G148-06/07 and what those code changes accomplished. Each committee member understood the technical ramifications of this issue. The published committee reason statement indicating that there were no technical changes was inaccurate and regrettable. Obviously, the format for the table and the fire-resistance rating requirements contained in the dedicated table were very different from the former consolidated table. I believe that the inference was intended to indicate that the new provisions were very similar to those contained in a former model code and therefore had historical precedence. In my opinion the membership also knew what they were doing based on comments I received from many of them. Therefore since this was the first time in three cycles that the committee voted to return to the old 2003 edition mixed occupancies table I felt it appropriate that the membership have the final vote to support their past actions.

The 2009 IBC Table 508.4 places similar risks together without a separation requirement and in those cases mixed occupancy is based solely on performing the ratio calculation. Only dissimilar risk requires a fire separation. All that table 508.4 is dealing with is allowable area limits; table 706.3.9 addresses separation of fire areas for fire protection thresholds. How much of a difference in allowable area is there between a group M and Group S1? In table 503 there is none with type 5B construction and only 5000sf with type 2B. The biggest difference is higher occupant loads but not higher fuel loads so it makes since to allow use of the ratio calculation only to mitigate the slight hazard disparity between the two similar uses thereby allowing slightly larger buildings than non-separated use would allow in those case. When you get to the next level where the fuel loading and occupant load risk differ, such as between Assembly and Storage use then in addition to the ration calculation you also get the fire rated separation. The current table 508.4 uses a more sensible stepped approach to handling mixed occupancies with the separated mixed-use method. This method also makes the method more usable. I can count on one hand the number of buildings I have seen in 16 years of code enforcement where separated mixed use was used to achieve allowable area requirements. With sprinkler and frontage increases and sprinkler thresholds that kick in most mixed-use buildings can comply as non-separated mixed use.

Public Comment 4:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Disapproval.

Commenter's Reason: Under the provisions of the IBC, there are some groupings of occupancies that are very similar based on their risks as defined in Section 903 for fire, and Chapter 10 for egress. Often these occupancies are combined with business functions because of their need for such functional support. The question raised by G118-09/10 is whether or not such activities must be separated from each other. Historically the codes have treated these conditions differently, but both the 2006 and 2009 IBC have allowed these occupancies to be unseparated, but allowed them to be treated as if they were separated to determine the allowable area for a mixed use.

G118-09.10 changes the structure in Table 508.4 and takes the code back to the original separation requirements found in the 2003 IBC. Many of the "fixes" aren't fixes as all, and just add to the confusion of requiring separation where none is needed. A classic example is the mixed-use separated requirement for Business (B) and Low-Hazard Storage (S-2) occupancies. Table 503 establishes the numbers of stories and areas of a business and low-hazard storage as:

Table 1 Area Permitted Per Story
B and S-2 per Table 503

Type of Construction		IIB	IIIA	IIIB	VA	VB
Business	Stories	3	5	3	3	2
	Area	23,000	28,500	19,000	18,000	9,000
Storage (S-2)	Stories	4	4	4	4	1
	Area	26,000	39,000	26,000	21,000	13,500

When using G118-09/10 mixed-use options, you are limited by the smallest allowable area, or by a relative percentage of the allowed areas when separating them.

G118-09/10 ignores the safety factors associated with some groups that are so similar that the code treats them almost identically. They are often with each other in the same facility because of a business interrelationship. The following table shows the maximum allowable area for the mixed-use and the area of each occupancy if the B were strictly an accessory function.

Table 2 Area Permitted Per Story
B Accessory to S-2

Type of Construction		IIB	IIIA	IIIB	VA	VB
B/S-2 Combined	Stories	3	3	3	3	1
	Area	23,000	28,500	19,000	18,000	9,000
S-2 portion Area		20,700	25,650	17,100	16,200	8,100
B portion Area		2,300	2,850	1,900	1,800	900

If the B function were more than 10% of the building floor, G118-09/10 would require a 1 hour fire barrier between the business and storage occupancy in order to treat it as mixed-use separated. Under the 2009 IBC that same configuration would require no fire barrier. Assuming that 25% of the floor were business and 75% were low-hazard storage, the allowable floor area and the breakdown for the area for each occupancy would be as follows:

Table 3 Area Permitted Per Story
25% B and 75% S-2 (no Sprinklers)

Type of Construction		IIB	IIIA	IIIB	VA	VB
B + S-2 Combined	Stories	3	3	3	3	1
	Area	25,250	36,750	24,250	20,250	12,375
S-2 portion - Area		19,500	29,250	19,500	15,750	10,125
B portion - Area		5,750	7,125	4,750	4,500	2,250

In some cases the area of the low-hazard storage is smaller and in others it is larger than it would be if there were no mixed occupancy, but with G118-09/10, a 1 hour wall is required to protect it even though it is smaller in area than if it were a single occupancy.

Neither a B nor an S-2 occupancy require fire suppression, unless the S-2 is a commercial parking garage. The S-2 can be in a one story, unlimited area building without a fire suppression system, while the B could be in a one story and both a B and S-2 (unseparated) could be in two-story unlimited area buildings with fire suppression.

Both G118-09/10 (with a 1 hour fire barrier) and the current IBC (without the fire barrier) would allow the following if the building is sprinklered throughout assuming the same proportion of building area with 25% business and 75% low-hazard storage:

Table 4 Area Permitted Per Story
25% B and 75% S-2 (with Sprinklers)

Type of Construction		IIB	IIIA	IIIB	VA	VB
B/S-2	Stories	3	3	3	3	2
	Area	75,750	109,125	72,750	60,750	37,125

A similar phenomenon occurs in the group of at a B business combined with either M mercantile, or F-1 manufacturing, or S-1 moderate-hazard storage in a mixed-use. As designed, constructed and used, most of these cases the business activity is the minor portion of the facility. Table 503 permits these base areas:

Table 5 Area Permitted Per Story
B, M, F-1, S-1 Stories/Area per Table 503

Type of Construction		IIB	IIIA	IIIB	VA	VB
Business	**Stories**	3	5	3	3	2
	Area	23,000	28,500	19,000	18,000	9,000
Mercantile	**Stories**	4	4	4	3	1
	Area	12,500	18,500	12,500	14,000	9,000
Manufacturing (F-1)	**Stories**	2	3	2	2	1
	Area	15,500	19,000	12,000	14,000	8,500
Storage (S-1)	**Stories**	3	4	3	4	3
	Area	17,500	26,000	17,500	14,000	9,000

Because of the risk associated with these occupancies, Section 903.2 would require fire suppression for them at the following building area thresholds:

Section 903.2 Sprinkler thresholds for each occupancy is:

Business	None – based on area
Mercantile	12,000 or 24,000 combined
Manufacturing (F-1)	12,000 or 24,000 combined
Storage (S-1)	12,000 of 10,000 2 or more stories in height

Table 1004.1 The occupant load factor in each is:

Business	100 gross
Mercantile	300 gross (storage/stock/shipping)
Manufacturing (F-1)	100 gross
Storage (S-1)	500 gross (warehouses)

Table 1016.1 Travel distance limitation for each occupancy is:

Business	200 feet
Mercantile	200 feet
Manufacturing (F-1)	200 feet
Storage (S-1)	200 feet

To examine the question raised by G118-09/10, assume a mixed use of B with either M, F-1 or S-1 without separation, with the B being 25% of the building area (relatively large). The allowed total per floor area <u>without fire suppression</u> would be:

Table 6 Area Permitted Per Story
25% B with 75% M or F-1 or S-1 (no Sprinklers)

Type of Construction		IIB	IIIA	IIIB	VA	VB
B/M	**Stories**	2	2	2	2	1
	Area	11,999	11,999	11,999	11,999	9,000
B/F-1	**Stories**	2	2	2	2	1
	Area	11,999	11,999	11,999	11,999	8,500
B/S-1	**Stories**	1	1	1	1	1
	Area	11,999	11,999	11,999	11,999	9,000

Using the provisions from the 2009 IBC and assuming that an NFPA 13 fire suppression system were installed throughout the building, the total allowable area per floor for the uses (B @ 25%) in a multi-story application would be shown as B + M, F + F-1 and B + S-1. In the same table is the allowable area for only the M, F-1 and S-1 when totally sprinklered.

Table 7 Area Permitted Per Story
25% B with 75% M or F-1 or S-1 (with Sprinklers)

Type of Construction		IIB	IIIA	IIIB	VA	VB
B + M	**Stories**	3	3	3	3	3
	Area	45,375	63,000	42,375	45,000	27,000
M	**Stories**	3	3	3	3	2
	Area	37,500	55,500	37,500	42,000	27,000
B + F-1	**Stories**	3	3	3	3	3
	Area	52,125	64,125	41,250	45,000	25,875
F-1	**Stories**	3	3	3	3	2
	Area	46,500	57,000	36,000	42,000	25,500
B + S-1	**Stories**	3	3	3	3	3
	Area	56,625	79,875	53,625	45,000	27,000
S-1	**Stories**	3	3	3	3	3
	Area	52,500	78,000	52,500	42,000	27,000

Note: Because the code limits the overall building area, none of the values are shown for a building more than 3 stories in height. If a building with these occupancy groups were built higher, the area per floor would have to be fractionally reduced.

B group functions in these buildings would never trigger the requirement for the building to be sprinklered and does not play any role in the allowed height of the building except to limit it in some circumstances.

G118-10/11 requires a 1 hour fire barrier separation between the B portion of the building and the S-1 group, and a 2 hour fire barrier between the B functions and the M and F-1 areas. When you examine this question you should ask what has been accomplished. What additional safety exists? Except to significantly increase the cost of construction, no additional safety has been gained.

For example, in Type IIB structure, an M occupancy can be 37,500 sf per floor and have 10% of that floor area be an accessory business function (3,750 sf) with no separation and the building would not be classified as a B occupancy; it would be 100% M at 37,500 sf. However, if it is declared a B group mixed with an M group, the total building area could increase to 45,375 sf. and the building would be allowed to have 17,250 sf of B Group and 28,125 sf, M Group.

The assumed hazard (M Group) has been reduced by the less hazardous (B Group). The B function has such a low level of risk that including it in these buildings does not create a hazard for the M, F-1 and S-1 areas. It is the M, F-1 and S-1 areas that are the risk and that is why they have a fire suppression threshold at 12,000 sf.

G118-09/10 provides for additional construction cost without providing any additional safety in the building. I urge the membership to overturn the committee and deny this change.

Public Comment 5:

Bruce D. Dimmig, representing, Arizona Building Officials, request Disapproval.

Commenter's Reason: The occupancy separation table (508.3.3) should be left as it is in the 2009 codes, as it is more of a risk-based case than a prescriptive case as per the table in the 2003 code cycle. In the Proponent's reasoning statement provided with the proposal heard in Baltimore, they state that the 2006 code change resulted in over 100 fire-resistive ratings changes. However, information to show that this resulted in a decrease in fire safety or data showing that this increased the number of incidents (fires, etc.) was not provided. Moreover, very few projects are designed as separated occupancies.

Public Comment 6:

Sam Francis, representing American Wood Council (AF&PA), requests Disapproval.

Commenter's Reason: The proponent has stated that G118 is simply a restoration of previous Table 302.3.2 from the 2003 IBC. This is true. However, the proponent has failed to make the case for why such a drastic step is necessary. For example, separation from B to F-1 goes from <u>None Required</u> to <u>3 Hours</u>. Is that an appropriate increase with virtually no data to support it? And of course, several examples of separated uses become not permitted under this proposal. On the surface, this seems to be a continuation of the struggle by Legacy Code users to recreate tables to reflect their experiential situation. Such change should require the rigor of data. It is lacking here.

Public Comment 7:

Jonathan Humble, AIA, American Iron & Steel Institute, requests Disapproval.

Commenter's Reason: We ask that the membership disapprove this proposal. Our basis for recommending this action is based on both the proposers reasoning for modifying the table back to the 2003 format and tabular values, and the recommendation by the code development committee concerning primarily format issues and not necessarily technical substance.

Why the 2003 edition? Comparing the 2009 table to the 2003 edition of the table represents a silo approach, yet the reason statement takes us to BOCA. Since the proponent used as an example the BOCA National Building Code, let's go back to 1989 when Section 313 (Mixed use and occupancy) was introduced as we recognize it today. From that time to the publication of the 1999 BOCA National Building Code there were a number of changes concerning the fire-resistance tabular values. The same can be said with respect to a comparison between the 1999 BOCA National Building Code and the 2003 International Building Code. And again, changes took place from the 2003 International Building Code to the 2009 International Building Code. One must therefore ask why should we only focus on the 2003 edition of the table only? Unfortunately, there is no clear basis cited in the original proponent's reasons to technically justify this narrow focus.

Does the proposal take into effect other modifications? Further, we must question if other related modifications to the International Building Code were addressed. For example, in the 2009 International Building Code the table contains a number of entries under the category "non-sprinklered" where it specifies "not permitted". But the original proponent's reason statement lacks that comparison. Therefore, is the argument for the 2003 table really legitimate? If one compares, one finds that the values in the 2003 edition represent an hourly rating thus representing a lessening of the stringency. Does this represent a logical approach? We would submit not. Then there are the modifications to other provisions of the International Building Code since 2003, such as additional sprinkler requirements, requirements for the high rise provisions, fire resistance, etc. which also can impact the decisions made to this table. None of which is accounted for in the proponents original reason statement.

In view of the above, we recommend disapproval.

Public Comment 8:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Disapproval.

Commenter's Reason: The fundamental argument of the proponent of G118-09/10 for approval was that his proposal corrects an error made by the ICC General Code Development Committee during the 2006 code development cycle. The proponent's contention is that the 2003 IBC separated mixed occupancy fire-resistance rating requirements are time proven and necessary for occupant safety. In the published reason statement for G118-09/10 the proponent states, "Certainly, those occupancy separations requirements used in the separated occupancies option have stood the test of time. There continues to be a critical need to separate adjacent major occupancies of dissimilar use, with fire-resistance rated construction. This proposal would delete the current Table 508.4 in its entirety and substitute the previous Table 302.3.2 which was replaced in Code Change G32-04/05."

Additionally, it is implied that the ICC General Code Committee was remiss in its approval of G32-04/05. He states, "This change needs to be corrected, and a selective justification undertaken to determine which, if any, of these changes are desirable and justifiable." A misleading statement published in the committee report for the 04/05 code development cycle is offered as substantiation for that assertion. The proponent notes in his G118-09/10 reason statement, "In the published "Report of the Public Hearing on the 2003 editions of the International Building Code", the committee's published reason for recommending adoption of G32-04/05 is reported as follows: "The proposal does not have any significant technical changes from the current requirements." In reality, this code change proposals has lead to over 100 changes to required fire resistance ratings for occupancy separation, in both sprinklered and unsprinklered occupancies, without providing individual justifications of any kind." The G118-09/10 reason statement also declares, "Furthermore, the occupancy separation fire resistance ratings from this predecessor table were taken directly from the BOCA National Building Code, along with the entire concept of the non-separated and separated occupancies in mixed occupancy buildings. The occupancy separation Table had existed in the BOCA National Building Code for a very long time, and was incorporated into the first edition of the IBC."

It is true that 2003 separated mixed occupancy fire-resistive rating requirements were contained within the BOCA code and therefore could be deemed to "have stood the test of time." What is not mentioned is that most, if not all, of the former Table 302.3.2 requirements are intended to apply to fire barriers separating nonsprinklered fire areas. In fact, the title of BOCA code Table 313.1.2 that became ICC Table 302.3.2 was, "FIRERESISTANCE RATING REQUIREMENTS FOR FIRE SEPARATION ASSEMBLIES BETWEEN FIRE AREAS."

The proponent's reason statement notes, "There continues to be a critical need to separate adjacent major occupancies of dissimilar use, with fire-resistance rated construction." The fact of the matter is that the proponent's table is inconsistent with that technical philosophy. In reality, the proposed table impacts buildings of lesser heights and types of construction, and in many cases, creates illogical and excessive requirements. For example, in other than Group H occupancies, there are no occupancy separation requirements in unlimited area and height buildings of Type IA and IB construction. These buildings will always qualify for nonseparated mixed occupancy provisions. Similarly, Section 507 unlimited area buildings would often qualify for nonseparated or accessory mixed occupancy provisions, neither of which would require a fire-resistance rated occupancy separation in other than Group H occupancies. On the other hand, the proposed table requires a physical separation between certain occupancies that would typically qualify for nonseparated occupancy provisions. Various Group A occupancies, for example, are generally permitted the same allowable area based on the building type of construction at Table 503. Yet, the proposed table requires a 2-hour occupancy separation between different Group A occupancies. In this instance, there is negligible dissimilar risk, yet a significant requirement for passive fire protection. That 2-hour fire-resistance rating requirement is appropriate for separation between nonsprinklered fire areas. That requirement was incorporated into new Table 706.3.9 in 2003; however, was never removed from existing Table 302.3.2. The ICC General Code Committee did realize what had been accomplished through the creation of Table 706.3.9 in 2003. When they stripped the fire area separation provisions out of 2006 Table 508.3.3, the committee regarded the resulting table as not representing significant technical changes. It was largely a housekeeping exercise at that point in time. Another legacy code, the Uniform Building Code served as the historical precedent for new 2006 Table 508.3.3. It was the only legacy code that had an occupancy separation table based solely on dissimilar risk of adjacent occupancies. As was the case with the former BOCA table, the ICBO table has "stood the test of time."

In his reason statement, the proponent provides a specific example intended to demonstrate the need for a three-hour fire-resistance rated occupancy separation between Group B office and a Group S-1 warehouse. He expresses the opinion that, "To unilaterally propose that a mixed use office and moderate hazard warehouse be reduced from the current 3-hour minimum fire separation to a zero separation is unjustifiable." He fails to note that both Group B and Group S-1 are moderate or ordinary hazard occupancies exhibiting somewhat similar risks. The most glaring error in the proponent's argument is that he fails to mention a key requirement in the separated occupancy design option. That is, the mandatory performance of the sum of the ratios calculation. By requiring the ratio of actual occupancy areas divided by total allowable areas not to exceed 1.0, the calculation ensures that fuel loading remains balanced in the subject occupancies. This calculation accounts for minor dissimilarities in risk between occupancies of a similar nature such as Groups B, F-1, M and S-1 moderate hazard occupancies or Groups A-1, A-2, A-3, A-4, A-5 and E people intensive occupancies. Using the proponent's suggested occupancies as an example, Group B and Group S-1 occupancies of any size require no fire separation when constructed of Type IA or IB construction or unlimited area buildings as permitted in Sections 507.3 or 507.4. In other types of construction, a fire separation is not required where the relative areas qualify for accessory occupancy or nonseparated occupancy provisions. Contrary to the proponent's contention that, "There continues to be a critical need to separate adjacent major occupancies of dissimilar use, with fire-resistance rated construction," IBC mixed occupancy provisions (and cited former BOCA provisions) have always permitted the absence of a fire-resistance separation in a vast majority of buildings.

As previously mentioned, separated occupancy provisions illogically apply to smaller buildings with less inherent risk. The proponent makes a generalization without providing for any sense of scale. Type IIA construction provides the largest allowable areas for those construction types subject to separated occupancy provisions. The maximum allowable floor area of a sprinklered, Group S-1 occupancy is 97,500 square feet, including sprinkler and maximum frontage increases (Section 503.1). The basic maximum allowable floor area of a Group B occupancy is 140,625 square feet (Section 503.1). Separated occupancy provisions do <u>not</u> permit a story with a total combined floor area of 238,125 square feet (97,500 + 140,625). If such was the case, the fire-resistive separation requirement currently contained in Table 707.3.9 and previously contained in 2003 Table 302.3.2, would be entirely appropriate. However, the allowable area is regulated by Section 508.4.2.

The office occupancy could contain 14,062 square feet of Group S-1 use without fire separation based on Section 508.2, accessory occupancy provisions. Conversely, the warehouse occupancy could contain up to 9,750 square feet of office occupancy without separation. By increasing the Group S-1 area by 1 percent, to 10,725 square feet, the story no longer qualifies for accessory occupancy provisions. Assuming the design need for a total area greater than the most restrictive allowable area of 97,500 square feet, separated occupancy provisions would apply. In this instance, the total allowable area based on the required sum of the ratios calculation would be 135,851 square feet ([125,126 ÷ 140,625] + [10,725 ÷ 97,500]). Note that the maximum area is 4,774 square feet <u>less</u> than that normally permitted for a single occupancy Group B story. Although the Group B footprint has been decreased by almost 5,000 square feet and the Group S-1 occupancy is only 975 feet larger than that permitted by accessory occupancy provisions, the proponent believes that a <u>three-hour</u> fire-resistance rated occupancy separation should be required. The reverse proportion is just as dramatic. Assuming an 11 percent Group B floor area in a Group S-1 occupancy, the total allowable area would be 102,264 square feet ([86,775 ÷ 97,500] + [15,469 ÷ 140,625]). In this case, the floor area is only 4,764 square feet larger than the most restrictive Group S-1 allowable area while the area of the Group S-1 fuel load has been decreased by 10,725 square feet. Again, the proponent advocates a three-hour fire-resistance rated occupancy separation. Yet, no occupancy separation is required in unlimited area buildings containing the same occupancy groups.

During the 2006 code development cycle, the ICC General Code Committee fully understood the complexities of separated occupancies, and more importantly, the <u>system</u> of mixed occupancy design options in the IBC. Contrary to that suggested by the proponent, technical justifications for modifications to former Table 302.3.2 were not necessary because those values were largely applicable to unsprinklered fire area separation and out of context for the separation of dissimilar risk. Current Table 508.4 does not require correction. The current provisions were reviewed, considered and justified to be desirable and justifiable by the code committee over six code development cycles. Those conclusions were ratified by the membership at the conclusion of each of those cycles.

Although the proponent's primary opposition to current separated occupancy separation requirements was based on criticism of the committee's technical due diligence, the 2009 IBC General Code Committee report substantiating approval as submitted stated, "The committee approved the table as providing a better format for the information for occupancy separation requirements." Additionally, "There was discomfort that the existing Table 508.4 combines in the same column and row occupancies that are distinctly different." Lastly, it was stated that, "The committee intends that existing Table 508.4 be replaced by Table 302.3.2 from the 2003 Edition of the IBC, with no changes to the tabular values in the 2003 Table." Ironically, the proponent claims that current separated occupancy provisions were adopted without technical justification. Following many cycles of vetting current Table 508.4 requirements, there was no contextual technical justification for a return to former 2003 provisions. Nevertheless, this General Code Committee approved G118-09/10 as submitted, 7-5. The committee reason was somewhat contradictory. If it was desired to change the Table 508.4 format to include all possible occupancy combinations, the submittal should have modified the format while retaining the current separation requirements. The rationale for the format change is that it will accommodate future discussions of specific separation requirements. The current occupancy groupings were criticized by some. It should be noted that most tables in the IBC contain similar groupings. By way of example, the nonsprinklered fire area separation requirements formerly contained in 2000 IBC Table 302.3.2 were consolidated into Table 707.3.9 which has four lines of occupancy groupings. Table 508.4 currently has nine occupancy groupings. The groupings are based occupancy risk similarity. Individual groupings may be altered at any time during the code development process based on technical merit. There is no reason to create a table that isolates every occupancy group simply to "provide a clear route to <u>consider</u> different values," as stated in the committee reason statement.

The stated objective of G118-09/10 is to reformat the separated occupancy table, restore 2003 fire-resistive rating requirements between all mixed occupancy combinations and start over with the analysis for the justification of reduction of former requirements. Sustaining the approval of G118-09/10 would result in the taking of a giant technical step backwards and would serve to insult the countless hours that have been devoted to the ongoing development of a viable and effective system of mixed occupancy design options over the past decade. Current Table 508.4 values have been contained in the IBC for the last two editions. There is no loss history that would indicate that they are inadequate. The entire premise of the proponent's technical/philosophical contention is based on the fact that certain fire-resistance rating requirements were formerly contained in the two earliest editions of the IBC. Over years, the various IBC code committees have worked diligently to resolve technical discrepancies caused by the integration of the three former model (legacy) codes. One such discrepancy was the dual purpose table to which the proponent assigns so much importance and technical credibility. Based on considerable debate over numerous code development cycles, earlier ICC General Code Committees resolved those conflicts and developed a relative and pertinent system of mixed occupancy provisions. Achieving a wholesale return to out of context separated occupancy requirements is irresponsible code development. It will provide occupants with a false sense of security at considerable, unnecessary cost to building developers and owners. Please maintain the technical integrity of IBC mixed occupancy provisions and disapprove G118-09/10.

Public Comment 9:

Eirene Oliphant, MCP, City of Leawood, representing Metropolitan Kansas City Chapter of the ICC requests Disapproval.

Commenter's Reason: At first glance, it appears that this code change is nothing but a re-organization of existing data, but that is not the case. While the proposed table does indeed provide for simpler reading, it has introduced considerable changes from the current table. Refer to the table below for a comparison of the current code to what is provided for in this code change:

The proponent states in his reasoning that G32-04/05, "has unilaterally reduced the fire separation between a mixed use office and a moderate hazard warehouse from the previously existing 3-hour fire separation to zero, while providing no technical justification or compensating measures." The same could be said about this proposed code change which now allows for as little as a one-hour separation between "H" occupancy groups which are "not permitted" under the current table.

The proponent also states in their reasoning that "there is a growing level of concern with the reductions in the fire resistance ratings between separated occupancies in mixed occupancy in the 2006 IBC. The adoption of this code change in the 2006 and 2009 IBC arbitrarily reduced fire resistance ratings to levels significantly below most of the Legacy Codes, without providing any compensating safety measures." The same can be said of the proposed code change.

There is no question that some occupancy groups by themselves present a possible hazard to an adjacent occupancy. This is usually because of the fire load or other hazard associated with one of the occupancies. The current Table 508.4 recognizes this fact and does provide separation when needed. If the proponent really believes that all occupancies need to be separated from one another, then one is left wondering why the code allows for "non-separated mixed use."

It is unclear which of the proponent's reasons for the change the committee supported. As a result, one is left wondering why the committee took the action it did. Is the committee suggesting that the non-separated use is the preferred method for dealing with mixed occupancies; or is it suggesting the separation requirements are so stringent that one is automatically forced to use the non-separated use option? The committee's response does not appear to provide justification for changing the separation requirements.

This table is vital to the enforcement of the building code for both plan review and inspection purposes. It is not a section of the code that as code officials we can afford to change with every code cycle. There needs to be consistency in the application of occupancy separations. The current table provides adequate separation and does not need to be modified by reverting back to an old table.

Public Comment 10:

Stephen Thomas, Colorado Code Consulting, LLC, representing Colorado Chapter of ICC, requests Disapproval.

Commenter's Reason: Approval of this change is a reversal of hours of research and work by the committee and proponents of previous changes to this table. There was not technical justification given to go back to what was in the 2003 IBC. The proponent states that the change restores the concept of separated occupancies. Separated uses are still permitted within the IBC. It was never removed. The revisions that were made in the 2006 code were investigated and discussed for at least two code cycles. It was not an arbitrary decision by the previous committee.

The proposal also perpetuates mistakes in the table that have subsequently be fixed over the last few code cycles between the table and the footnotes. Footnote c permits a one-hour reduction in the separation between a parking garage used to store private and pleasure vehicles. There are some occupancies that only require a one-hour separation to start with. Does that mean that there is no separation required? Footnote b is not needed. Both B and M occupancies permit storage within the use (Ref. 304.1 & 309.1) Storage areas are included within the particular occupancy and therefore not a separate occupancy. The mixed occupancies provisions do not apply in this case.

The committee approved the proposal because they said it would be easier to read and provide a better format. They did not discuss any of the technical revisions and confirm that there was any technical justification provided to go back to the 2003 requirements. In my experience, the table in

	A-1 (2009)	A-1 (proposed)	A-2 (2009)	A-2	A-3 (2009)	A-3	A-4 (2009)	A-4	A-5 (2009)	A-5	B (2009)	B	E (2009)	E	F-1 (2009)	F-1	F-2 (2009)	F-2	H-1 (2009)	H-1	H-2 (2009)	H-2	H-3 (2009)	H-3	H-4 (2009)	H-4	H-5 (2009)	H-5	I-1 (2009)	I-1	I-2 (2009)	I-2	I-3 (2009)	I-3	I-4 (2009)	I-4	M (2009)	M	R-1 (2009)	R-1	R-2 (2009)	R-2	R-3, R-4 (2009)	R-3, R-4	S-1 (2009)	S-1	S-2 (2009)	S-2	U (2009)	U
A-1	N	-	N	**2**	N	**2**	N	**2**	N	**2**	2	2	N	**2**	2	**3**	1	**2**	NP	NP	4	4	3	3	3	**2**	3	**4**	2	2	NP	**2**	2	2	2	2	2	2	2	2	2	2	2	2	2	**3**	1	**2**	1	1
A-2			N	-	N	**2**	N	**2**	N	**2**		2	N	**2**	2	**3**	1	**2**	NP	NP	4	4	3	3	3	**2**	3	**4**	2	2	NP	**2**	2	2	2	2	2	2	2	2	2	2	2	2	2	**3**	1	**2**	1	1
A-3					N	-	N	**2**	N	**2**	2	2	N	**2**	2	**3**	1	**2**	NP	NP	4	4	3	3	3	**2**	3	**4**	2	2	NP	**2**	2	2	2	2	2	2	2	2	2	2	2	2	2	**3**	1	**2**	1	1
A-4								-	N	**2**	2	2	N	**2**	2	**3**	1	**2**	NP	NP	4	4	3	3	3	**2**	3	**4**	2	2	NP	**2**	2	2	2	2	2	2	2	2	2	2	2	2	2	**3**	1	**2**	1	1
A-5										-	2	2	N	**2**	2	**3**	1	**2**	NP	NP	4	4	3	3	3	**2**	3	**4**	2	2	NP	**2**	2	2	2	2	2	2	2	2	2	2	2	2	2	**3**	1	**2**	1	1
B												-	2	**2**	N	**3**	N	**2**	NP	NP	2	2	1	1	1	1	1	1	2	2	NP	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2	1	1
E														-	2	**3**	1	**2**	NP	NP	4	4	3	3	3	**2**	3	**3**	2	2	NP	**2**	2	2	2	2	2	2	2	2	2	2	2	2	2	**3**	1	**2**	1	1
F-1																-	2	**3**	NP	NP	3	**2**	2	**1**	2	**1**	2	**1**	2	**3**	NP	**3**	2	**3**	2	**3**	N	**3**	2	**3**	2	**3**	2	**3**	N	**3**	2	**3**	N	**3**
F-2																		-	NP	NP	4	**2**	3	**1**	3	**1**	3	**1**	2	2	NP	**2**	2	2	2	2	2	2	2	2	2	2	2	2	2	**3**	N	**2**	N	**1**
H-1																					NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
H-2																						-	NP	**1**	NP	**2**	NP	**2**	NP	**4**	NP	**4**	NP	**4**	NP	**4**	3	**4**	NP	**2**	NP	**4**	NP	**4**	3	**2**	4	**2**	4	**1**
H-3																								-	NP	**1**	NP	**1**	NP	**4**	NP	**3**	NP	**3**	NP	**3**	2	**1**	NP	**3**	NP	**3**	NP	**3**	2	**1**	3	**1**	3	**1**
H-4																										-	NP	**1**	NP	**4**	NP	**4**	NP	**4**	NP	**4**	2	**1**	NP	**4**	NP	**4**	NP	**4**	2	**1**	3	**1**	3	**1**
H-5																												-	NP	**4**	NP	**4**	NP	**4**	NP	**3**	2	**1**	NP	**4**	NP	**4**	NP	**4**	2	**1**	3	**1**	3	3
I-1																														-	NP	**2**	N	**2**	N	**2**	2	2	NP	**2**	NP	**2**	NP	**2**	2	**4**	2	**3**	2	2
I-2																																-	NP	**2**	N	**2**	NP	**2**	NP	**2**	NP	**2**	NP	**2**	NP	**3**	NP	**2**	NP	**1**
I-3																																		-	N	**2**	2	2	NP	**2**	NP	**2**	NP	**2**	2	**3**	2	2	2	**1**
I-4																																				-	2	2	NP	**2**	NP	**2**	NP	**2**	2	**3**	2	2	2	**1**
M																																						-	2	**2**	2	2	2	2	N	**3**	2	2	2	**1**
R-1																																								-	N	**2**	N	**2**	2	**3**	2	2	2	**1**
R-2																																										-	N	**2**	2	**3**	2	2	2	**1**
R-3, R-4																																												-	2	**3**	2	2	2	**1**
S-1																																														-	2	**3**	2	**3**
S-2																																																-	N	**1**
U																																																		-

the 2003 code was more difficult to read than the 2006 revision. The committee also stated that the "The values quickly force someone to consider the non-separated mix occupancy option. Is that really the intent of the code, to force someone to consider one option or the other? Isn't it really to allow the design professional to use the code in a way that works with the building they are designing?

Final Action: AS AM AMPC____ D

G120-09/10
Table 508.4

Proposed Change as Submitted

Proponent: Stephen Thomas, Colorado Code Consulting, LLC, representing The Colorado Chapter ICC

Revise table notes as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

(Portions of table not shown are unchanged.)

For SI: 1 square foot = 0.0929 m^2.
S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.4.2.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than one hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the ~~restaurant seating~~ dining areas that they serve.
e. Separation is not required between occupancies of the same classification.
f. For H-5 occupancies, see Section 415.8.2.2.

Reason: Even though footnote e is included with the E occupancies in Table 508.4, a code official has interpreted that this footnote does not apply to the cafeteria in a school. In my opinion there is no difference in the two uses. However, it can be argued that a cafeteria in a school is not a "restaurant" which is specifically stated in the footnote. This change clarifies the intent that the footnote applies to any type of dining area that is adjacent to a commercial kitchen.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: THOMAS-G2-T508.4

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

(Portions of table not shown are unchanged)

a. For Group H-5 occupancies, see Section 903.2.4.2.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from dining or seating areas that they serve.
e. Separation is not required between occupancies of the same classification.
f. For H-5 occupancies, see Section 415.8.2.2.

Committee Reason: The revision provides clarification that a separation is not needed between a 'commercial kitchen' and the associated dining and seating areas regardless if the activity is a restaurant of other use. Some of the committee felt the footnote wasn't needed at all because such kitchens are part of the occupancy and separation is not required. As there is not universal agreement on that interpretation, the change provides consistency regardless of the occupancy classifications assigned. The change also allows the exception clearly apply to such applications as school lunchrooms, places of religious worship and fire stations.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc, representing International Firestop Council (IFC), requests Disapproval.

Commenter's Reason: Available statistics on fires in Commercial Cooking establishments does not support a relaxation of the separation requirements between the commercial kitchens and dining or seating areas, particularly in Educational facilities.

According to the most recent statistics from U.S. Fire Administration's (USFA) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA) annual fire department experience survey, there were an estimated 7,670 fires reported to public fire departments nationwide each year in restaurants between 1999 and 2002, per NFPA statistics. These fires resulted in direct property damage of $153 million annually.[1]

Cooking equipment was the leading cause of structure fires in college classroom buildings and adult education centers. Almost half (45%) of the structure fires in college classroom buildings and adult education centers were cooking equipment fires, including 42% which were reported as confined to cooking equipment.[2]

An estimated 4,870 structure fires involving pre-school through grade 12 buildings were reported per year in 2003-2006.

During the four-year period of 2003-2006, an estimated average of 4,870 structure fires in these properties were reported per year. These fires caused an annual average of 65 civilian fire injuries and $74.2 million in direct property damage. There were no civilian deaths reported in these properties during this time period. Eighteen percent of fires in these properties were caused by cooking equipment, which includes 16% of fires reported as confined cooking equipment fires, and 21% of civilian injuries.[2]

Cooking equipment was the leading cause of structure fires in day-care centers. The leading causes of fires in these properties with data summarized from several NFIRS fields. In some cases, the equipment involved in ignition is most relevant; heat source, the field "cause," and factor contributing to ignition also provide relevant information. Almost two of every three (65%) structure fires in day-care centers were cooking equipment fires, including 59% which were reported as confined to cooking equipment. Another 8% of these fires were heating equipment fires, including 5% which were reported as confined heating equipment. Another 5% of fires in these properties were caused by electrical distribution and lighting equipment.[2]

Sources:
1. Protecting restaurants from cooking fires NFPA Journal online exclusive, *March/April 2007By Charlie Bauroth*

2. NFPA Report, STRUCTURE FIRES IN EDUCATIONAL PROPERTIES, Jennifer D. Flynn, August 2009

Final Action: AS AM AMPC____ D

G122-09/10
Table 508.4, 303.1 (IFC [B] 202)

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

	A[~~d~~], E		I-1, I-3, I-4		I-2		R		F-2, S-2[b], U		B, F-1, M, S-1		H-1		H-2		H-3, H-4, H-5	
OCCUPANCY	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**
A[~~d~~], E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3[a]
I-1, I-3, I-4	—	—	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP
I-2	—	—	—	—	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
R	—	—	—	—	—	—	N	N	1[c]	2[c]	1	2	NP	NP	3	NP	2	NP
F-2, S-2[b], U	—	—	—	—	—	—	—	—	N	N	1	2	NP	NP	3	4	2	3[a]
B, F-1, M, S-1	—	—	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2[a]
H-1	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP
H-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	1	NP
H-3, H-4, H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 [d,e,~~f~~]	NP

For SI: 1 square foot = 0.0929 m^2.
S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.4.2.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.

c. See Section 406.1.4.
~~d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.~~
~~e~~ d. Separation is not required between occupancies of the same classification.
~~f~~ e. For Group H-5 occupancies, see Section 415.8.2.2.

303.1 (IFC [B] 202) Assembly Group A. Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption or awaiting transportation.

A-2 Assembly uses intended for food and/or drink consumption including, but not limited to:

Banquet halls
Nightclubs
Restaurants (including associated commercial kitchens)
Taverns and bars

(Portions not shown are unchanged.)

Reason: This proposal deletes a somewhat confusing and unnecessary commercial kitchen exception from Table 508.4 in favor of clarifying that the restaurant and associated kitchen are the same Group A-2 occupancy in Section 303.1. The current footnote reference d is shown as applicable to Group A occupancies. Occupancy separations are not required within Group A occupancies, therefore the footnote is extraneous and moot. Approval of this proposal will place the commercial kitchen provision in the proper context of occupancy classification as opposed to mixed occupancy.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Because the code requires buildings containing either Group I or R occupancies to be fully sprinkler protected, the Code Correlation Committee has replaced all numeric values in cells indicating a NS (non sprinklered) Group I or R occupancy building with NP for not permitted.

ICCFILENAME: KEITH-G6A-508.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Deleting the footnote and adding provisions to only Group A-2 would leave in questions the application to kitchens serving schools, places of religious worship and fire houses. A definition of commercial kitchen would need to be provided; and would be helpful in clarifying this activity in this and other situations such as catering kitchens.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

303.1 (IFC [B] 202) Assembly Group A. Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption or awaiting transportation.

A-2 Assembly uses intended for food and/or drink consumption including, but not limited to:

Banquet halls
Nightclubs
Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens)
Taverns and bars

(Portions of text not shown remain unchanged)

306.2 Factory Industrial F-1 Moderate-hazard Occupancy. Factory industrial uses which are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

Food processing and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities.

(Portions of text not shown remain unchanged)

Commenter's Reason: At the code development hearings in Baltimore, three separate proposals addressed Footnote d to Table 508.4. Each addressed the limiting and potentially confusing language of the footnote. The approach of G122-09/10 was to eliminate the footnote in favor of simply clarifying the commercial kitchens associated with restaurants were a portion of the same Group A-2 occupancy. The fact that there is a footnote in the table that potentially requires occupancy separations between different occupancies, indicates that commercial kitchens are a separate occupancy unto themselves. Traditionally, commercial kitchens associated with restaurants have been included as a portion of those restaurants. In fact, the presence of such kitchens was included in establishing the relative risk of Group A-2 occupancies.

Discussion of G122 in Baltimore revealed a number of related concerns. Some felt that reference to restaurants alone was too limiting and did not recognize cafeterias and similar dining facilities. Also, there was the concern about the classification of commercial kitchens not associated with dining facilities such as catering kitchens.

This public comment for approval as modified attempts to address those concerns. First, the description at Section 303.1 has been expanded to include all dining facility and associated kitchen contingencies, whether formal or informal. Also, it clarifies that stand-alone food preparation facilities such as catering kitchens shall be classified as Group F-1 Moderate Hazard occupancies. Approval of this public comment will demystify occupancy separation provisions associated with commercial kitchens. The current default assumes that an occupancy separation may be required if it were not for Footnote d to Table 508.4. This of course, presumes that dining facilities and commercial kitchens are different occupancies. The issue is best resolved by the proper initial classification of the occupancies. Historically, commercial kitchens associated with dining facilities have been included within the Group A-2 occupancy classification of the restaurant (or other dining facility). This public comment speaks to technical concerns expressed in Baltimore and will assist in the consistent application of code requirements applicable to commercial kitchens.

Final Action: AS AM AMPC____ D

G124-09/10
Table 508.4

Proposed Change as Submitted

Proponent: Jason Thompson, National Concrete Masonry Association, representing the Masonry Alliance for Codes and Standards

Revise as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

	A[d], E		I-1, I-3, I-4		I-2,		R		F-2, S-2[b], U		B, F-1, M, S-1		H-1		H-2		H-3,H-4, H-5	
OCCUPANCY	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**
A[d], E	N	N	1	2	2	NP	~~1~~ 2	~~2~~NP	N	1	1	2	NP	NP	3	4	2	3[a]
I-1, I-3, I-4	—	—	N	N	2	NP	~~1~~ 2	NP	1	~~2~~NP	1	2	NP	NP	3	NP	2	NP
I-2	—	—	—	—	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
R	—	—	—	—	—	—	N	N	~~1~~[c] 2	~~2~~[c]NP	~~1~~ 2	2	NP	NP	3	NP	2	NP
F-2, S-2[b], U	—	—	—	—	—	—	—	—	N	N	1	2	NP	NP	3	4	2	3[a]
B, F-1, M, S-1	—	—	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2[a]
H-1	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP
H-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	1	NP
H-3, H-4, H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1[e,f]	NP

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

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.5.2.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.

e. Separation is not required between occupancies of the same classification.
f. For H-5 occupancies, see Section 415.8.2.2.

Reason: Group R occupancies involve a living environment that has persons sleeping and who may not be aware of their surroundings should an emergency due to fire begin to develop. Because of this there is need to provide a higher degree of fire resistive separation than might normally be provided between occupancies where the persons in the buildings are alert to their surroundings such as Group A, B, E, F, M or S . This proposal increases the fire resistance between Group R occupancies and all other occupancies to 2-hours to reduce the risk of fire spreading while the occupants are sleeping.

The code change also corrects several cells in the table where the table implies you can have fire separation between an unsprinklered Group I-1, I-3, I-4 and R occupancies and other occupancy groups. All Group I-1, I-3, I-4 and R occupancies are required to be fully sprinklered.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: A question is how this proposed change would coordinate with the separation requirements in Section 406.1.4, which is referenced in note c.

ICCFILENAME: Thompson-G1-T508.4

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee preferred the changes approved under G118-09/10 and this change would be unnecessary.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, National Concrete Masonry Alliance (NCMA), representing, Masonry Alliance for Codes and Standards (MACS), requests Approval as Submitted.

Commenter's Reason: We are submitting this Public Comment requests Approval of our Code Change G124-09/10 as a fallback position should there be Public Comments submitted to Code Change G118-09/10 requesting disapproval of that Code Change which was recommended for approval by the IBC General Code Development Committee. As noted in the Committee Reason statement, the Committee preferred the changes they approved in G118-09/10 so they considered this Code Change unnecessary. We agree with that approach and, in fact, at the ICC Code Development Committee Hearings held in Baltimore last year, we supported the approval of G118-09/10 and indicated that if it were approved, we would withdraw our Code Change G124-09/10.

We still believe that Code Change G118-09/10 is the best solution to the issue of requiring appropriate fire-resistance ratings for the separation of mixed occupancies under the separated occupancies option in Section 508.4 of the IBC. It takes a comprehensive approach to the issue as compared to this code change which focuses on the modification of several cells in Table 508.4 Required Separation of Occupancies. Our goal is to assure that Code Change G118-09/10 is approved at the ICC Final Action Hearings in which case we would withdraw this Public Comment to our Code Change G124-09/10. However, if Code Change G118-09/10 is voted for disapproval at the ICC Final Action Hearings, then we believe this Code Change should be approved as submitted based on our original Reason Statement.

Final Action: AS AM AMPC____ D

G125-09/10
Table 508.4

Proposed Change as Submitted

Proponent: Maureen Traxler, City of Seattle, Seattle Dept of Planning & Development

Revise as follows:

Table 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

Occupancy	**A[d], E**		**I-1, I-3, I-4**		**I-2**		**R**		**F-2, S-2[b], U**		**B, F-1, M, S-1**		**H-1**		**H-2**		**H-3, H-4, H-5**	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A[d], E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3[a]
I-1, I-3, I-4	-	-	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP
I-2	-	-	-	-	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
R	-	-	-	-	-	-	N	N	1[c]	2[c]	1	2	NP	NP	3	NP	2	NP
F-2, S-2[b], U	-	-	-	-	-	-	-	-	N	N	~~1~~N	~~2~~N	NP	NP	3	4	2	3[a]
B, F-1, M, S-1	-	-	-	-	-	-	-	-	-	-	N	N	NP	NP	2	3	1	2[a]
H-1	-	-	-	-	-	-	-	-	-	-	-	-	N	NP	NP	NP	NP	NP
H-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	NP	1	NP
H-3, H-4, H-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1[e,f]	NP

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

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

(Notes a through f to the table remain unchanged.)

Reason: Table 508.4 allows an unrated separation between Groups B/M/U occupancies and Group F-1/S-1 (moderate-hazard) occupancies yet requires a 2-hr separation between Groups B/M/U occupancies and Group F-2/S-2 (low-hazard) occupancies. It is not appropriate to require a higher level of separation from an occupancy of lower hazard. This proposal amends the separation requirements so the low-hazard occupancies Group F-2 and S-2 no longer require a level of separation higher than that of the moderate-hazard occupancies Groups F-1 and S-1.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Because the code requires buildings containing either Group I or R occupancies to be fully sprinkler protected, the Code Correlation Committee has replaced all numeric values in cells indicating a NS (non sprinklered) Group I or R occupancy building with NP for not permitted.

ICCFILENAME: TRAXLER-G4-T508.4.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee preferred the changes approved under G118-09/10 and this change would be unnecessary.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, City of Seattle Dept. of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Table 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

Occupancy	A[d], E		I-1, I-3, I-4		I-2		R		F-2, S-2[b], U		B, F-1, M, S-1		H-1		H-2		H-3, H-4, H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A[d], E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3[a]
I-1, I-3, I-4	-	-	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP
I-2	-	-	-	-	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
R	-	-	-	-	-	-	N	N	1[c]	2[c]	1	2	NP	NP	3	NP	2	NP
F-2, S-2[b], U	-	-	-	-	-	-	-	-	N	N	1	2	NP	NP	3	4	2	3[a]
B, F-1, M, S-1	-	-	-	-	-	-	-	-	-	-	~~N~~ 1	~~N~~ 2	NP	NP	2	3	1	2[a]
H-1	-	-	-	-	-	-	-	-	-	-	-	-	N	NP	NP	NP	NP	NP
H-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	NP	1	NP
H-3, H-4, H-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1[e,f]	NP

For SI: 1 square foot = 0.0929 m^2.
S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

(Notes a through f to the table remain unchanged.)

Commenter's Reason: Table 508.4 allows an unrated separation between B/M occupancies and F-1/S-1 (moderate-hazard) occupancies yet requires a 2-hr separation between B/M occupancies and F-2/S-2 (low-hazard) occupancies. It is not appropriate to require a higher level of separation from an occupancy of lower hazard. To address some of the issues raised during testimony on this proposal, rather than reducing the separation requirement of the low-hazard occupancies to match the separation requirement of the moderate-hazard occupancies (as was done in the original proposal), this modification increases the separation requirement of the moderate-hazard occupancies to match the separation requirements of the low-hazard separation requirements.

Final Action: AS AM AMPC____ D

G127-09/10
Table 508.4

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council

Revise Table as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

	A[d], E		I-1, I-3, I-4		I-2		R		F-2, S-2[b], U		~~B,~~ F-1, M, S-1		B		H-1		H-2		H-3, H-4, H-5	
OCCUPANCY	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**
A[d], E	N	N	1	2	2	NP	1	2	N	1	1	2	1	2	NP	NP	3	4	2	3[a]
I-1, I-3, I-4			N	N	2	NP	1	NP	1	2	1	2	1	NP	NP	NP	3	NP	2	NP
I-2					N	N	2	NP	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
R							N	N	1[c]	2[c]	1	2	1	NP	NP	NP	3	NP	2	NP
F-2, S-2[b], U									N	N	1	2	1[g]	2[g]	NP	NP	3	4	2	3[a]

	A[d], E		I-1, I-3, I-4		I-2		R		F-2, S-2[b], U		~~B,~~ F-1, M, S-1		<u>B</u>		H-1		H-2		H-3, H-4, H-5	
OCCUPANCY	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	<u>**S**</u>	<u>**NS**</u>	**S**	**NS**	**S**	**NS**	**S**	**NS**
~~B,~~ F-1, M, S-1											N	N	<u>1[g]</u>	<u>2[g]</u>	NP	NP	2	3	1	2[a]
<u>B</u>													<u>N</u>	<u>N</u>	<u>NP</u>	<u>NP</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2[a]</u>
H-1															N	NP	NP	NP	NP	NP
H-2																	N	NP	1	NP
H-3, H-4, H-5																			1[e,f]	NP

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

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.5.2.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.
e. Separation is not required between occupancies of the same classification.
f. For H-5 occupancies, see Section 415.8.2.2.
<u>g.</u> <u>Occupancy separation need not be provided for storage areas associated with a Group B occupancy if the:</u>
   1. <u>Area is less than 10 percent of the floor areas;</u>
   2. <u>Area is provided with an automatic sprinkler system and is less than 3,000 square feet; or</u>
   3. <u>Area is less than 1,000 square feet.</u>

Reason: The purpose of this Code change is to break out the Group B Occupancies from Groups F-1, M, and S-1 since the current grouping in Table 508.4 does not represent similar hazards, and results in no fire separations being required between these.

This proposal aims to restore a portion of the level of protection afforded in the 2003 IBC and many of the Legacy Codes. While the current Table 508.4 was first revised for the 2006 IBC, few jurisdictions had any history with the lack of fire resistance rated separations between occupancies which the 2006 IBC would now permit.

As the table is currently formatted for required separation of occupancies under the separated occupancies option of Section 508.4, there is no occupancy separation required between any of the occupancies in the B, F-1, M, and S-1 Grouping, as indicated by the letter "N" contained in the table for those occupancy groups. However, a Group B occupancy generally has a significantly lower fire load than the Group F-1, M, and S-1 occupancies, and the occupancy hazard is different as well.

If Table 508.4 truly implements the separated occupancies option which mandates occupancy separations as compared to the nonseparated occupancies option in Section 508.3 which does not, it follows that there should be occupancy separations required between occupancies with different hazard characteristics. Group B occupancies generally have combustible fire loads less than 10 pounds per sq ft, as compared to the Group F-1, M, and S-1 occupancies which could have fire loads as much as 20 to 30 pounds per sq ft or more. Therefore, we have proposed a minimum 2-hour occupancy separation between the Group B occupancies and the Group F-1, M, and S-1 occupancies in nonsprinklered buildings and a minimum 1-hour fire-resistance rating in sprinklered buildings. This is consistent with the other occupancy classifications requiring occupancy separations between them and the Group F-1, M, and S-1 occupancies.

It should also be noted that this is consistent with the required occupancy separation for Group B/M mixed occupancies in former Table 302.3.2 of the 2003 IBC which Table 508.4 replaced in the 2006 IBC. And it is actually less restrictive than former Table 302.3.2 for the Group B/F-1 and Group B/S-1 mixed occupancies separations.

The concept of separation of major occupancies exists in Building regulations throughout the world. Certainly, those occupancy separations requirements used in the separated occupancies option have stood the test of time. There continues to be a critical need to separate adjacent major occupancies of dissimilar use, with fire-resistance rated construction. The previous Table 302.3.2 had been is use for the three plus years it existed in the 2000 and 2003 editions of the IBC. Furthermore, the occupancy separation fire resistance ratings from this predecessor table were taken directly from the BOCA National Building Code, along with the entire concept of the non-separated and separated occupancies in mixed occupancy buildings.

As currently published, the 2009 Code provisions in Section 508 blur the distinction between separated uses and the non-separated use options previously prescribed in Section 302.3.1. The full impact of this change has not yet been felt.

The proposal also adds a footnote g which is essentially the footnote that was provided for storage associated both Group B and M occupancies in Table 508.3.3 of the 2006 IBC. Based on the limited separations between the B, M and S occupancies, the footnote was determined unneeded and removed for the 2009 edition. With the reestablishment of separations between Group B and the S occupancies, this previous footnote should be re-established.

Bibliography & References:
[1] 2003 IBC, International Codes Council, Table 302.3.2
[2] 1996 BOCA National Building Code, BOCA
[3] 1997 Standard Building Code, SBCCI
[4] 1997 Uniform Building Code, ICBO

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: Alternative locations for this allowance rather than as a footnote to a table would be as exceptions to Sections 508.3.3 and 508.4.4. Because the code requires buildings containing either Group I or R occupancies to be fully sprinkler protected, the Code Correlation Committee has replaced all numeric values in cells indicating a NS (non sprinklered) Group I or R occupancy building with NP for not permitted.

ICCFILENAME: CRIMI-G1-TABLE 508.4.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee preferred the changes approved under G118-09/10 and this change would be unnecessary.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc, representing International Firestop Council (IFC), requests Approval as Submitted.

Commenter's Reason: The purpose of submitting this public comment is to maintain options for the ICC voting membership at the Final Action Hearings in Dallas, regardless of what may occur on other related Proposals. This proposal aims to restore a portion of the level of protection afforded in the 2003 IBC and many of the Legacy Codes. While the current Table 508.4 was first revised for the 2006 IBC, few jurisdictions had any history with the lack of fire resistance rated separations between occupancies which the 2006 IBC would now permit. The purpose of this Code change is to break out the Group B Occupancies from Groups F-1, M, and S-1 since the current grouping in Table 508.4 does not represent similar hazards, and results in no fire separations being required between these.

It should also be noted that this is consistent with the required occupancy separation for Group B/M mixed occupancies in former Table 302.3.2 of the 2003 IBC which Table 508.4 replaced in the 2006 IBC, and it is actually less restrictive than former Table 302.3.2 for the Group B/F-1 and Group B/S-1 mixed occupancies separations.

Final Action: AS AM AMPC____ D

G128-09/10
Table 508.4

Proposed Change as Submitted

Proponent: Mike Ashley C.B.O. /Representing The Alliance for Fire & Smoke Containment & Control, Inc. (AFSCC)

Revise Table as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

	A[d], E		I-1, I-3, I-4		I-2		R		F-2, S-2[b], U		B, F-1, ~~M,~~ S-1		M		H-1		H-2		H-3, H-4, H-5	
OCCUPANCY	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**
A[d], E	N	N	1	2	2	NP	1	2	N	1	1	2	1	2	NP	NP	3	4	2	3[a]
I-1, I-3, I-4			N	N	2	NP	1	NP	1	2	1	2	1	NP	NP	NP	3	NP	2	NP
I-2					N	N	2	NP	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
R							N	N	1[c]	2[c]	1	2	1	NP	NP	NP	3	NP	2	NP
F-2, S-2[b], U									N	N	1	2	1[g]	2[g]	NP	NP	3	4	2	3[a]
B, F-1, ~~M,~~ S-1											N	N	1[g]	2[g]	NP	NP	2	3	1	2[a]
M													N	N	NP	NP	2	3	1	2[a]
H-1															N	NP	NP	NP	NP	NP
H-2																	N	NP	1	NP
H-3, H-4, H-5																			1[e,f]	NP

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

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.

NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.5.2.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.
e. Separation is not required between occupancies of the same classification.
f. For H-5 occupancies, see Section 415.8.2.2.
g. Occupancy separation need not be provided for storage areas associated with a Group M occupancy if the:
    4. Area is less than 10 percent of the floor areas;
    5. Area is provided with an automatic sprinkler system and is less than 3,000 square feet; or
    6. Area is less than 1,000 square feet.

Reason: In this code change we propose to separate out the Group M occupancies from the grouping of occupancies which includes Groups B, F-1, M, and S-1 as is currently the case in Table 508.4 which is used for implementing the separated occupancies option of Section 508.4. It should be noted that the separated occupancies option requires different occupancies in the same building to be separated from each other based on the fire-resistance ratings specified in Table 508.4, as compared to the nonseparated occupancies option in Section 508.3 which does not require any fire-resistance-rated separation between occupancies. However, no occupancy separations are required between any of the occupancies in the grouping containing Group B, F-1, M, and S-1 occupancies since the letter "N" is entered in the table for those occupancy groups. This means that there is no separation requirement whatsoever.

By removing the Group M occupancies from that grouping and creating a separate entry for them, we have achieved a required separation of occupancies for the Group M occupancy from any of the Group B, F-1, or S-1 occupancies. We believe Group M occupancies should be separated from these other occupancies because of the relative hazard of a Group M occupancy as compared to the other occupancies both in terms of fire load and occupant life safety. Group M occupancies can contain fire loads as much as 20 pounds per sq ft or more depending upon the type of retail operations and, of course, they can contain high densities and numbers of people, especially during holiday seasons and special sales events, as compared to the other occupancies. Group B occupancies generally contain fire loads less than 10 pounds per sq ft so they should be separated in order to protect that occupancy from the higher fire exposure of the Group M occupancies. The Group F-1 and S-1 occupancies should be separated from the Group M occupancies mainly because of the occupant life safety hazard exposures from those occupancies to the occupants of the Group M occupancy. In this code change we are proposing a 2-hour occupancy separation for fire barrier walls and horizontal assemblies in nonsprinklered buildings and 1-hour for sprinklered buildings. This is consistent with the occupancy separations contained in the current table between the Group B, F-1, M, and S-1 occupancies and all other occupancies except Group H-2. We believe that those occupancy combinations represent similar relative hazards in terms of fire and life safety.

The proposal also adds a footnote g which is essentially the footnote that was provided for storage associated both Group B and M occupancies in Table 508.3.3 of the 2006 IBC. Based on the limited separations between the B, M and S occupancies, the footnote was determined unneeded and removed for the 2009 edition. With the reestablishment of separations between Group M and the S occupancies, this previous footnote should be re-established.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: Alternative locations for this allowance rather than as a footnote to a table would be as exceptions to Sections 508.3.3 and 508.4.4. Because the code requires buildings containing either Group I or R occupancies to be fully sprinkler protected, the Code Correlation Committee has replaced all numeric values in cells indicating a NS (non sprinklered) Group I or R occupancy building with NP for not permitted.

ICCFILENAME: ASHLEY-G2-TABLE 508.4

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee preferred the changes approved under G118-09/10 and this change would be unnecessary.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ashley, CBO, Alliance for Fire & Smoke Containment & Control, Inc. (AFSCC), requests Approval as Submitted.

Commenter's Reason: This change created a separate column for M occupancies for both sprinklered and non sprninklered. This just a simple clean up of table 508.4.

Final Action Agenda voters are asked to vote against the standing motion to disapprove the Committee's recommendation and, instead, to approve G128 as submitted by this Public Comment.

Final Action: AS AM AMPC____ D

G129-09/10
Table 508.4

Proposed Change as Submitted

Proponent: Jason Thompson, National Concrete Masonry Association, representing the Masonry Alliance for Codes and Standards

Revise as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

	A[d], E		**I-1, ~~I-3,~~ I-4**		**I-2, I-3**		**R**		**F-2, S-2[b], U**		**B, F-1, M, S-1**		**H-1**		**H-2**		**H-3,H-4, H-5**	
OCCUPANCY	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**
A[d], E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3[a]
I-1, ~~I-3,~~ I-4	—	—	~~N~~ 1[e]	NP	2	NP	1	NP	1	~~2~~NP	1	~~2~~NP	NP	NP	3	NP	2	NP
I-2, I-3	—	—	—	—	~~N~~ 2[e]	NP	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
R	—	—	—	—	—	—	N	N	1[c]	2[c]	1	2	NP	NP	3	NP	2	NP
F-2, S-2[b], U	—	—	—	—	—	—	—	—	N	N	1	2	NP	NP	3	4	2	3[a]
B, F-1, M, S-1	—	—	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2[a]
H-1	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP
H-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	1	NP
H-3, H-4, H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1[e,f]	NP

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

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.5.2.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.
e. Separation is not required between occupancies of the same classification.
f. For H-5 occupancies, see Section 415.8.2.2.

Reason: This proposed code change accomplishes several things. First, it relocates the Group I-3 occupancies to the same cells as the Group I-2 occupancies. Second, it requires that the Group I-1 and Group I-4 occupancies be separated from each other with a minimum 1-hour fire-resistance rating. Third, it also clarifies the table regarding the Group I occupancies for the NS columns where some of the individual cell entries have been changed to "NP." This recognizes the fact that the entire building containing a Group I occupancy is required to be protected with an automatic sprinkler system throughout even where there are other mixed occupancies that may be separated with fire barriers or horizontal assemblies that would otherwise not be required to be sprinklered.

Group I-3 occupancies should be treated the same as the Group I-2 occupancy when the separated occupancies option of Section 508.4 is used since they have similar relative hazards. This is also consistent with the 2009 NFPA 101 Life Safety Code which requires a minimum 2-hour fire-resistance rating for all occupancy separations involving detention and correctional facilities and other occupancies in the same building as specified in Tables 6.1.14.4.1(a) and (b) Required Separation of Occupancies (hours), Part 1 and Part 2. The separated occupancies option section in Section 508.4 of the 2009 IBC, refers to Table 508.4 Required Separation of Occupancies (hours) for determining the fire-resistance rating of the occupancy separation depending upon the occupancies being separated. However, the way the table is currently structured, a Group I-3 occupancy would not be required to be separated from a Group I-1 or I-4 occupancy because they are grouped together.

As indicated previously, this amendment will also require that a Group I-1 occupancy be separated from a Group I-4 occupancy with a minimum 1-hour fire-resistance-rated separation. This would be consistent with the Table 508.4 requirement that these occupancies be separated from Group R occupancies with a minimum 1-hour fire-resistance rating.

Also Footnote e has been added to the 1-hour rating for the I-1/I-4 occupancies to indicate that where the occupancy classification is the same, then there is no separation required. In other words, this would not require, as is currently the case, an occupancy separation for a Group I-1 occupancy and an adjacent Group I-1 occupancy in the same building, or similarly for a Group I-4 occupancy adjacent to another Group I-4 occupancy in the same building. And, a footnote has been added for the Group I-2 and I-3 occupancies for the same reason.

Finally, for the Group I-1 occupancies, this amendment is consistent with Exception 3 to Section 508.2.4 Separation of Occupancies for accessory occupancies, Exception 2 to Section 508.3.3 Separation for nonseparated occupancies, and Section 420.2 Separation Walls for Group I-1 sleeping/dwelling units.

The code change also corrects several cells in the table where the table implies you can have fire separation between an unsprinklered Group 1-1, I-3, I-4 occupancies and other occupancy groups. All Group I and R occupancies are required to be fully sprinklered.

In conclusion, this amendment will clarify where the required occupancy separations are to be provided under the separated occupancies option of the 2009 IBC for all Group I occupancies while making the code internally consistent.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: Because the code requires buildings containing either Group I or R occupancies to be fully sprinkler protected, the Code Correlation Committee has replaced all numeric values in cells indicating a NS (non sprinklered) Group I or R occupancy building with NP for not permitted.

ICCFILENAME: Thompson-G3-T508.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee preferred the changes approved under G118-09/10 and this change would be unnecessary.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, National Concrete Masonry Alliance (NCMA), representing Masonry Alliance for Codes and Standards (MACS), requests Approval as Submitted.

Commenter's Reason: We are submitting this Public Comment requests Approval of our Code Change G129-09/10 as a fallback position should there be Public Comments submitted to Code Change G118-09/10 requesting disapproval of that Code Change which was recommended for approval by the IBC General Code Development Committee. As noted in the Committee Reason statement, the Committee preferred the changes they approved in G118-09/10 so they considered this Code Change unnecessary. We agree with that approach and, in fact, at the ICC Code Development Committee Hearings held in Baltimore last year, we supported the approval of G118-09/10 and indicated that if it were approved, we would withdraw our Code Change G129-09/10.

We still believe that Code Change G118-09/10 is the best solution to the issue of requiring appropriate fire-resistance ratings for the separation of mixed occupancies under the separated occupancies option in Section 508.4 of the IBC. It takes a comprehensive approach to the issue as compared to this code change which focuses on the modification of several cells in Table 508.4 Required Separation of Occupancies. Our goal is to assure that Code Change G118-09/10 is approved at the ICC Final Action Hearings in which case we would withdraw this Public Comment to our Code Change G129-09/10. However, if Code Change G118-09/10 is voted for disapproval at the ICC Final Action Hearings, then we believe this Code Change should be approved as submitted based on our original Reason Statement.

Final Action: AS AM AMPC____ D

G130-09/10
Table 508.4

Proposed Change as Submitted

Proponent: Stephen V. Skalko, P.E., Portland Cement Association

Revise as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

	A[d], E		I-1, I-3, I-4		I-2		R		F-2, S-2[b], U		B, ~~F-1,~~ M~~, S-1~~		F-1, S-1		H-1		H-2		H-3, H-4, H-5	
OCCUPANCY	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**	**S**	**NS**
A[d], E	N	N	1	2	2	NP	1	2	N	1	1	2	2	3	NP	NP	3	4	2	3[a]
I-1, I-3, I-4			N	N	2	NP	1	NP	1	2	1	~~2~~NP	2	NP	NP	NP	3	NP	2	NP
I-2					N	N	2	NP	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP
R							N	N	1[c]	2[c]	1	~~2~~NP	2	NP	NP	NP	3	NP	2	NP
F-2, S-2[b], U									N	N	1	2	2	3	NP	NP	3	4	2	3[a]
B, ~~F-1~~, M~~, S-1~~											N	N	2	3	NP	NP	2	3	1	2[a]
F-1, S-1													N	N	NP	NP	2	3	1	2[a]
H-1															N	NP	NP	NP	NP	NP
H-2																	N	NP	1	NP
H-3, H-4, H-5																			1[e,f]	NP

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

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.5.2.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.
e. Separation is not required between occupancies of the same classification.
f. For H-5 occupancies, see Section 415.8.2.2.

Reason: In this code change Group F-1 and S-1 occupancies are proposed to be separated out from the grouping of occupancies which includes Groups B, F-1, M, and S-1 as is currently the case in Table 508.4 which is used for implementing the separated occupancies option of Section 508.4. It should be noted that the separated occupancies option requires different occupancies in the same building to be separated from each other based on the fire-resistance ratings specified in Table 508.4 as compared to the nonseparated occupancies option in Section 508.3 which does not require any fire-resistance-rated separation between different occupancies. However, no occupancy separations are required between any of the occupancies in the grouping containing Group B, F-1, M, and S-1 occupancies since the letter "N" is entered in the table for those occupancy groups. This means that there is no separation requirement whatsoever even though the Group F-1 and S-1 occupancies may contain significantly greater fire loads than the Group B and M occupancies.

If Table 508.4 truly implements the separated occupancies option which mandates occupancy separations between mixed occupancies in the same building as compared to the nonseparated occupancies option in Section 508.3 which does not, it follows that there should be occupancy separations required between occupancies with different hazard characteristics. By removing the Group F-1 and S-1 occupancies from the grouping of the Group B, F-1, M, and S-1 occupancies and creating a separate entry for them in the table, a required separation of occupancies for the Group F-1 and S-1 occupancies from any of the Group B and M occupancies is achieved. This is based on the premise that the Group F-1 and S-1 occupancies should be separated from these occupancies because of the relative hazard of the Group F-1 and S-1 occupancy as compared to the Group B and M occupancies both in terms of the fire load and occupant life safety. Group F-1 and S-1 occupancies can contain fire loads as much as 20 to 30 pounds per sq ft or more. This can represent a significant fire exposure to the adjacent Group B and/or M occupancies in the same building which may also have significant numbers of occupants representing a potential life safety hazard.

Therefore, this proposal requires a minimum 3-hour occupancy separation for fire barrier walls and horizontal assemblies in nonsprinklered buildings and 2-hours for sprinklered buildings. This is consistent with the occupancy separations contained in the current table between the Group B, F-1, M, and S-1 occupancies and the Group H-2 occupancies. This occupancy usually has an occupancy combination that represents a similar relative hazard in terms of fire and life safety. This is also consistent with Table 707.3.9 for the separation of fire areas and Table 706.4 Fire Wall Fire-Resistance Ratings. It should also be noted that these proposed occupancy separations are consistent with the required occupancy separations for Group F-1 and S-1 mixed occupancies in former Table 302.3.2 of the 2003 IBC which Table 508.4 replaced in the 2006 IBC.

The code change also corrects several cells in the table where the table implies you can have fire separation between an unsprinklered Group I-1, I-3, I-4 and R occupancies and other occupancy groups. All Group I-1, I-3, I-4 and R occupancies are required to be fully sprinklered.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: Because the code requires buildings containing either Group I or R occupancies to be fully sprinkler protected, the Code Correlation Committee has replaced all numeric values in cells indicating a NS (non sprinklered) Group I or R occupancy building with NP for not permitted.

ICCFILENAME: Skalko-G1-T508.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee preferred the changes approved under G118-09/10 and this change would be unnecessary.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephen V. Skalko, PE, Porland Cement Association, requests Approval as Submitted.

Commenter's Reason: G130 was submitted to correct a deficiency in TABLE 508.4 REQUIRED SEPARATION OF OCCUPANCIES. In the existing table F-1 and S-1 occupancies are not required to have a fire rated separation between them and B and M occupancies. But F-2 and S-2 occupancies, which present a lesser fire risk to B and M occupancies, are required to have a fire rated separation from the B and M occupancies. This change will place F-1 and S-1 occupancies into a separate column and require a fire rated separation between these occupancies and all others.

The committee reason for disapproval of G130 was the action on code change G118 of recommending approval as submitted. We agree with the committee action on G118 and support the membership voting to sustain that recommendation. If the committee recommendation on G118 is sustained then G130 is not necessary. However, should the membership decide that the committee recommendation on G118 be overturned and then disapproved, G130 should be approved as submitted to correct the deficiency noted above.

Final Action: AS AM AMPC____ D

G131-09/10
509.2

Proposed Change as Submitted

Proponent: Lou Malattia representing Washington Association of Building Officials

Revise as follows:

509.2 Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls,* limitation of number of stories and type of construction where all of the following conditions are met:

1. The buildings are separated with a horizontal assembly having a minimum 3-hour fire-resistance rating.
2. The building below the horizontal assembly is no more than one story above grade plane.
3. The building below the horizontal assembly is of Type IA construction.
4. Shaft, stairway, ramp and escalator enclosures through the horizontal assembly shall have not less than a 2-hour fire-resistance rating with opening protectives in accordance with Section 715.4.

   Exception: Where the enclosure walls below the horizontal assembly have not less than a 3-hour fire resistance rating with opening protectives in accordance with Section 715.4, the enclosure walls extending above the horizontal assembly shall be permitted to have a 1-hour fire-resistance rating, provided:

   1. The building above the horizontal assembly is not required to be of Type I construction;
   2. The enclosure connects less than four stories <u>above the horizontal assembly</u>; and

3. The enclosure opening protectives above the horizontal assembly have a minimum 1-hour fire protection rating.

5. The building or buildings above the horizontal assembly shall be permitted to have multiple Group A occupancy uses, each with an occupant load of less than 300, or Group B, M, R or S occupancies.
6. The building below the horizontal assembly shall be protected throughout by an approved automatic sprinkler system in accordance with Section 903.3.1.1, and shall be permitted to be any of the following occupancies:
   6.1. Group S-2 parking garage used for the parking and storage of private motor vehicles;
   6.2. Multiple Group A, each with an occupant load of less than 300;
   6.3. Group B;
   6.4. Group M;
   6.5. Group R; and
   6.6. Uses incidental to the operation of the building (including entry lobbies, mechanical rooms, storage areas and similar uses).
7. The maximum building height in feet shall not exceed the limits set forth in Section 503 for the building having the smaller allowable height as measured from the grade plane.

Reason: To provide clarification of this exception. There has been some conflicting code opinions and this exception. Section 509.2, Condition #4, the exception Item 4.2, which reads, "The enclosure connects less than four stories;", has been interpreted by some jurisdictions to mean that the Group S-2 level below the 3-hour separation is considered to be a level for the purposes of this exception, and therefore only permitting two stories above the horizontal separation.

The intent of the code is to permit Group A occupancies less than 300, Groups B or M occupancies to be considered separate buildings for the purpose of determining area limitations, continuity of fire wall, limitation of number of stories and type of construction. A typical building type using this provision is a three story wood framing apartment building above an enclosed concrete parking level.

The exception to condition #4 permits the two hour shaft to be reduced to one hour provided that the enclosure walls below the horizontal assembly is increased to a three hour fire-resistance rating. This additional protection permits three levels above the horizontal assembly to be protected with one hour shafts instead of the two- hour assembly.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MALATTIA-G3-509.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee was uncomfortable that the apparent effect of the change would be to allow a 5 story shaft which would only be rated as a one hour enclosure for four stories.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, City of Seattle, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Submitted.

Commenter's Reason: This proposal clarifies that the exception applies to shafts that connect 3 or fewer stories above the 3-hour assembly, and the story below the assembly. The current text can be interpreted to limit the total stairway enclosure to 3 stories as shown in Figure 1. However, the intent of the legacy code from which this provision is taken was to allow 3 stories above the three-hour separation as shown in Figure 2. The reduction in the rating of the enclosure above the 3-hour separation is mitigated by the requirement for 3-hour walls and 90-minute opening protectives below the 3-hour assembly. The proposed modification clarifies that the one-hour portion of the stairway can connect no more than 3 stories.

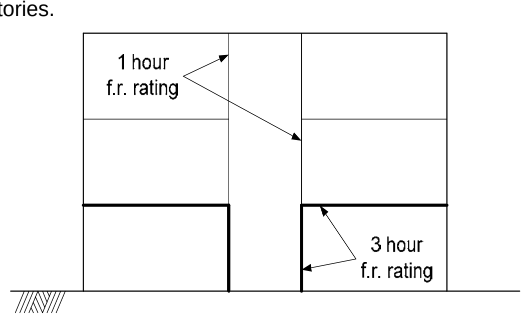


FIG. 1

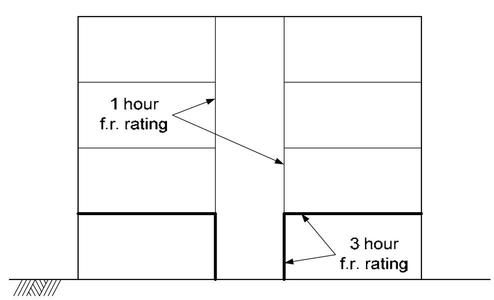


FIG. 2

Final Action: AS AM AMPC____ D

G136-09/10
Table 601

Proposed Change as Submitted

Proponent: Mike Ennis, Single Ply Roofing Industry (SPRI), representing the Single Ply Roofing Industry (SPRI)

Revise as follows:

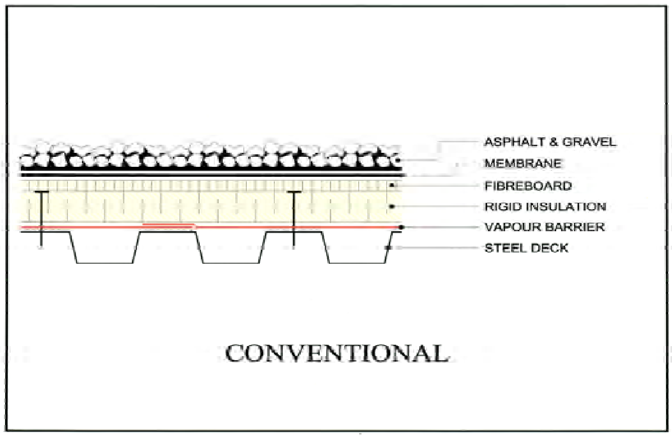
TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A[d]	B	A[d]	B	HT	A[d]	B
Primary structural frame[g] (see Section 202)	3[a]	2[a]	1	0	1	0	HT	1	0
Bearing walls									
Exterior[f, g]	3	2	1	0		2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[e]	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction and secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and secondary members<u>[h]</u> (see Section 202)	1½[b]	1[b, c]	1[b, c]	0 c	1[b, c]	0	HT	1[b, c]	0

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
b. Except in Groups F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.
c. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.
d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.
e. Not less than the fire-resistance rating required by other sections of this code.
f. Not less than the fire-resistance rating based on fire separation distance (see Table 602).
g. Not less than the fire-resistance rating as referenced in Section 704.10
<u>h. The requirements of this table for roof construction are not applicable to above deck components. For construction Types I and II, the materials used in above deck components shall meet the requirements of Section 603.1.</u>

Reason: Table 601 contains footnote b which states, "Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members." This footnote is referenced for all Types (I through V) of roof construction where a rated assembly is required. In many cases this footnote is being interpreted as meaning that fire-retardant-treated wood is required whenever wood is used in a roof assembly that requires an hourly rating.
A typical roofing assembly contains the components shown below:



The roof deck is typically steel, concrete or wood. On top of the roof deck is a layer of insulation, in many cases a coverboard and them a waterproofing system. The waterproofing system may be a asphalt/gravel system as shown above, a single ply roof membrane, or for steeper slope applications shingles or tile. The current footnote b references structural members, components installed above the roof deck are not structural, they are supported by the structure.

Insulation suppliers to the roofing industry manufacture a nailable insulation product (see included Atlas Nailbase Datasheet). This product consists of foam plastic insulation with a layer of wood (OSB, Plywood, or fire-retardant-treated wood) laminated to it, thus combining two of the components shown above (insulation and fiberboard) into one product This product is installed on top of the roof deck and is used as the nailable substrate for various roofing materials such as shingles, shakes and tile.

In many instances designers feel that footnote b of Table 601 requires that fire-retardant-treated wood be used as the nailable component of this product when a rated assembly is required. While this product can be made with fire-retardant-treated wood as the nailable component this unnecessarily increases the cost of construction.

The proposed footnote h would provide clarifying language while maintaining important fire safety requirements. For example, this footnote is no way removes the hourly rating requirements of the roof assembly. Hourly ratings can be achieved with OSB as the nailable substrate on this product. It also retains the requirement that the product meet the requirements of Section 603 COMBUSTIBLE MATERIALS IN TYPE I AND II CONSTRUCTION.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ENNIS-G1-Table 601

Public Hearing Results

Committee Action: Disapproved

Committee Reason: At the proponent's request, the committee disapproved the code change acknowledging that it needed further study and refinement. Of particular concern that it would allow a lessening of structural stability of roof assemblies.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Mike Ennis, representing Single Ply Roofing Industry (SPRI), requests Approval as Modified by this Public Comment.

Modify proposal as follows:

h. ~~The requirements of this table for roof construction are not applicable to above deck components~~. <u>Fire-retardant treated wood is not required for non-structural components installed above the roof deck.</u> For construction Types I and II, the materials used in above <u>roof</u> deck components shall meet the requirements of Section 603.1.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The proposed modification is provided to clarify the intent of the proposed Note h and to remove a potential conflict with Note a. As currently worded Note h could be used to ignore the fact that Note a should not be applied when any load is imposed on a roof by above deck installations.

The intent of Note h is to provide clarification to wording contained in Note b of Table 601. In part the intent of Note b is that fire-retardant treated wood is allowed for use in unprotected wood framing and decking if the roof construction is at least 20' above the floor. Some designers are interpreting Note b to mean that only fire-retardant treat wood can be used in roof assemblies. This has resulted in increased material costs and lead times for a product commonly used in steep slope (>2:12) roofing applications. This product is composed of foam plastic insulation with OSB laminated to it. It is installed on top of the roof deck and is non-structural. This product provides both insulation and a nailable substrate for the attachment of roof shingles/tiles, etc. Requiring the use of fire-retardant treated wood instead of OSB increases the cost and lead-time for this product.

The proposed modification states in much clearer words the intent of Note h

Public Comment 2:

Rich Roe, representing Atlas Roofing Corporation, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and deck where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed for such unprotected members. Fire-retardant treated wood is not required for non-structural components installed above the roof deck. For construction Types I and II, the materials used in above roof deck components shall meet the requirements of Section 603.1.

~~h. The requirements of this table for roof construction are not applicable to above deck components. For construction Types I and II, the materials used in above roof deck components shall meet the requirements of Section 603.1.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The proposed modification is provided to clarify the intent of the proposed Note b. The original proposal included the addition of Note h to provide this clarification. However as written Note h could be used to ignore the fact that Note a should not be applied when any load is imposed on a roof by above deck installations.

In part the intent of Note b is that fire-retardant treated wood is allowed for use in unprotected wood framing and decking if the roof construction is at least 20' above the floor. Some designers are interpreting Note b to mean that only fire-retardant treat wood can be used in roof assemblies. This has resulted in increased material costs and lead times for a product commonly used in steep slope (>2:12) roofing applications. This product is composed of foam plastic insulation with OSB laminated to it. It is installed on top of the roof deck and is non-structural. This product provides both insulation and a nailable substrate for the attachment of roof shingles/tiles, etc. Requiring the use of fire-retardant treated wood instead of OSB increases the cost and lead-time for this product.

The proposed modification provides wording directly in Note b to provide additional clarification instead of adding Note h.

Final Action: AS AM AMPC____ D

G138-09/10
Table 602

Proposed Change as Submitted

Proponent: Joe Holland or Dave Bueche, representing Hoover Treated Wood Products

Revise as follows:

TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR ECTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE[a, e]

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H[f]	OCCUPANCY GROUP F-1, M S-1[g]	OCCUPANCY GROUP A, B, E, F-2, I, R, S-2[g], U[b]
X < 5[c]	All	3	2	1
5 ≤ X <10	IA Others	3 2	2 1	1 1
10 ≤ X 30	IA, IB IIB, IIIB, VB Others	2 1 1	1 0 1	1[c] 0 1[c]
X ≤ 30	All	0	0	0

For SI: 1 foot = 304.8 mm.

a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.
b. For special requirements for Group U occupancies, see Section 406.1.2.
c. See Section 706.1.1 for party walls.
d. Open parking garages complying with Section 406 shall not be required to have a fire-resistance rating.
e. The fire-resistance rating of an exterior wall is determined based upon the fire separation distance of the exterior wall and the story in which the wall is located.
f. For special requirements for Group H occupancies, see Section 415.3.
g. For special requirements for Group S aircraft hangars, see Section 412.4.1.

Reason: The exterior wall fire resistance required in Table 601 is greater for Type IIIB than what is required for either Type IIB or VB. The interior fire resistance in Type IIIB construction is equivalent to Type IIB and Type VB and therefore should be allowed in the same category.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HOLLAND-BUECHE-G6-T602.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: No technical substantiation was provided to justify reducing the protection of Type IIIB construction.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche, representing Hoover Treated Wood Products, Inc., requests Approval as Submitted.

Commenter's Reason: The exterior bearing wall fire resistance required in Table 601 is greater for Type IIIB than what is required for either Type IIB or VB. The interior fire resistance in Type IIB construction is equivalent to Type IIB and Type VB and therefore should be allowed in the same category.

Final Action: AS AM AMPC____ D

G140-09/10
602.3, 602.4

Proposed Change as Submitted

Proponent: Jason Thompson, National Concrete Masonry Association (NCMA), representing Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

602.3 Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies ~~of~~ having not greater than a 2-hour fire-resistance rating ~~or less~~ where the exposed outer and inner faces of such walls are of noncombustible materials.

602.4 Type IV. Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section. Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies ~~with~~ having not greater than a 2-hour fire-resistance rating ~~or less~~ where the exposed outer and inner faces of such walls are of noncombustible materials.

Reason: This code change adds to the provision for exterior walls using fire-retardant-treated wood framing in buildings of Types III and IV construction by requiring that the framing be covered on the outer and inner faces with noncombustible materials. This additional provision when fire-retardant-treated wood is used in exterior walls otherwise required to be constructed of noncombustible materials is taken from the 1997 ICBO Uniform Building Code (UBC) Section 503.4.3 Fire-Retardant-Treated Wood Framing. That section was the source for the justification in the IBC to allow fire-retardant-treated wood in these exterior wall assemblies where the fire-resistance rating did not exceed 2-hours.

A significant number of Type III construction buildings have taken advantage of this provision to allow the exterior wall to be framed of wood rather than constructed entirely of noncombustible materials, while also taking advantage of Section 1406.2.2. Section 1406.2.2 allows combustible exterior wall coverings to be installed on the exterior faces of these walls. That application does not meet the code intent for limiting the combustible materials in the exterior walls of Type III construction which is a basic fire safety component of that type of construction. Since the legacy code provision was used to justify the use of fire-retardant-treated wood, then the other requirements applicable thereto in that legacy code should also be incorporated into the IBC to achieve the intended level of fire safety.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Thompson-G5-602.3

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal defeats the allowance for fire-retardant-treated wood in these assemblies especially the application of FRTW sheathing. Language addressing inner and outer faces was unclear to the committee as how it should be interpreted.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, National Concrete Masonry Alliance (NCMA), representing Masonry Alliance for Codes and Standards (MACS), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.3 Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies having not greater than a 2-hour fire-resistance rating where the exposed outer face of the exterior wall covering ~~and inner faces~~ of such walls is constructed ~~are~~ of noncombustible materials and a noncombustible membrane is applied over the interior face of the fire-retardant-treated wood framing to separate the framing from the interior of the building.

602.4 Type IV. Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section. Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies having not greater than a 2-hour fire-resistance rating where the exposed outer face of the exterior wall covering ~~and inner faces~~ of such walls is constructed ~~are~~ of noncombustible materials and a noncombustible membrane is applied over the interior face of the fire-retardant-treated wood framing to separate the framing from the interior of the building.

Commenter's Reason: We are submitting this Public Comment to request approval as modified of our Code Change Proposal G140-09/10 with appropriate revisions that respond to the IBC General Code Development Committee's Reason Statement for disapproval. The Committee felt that the language addressing inner- and outer-faces was unclear as to how it would be interpreted. Although this language was taken directly from the legacy building code from which the original provisions were taken and incorporated into the IBC, we have revised it to make it clear as to what is meant. The intent of this Code Change is to require some type of a noncombustible exterior covering on the outside of the exterior walls of Type III and IV buildings that are otherwise required to noncombustible, but are allowed to contain fire-retardant-treated wood framing within the wall construction. A noncombustible covering would also be required to be applied to the inner face of the fire-retardant-treated wood framing so that it is separated from the interior of the building. Thus, both the inner-face and the outer-face of the exterior wall construction covering the fire-retardant-treated wood framing would be required to be noncombustible by this Code Change Proposal as revised by this Public Comment.

As stated in our original Reason Statement for this Code Change, that is what the legacy building code, the 1997 ICBO Uniform Building Code (UBC), required in order to allow fire-retardant-treated wood framing within these exterior walls that are otherwise required to be constructed entirely of noncombustible materials.

Contrary to the Committee's Reason Statement that this code change defeats the allowance for fire-retardant-treated wood, especially in the application of FRTW sheathing, the code allowance for the use of fire-retardant-treated wood in the exterior walls of Types III and IV construction buildings only applies to the framing and not to the sheathing. In our opinion, fire-retardant-treated wood sheathing could still be applied over the noncombustible exterior wall covering applied over the fire-retardant-treated wood framing based on allowances in Section 1405.5 Wood Veneers and Section 1406.2.2 Type I, II, III and IV construction for combustible materials on the exterior side of exterior walls.

Section 1405.5 allows fire-retardant-treated wood veneer to be used on buildings of Type III and IV construction provided it is attached to, or furred from, a noncombustible backing that is fire-resistance rated as required by other provisions of this code based on Item 2 of that section. So this section would require a noncombustible backing which would be similar to the noncombustible exterior wall covering we are proposing in our Code Change Proposal allowing fire-retardant-treated wood framing in these exterior walls.

Section 1406.2.2 will allow combustible exterior wall coverings of fire-retardant-treated wood on buildings of Types III and IV construction as well, permitted to a height of 60 feet, just as that allowed by Section 1405.5. In our opinion, this assumes that the fire-retardant-treated wood will be applied over a noncombustible substrate represented by the noncombustible wall construction typically required by these types of construction.

In conclusion, we believe that the allowable use of fire-retardant-treated wood framing in exterior walls of Types III and IV construction, which are otherwise required to be constructed entirely of noncombustible materials, should be continued to be allowed within the scope of the original allowance from which this was derived, i.e. the 1997 ICBO UBC as indicated in our Reason Statement for our original Code Change Proposal. Therefore, we respectfully request that the Class A voting members overturn the Committee recommendation for disapproval of our Code Change and approve this Public Comment which will result in Code Change G140-09/10 being approved as modified.

Final Action: AS AM AMPC____ D

G143-09/10
603.1

Proposed Change as Submitted

Proponent: Joe Holland and Dave Bueche, representing Hoover Treated Wood Products

Revise as follows:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. Fire-retardant-treated wood shall be permitted in:
   - 1.1. Nonbearing partitions where the required fire-resistance rating is 2 hours or less.
   - 1.2. Nonbearing exterior walls where no fire rating is required.
   - 1.3. Roof construction, including girders, trusses, framing and decking.
   - <u>1.4. Blocking such as for handrails, millwork, cabinets and window and door frames.</u>

   Exception: In buildings of Type IA construction exceeding two stories above grade plane, fire-retardant-treated wood is not permitted in roof construction when the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).

2. through 13. *(No change to current text)*
~~14. Blocking such as for handrails, millwork, cabinets and window and door frames.~~
15. through 25. *(No change to current text)*

Reason: The primary members of partitions in Type I and Type II construction must be noncombustible or fire-retardant-treated wood. To allow untreated wood in the partitions for blocking is inconsistent with Type I and Type II construction. In some cases it can be flush mounted exposed with the wallboard behind cabinets or millwork. It certainly is not prudent. Two of the three legacy codes did not allow.

Cost Impact: The code change proposal will increase the cost of construction.

Staff Note: In the first 2 editions of the 2009 IBC, Item 1 of Section 603.1 was shown as Item 25.

ICCFILENAME: HOLLAND-BUECHE-G4-603.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent did not provide technical justification to restrict use of standard wood for simply blocking purposes. It was questioned whether there were fire retardant products available for all typical blocking situations. There was no information presented of a loss history because blocking materials were wood other than FRTW.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche representing Hoover Treated Wood Products Inc, requests Approval as Submitted.

Commenter's Reason: The committee disapproved the proposal because no technical justification was submitted or fire data. This is Type I and Type II construction. The use of untreated wood is typically limited to areas where is can be seen. There appears to be a conflict. Section 1 addresses the use of a combustible material, fire-retardant-treated wood, in partitions, exterior walls, and roofs. Section 14 allows untreated wood. This a conflict. To be consistent, all the wood should be treated. Most species of untreated wood used for backing and blocking has a Class C rating. FRTW is Class A. That can be a difference in the flame spread as great as 190 compared to less than 25. The FRTW products in the marketplace are actually in the 10 to 15 range. In addition, smoke generated by FRTW is substantially less that untreated wood. Depending on the species the smoke developed rating for untreated wood is in the 250 to 350 range. FRTW is 50 or less.

Final Action: AS AM AMPC____ D

G145-09/10, PART II
IRC R806.2

NOTE: PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART I IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART II.

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

PART II – IRC BUILDING/ENERGY

Revise as follows:

R806.2 Minimum area. The total net free ventilating area shall not be less than 1/150 of the area of the space ventilated. ~~except that reduction of the total area~~

Exceptions:

1. The net free-cross ventilation area shall be permitted to be reduced to 1/300 ~~is permitted~~ provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.
2. ~~As an alternative,~~ The net free cross-ventilation area ~~may~~ shall be permitted to be reduced to 1/300 when a Class I or II vapor barrier is installed on the warm-in-winter side of the ceiling.

Reason: IBC 1203.2. Current attic ventilation provisions do not address ventilation of low slopped or flat roof attics. It is appropriate to require more ventilation area (i.e. 1/150th) when 3' of vertical separation between the upper and lower vent areas is not possible. A reduction of required vent area (i.e. 1/300th) is appropriate when vertical separation of the vents is provided as natural convection provides additional air movement within the attic space. It is also appropriate to reduce the vent area when a vapor barrier is installed on the ceiling to reduce moisture transmission from the occupied space into the attic. This change also creates consistency with Section 806.2 of the 2009 IRC.

IRC R806.2. The current language found in IRC Section 806.2 includes two exceptions within the charging text. The proposal reformats the section to be consistent with the typical grammatical format found elsewhere in the codes. The change creates consistency with Section 1203.2 of the IBC.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: KRANZ-G2-1203.2

Public Hearing Results

PART II – IRC- B/E

Committee Action: **Disapproved**

Committee Reason: The committee feels that the language of proposal RB158-09/10 more adequately addresses this issue.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lee J. Kranz, City of Bellevue, representing Washington Association of Building Officials Technical Development Committee, requests Approval as Submitted.

Commenter's Reason: G-145 Part I was submitted to correct a problem related to ambiguity on how to ventilate low slope roof attics with less than 3' of vertical separation between the upper and lower vents. In the 2009 IBC, the requirement in Section 1203.2 to provide not less than 3' of vertical separation between the upper and lower vents is impossible to achieve in low slope roof attics. The IBC-General committee agreed and voted for approval of G-145 Part I as submitted.

G-145 Part II was submitted to correlate IRC Section R806.2 with IBC Section 1203.2; there are no substantive changes proposed for R806.2, only format. The IRC-B/E committee disapproved Part II because they thought RB-158 more adequately addressed the issue but subsequently disapproved RB-158 as well. As such we are recommending approval as submitted for G-145 Part II for correlation between the 2012 editions of the IBC and IRC.

Final Action: AS AM AMPC____ D

NOTE: PART I REPRODUCED FOR INFORAMATION PURPOSES ONLY – SEE ABOVE

G145-09/10, PART I
1203.2

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

PART I – IBC GENERAL

Revise as follows:

1203.2 Attic Spaces. Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. A minimum of 1 inch of airspace shall be provided between the insulation and the roof sheathing.
The net free ventilating area shall not be less than ~~1/300th~~ 1/150th of the area of the space ventilated.

Exceptions:

1. The net free cross-ventilation area shall be permitted to be reduced to 1/300 provided that ~~with~~ at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.
2. The net free cross-ventilation area shall be permitted to be reduced to 1/300 when Class I or II vapor barrier is installed on the warm-in-winter side of the ceiling.

Public Hearing Results

PART I- IBC GENERAL

Committee Action: **Approved as Submitted**

Committee Reason: The change resolves issues imposed by the current text. It puts the incentive in correct format to direct the code user to provide better ventilation. It also allows flat roof situations to be addressed where a 3 foot vertical distance between upper and lower vents cannot be achieved. It also eliminates the ability to interpret the section to allow all ventilation openings on the ridge of a roof.

Assembly Action: **None**

G146-09/10 – Part I
1203.2

Proposed Change as Submitted

Proponent: Ali M. Fattah, City of San Diego, representing San Diego Area Chapter ICC Code Committee

Revise as follows:

1203.2 Attic spaces. Where determined necessary by the building official due to atmospheric or climatic conditions, ~~Enclosed~~ enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. A minimum of 1 inch (25 mm) of airspace shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/300 of the area of the space ventilated, with 50 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.

Reason: The proposed code change deletes a current requirement. There are many conditions that can preclude providing attic ventilation where climactic conditions do not warrant attic ventilation, for example the installation of solar photovoltaics. Additionally, it is very impractical or not possible to ventilate occupied roof decks, low slope (flat) roofs or vaulted ceilings using rafters with drywall attached to directly to the underside of the solid combination rafter-ceiling joist. In many cases it is not possible to provide the 3 ft elevation difference between the high and low vents on low slope roofs and where low slope roofs include parapets and therefore no eave vents. The proposed change will not preclude applicants from providing attic ventilation to satisfy manufacturer's installation instructions for roof covering and therefore preserving the roof warranty. The language existed in the Uniform Building Code (Section 1505.3). That legacy building code was enforced in climates ranging from cold winter regions to hot desert regions in the southwest and had been in effect for more than 20 years. We are not aware of any moisture damage issues in attic spaces within jurisdictions that did not require attic ventilation, for example the City of San Diego and many surrounding jurisdictions.

This section can conflict with required one hour protection for projections such at eaves, as well as eave protection required by the International Wildland Urban interface Code.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FATTAH-G2.doc

Public Hearing Results

IBC GENERAL

Committee Action: **Disapproved**

Committee Reason: The change would introduce highly discretionary language into the code without providing the building official ample guidance for its use. A more detailed exception addressing the variety of climatic conditions that might warrant the waiver of attic ventilation would be appropriate. The discussion regarding installation of photovoltaic equipment on roof tops seemed irrelevant to the proposal to allow a waiver of attic ventilation.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ali M. Fattah, PE, City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1203.2 Attic spaces. ~~Where determined necessary by the building official due to atmospheric or climatic conditions,~~ ~~enclosed~~ Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. A minimum of 1 inch (25 mm) of airspace shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/300 of the area of the space ventilated, with 50 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.

Exception: Attic ventilation shall not be required when determined not necessary by the code official due to atmospheric or climatic conditions.

Commenter's Reason: This public comment is submitted in response to feedback from the committee and public testimony in Baltimore. Reference to solar photovoltaic's was only used as an example to demonstrate cases where our jurisdiction has had to modify the code to allow the installation of solar PV since and alternative to required ventilation could not be provided. Code officials applying the section under a legacy code that enforced in major portions of the country did not need specific guidance to determine whether attic ventilation is required due to local conditions. By revising the proposed code change from that initially proposed to an exception a building official does not have to grant the exception if data or justification is not available. We stand on the remainder of our initial statement of reasons and urge the voting membership to support this public comment.

Final Action: AS AM AMPC____ D

G146-09/10 – Part II
IRC R806.1

Proposed Change as Submitted

Proponent: Ali M. Fattah, City of San Diego, representing San Diego Area Chapter ICC Code Committee

Revise as follows:

R806.1 Ventilation required. Where determined necessary by the building official due to atmospheric or climatic conditions, ~~Enclosed~~ enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of $^1/_{16}$ inch (1.6 mm) minimum and ¼ inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than ¼ inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth, or similar material with openings having a least dimension of $^1/_{16}$ inch (1.6 mm) minimum and ¼ inch (6.4 mm) maximum. Openings in roof framing members shall conform to the requirements of Section R802.7.

Reason: The proposed code change deletes a current requirement. There are many conditions that can preclude providing attic ventilation where climactic conditions do not warrant attic ventilation, for example the installation of solar photovoltaics. Additionally, it is very impractical or not possible to ventilate occupied roof decks, low slope (flat) roofs or vaulted ceilings using rafters with drywall attached to directly to the underside of the solid combination rafter-ceiling joist. In many cases it is not possible to provide the 3 ft elevation difference between the high and low vents on low slope roofs and where low slope roofs include parapets and therefore no eave vents. The proposed change will not preclude applicants from providing attic ventilation to satisfy manufacturer's installation instructions for roof covering and therefore preserving the roof warranty. The language existed in the Uniform Building Code (Section 1505.3). That legacy building code was enforced in climates ranging from cold winter regions to hot desert regions in the southwest and had been in effect for more than 20 years. We are not aware of any moisture damage issues in attic spaces within jurisdictions that did not require attic ventilation, for example the City of San Diego and many surrounding jurisdictions.

This section can conflict with required one hour protection for projections such at eaves, as well as eave protection required by the International Wildland Urban interface Code.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FATTAH-G2.doc

Public Hearing Results

IRC Building and Energy

Committee Action: **Disapproved**

Committee Reason: This proposal would add language that would require the Building Official to decide the code requirements. This is a local issue and should be handled through local amendment to the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ali M. Fattah, PE, City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC, requests Approval as Modified by this Public Comment.

R806.1 Ventilation required. ~~Where determined necessary by the building official due to atmospheric or climatic conditions, enclosed~~ Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of 1/16 inch (1.6 mm) minimum and ¼ inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than ¼ inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth, or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and ¼ inch (6.4 mm) maximum. Openings in roof framing members shall conform to the requirements of Section R802.7.

Exception: Attic ventilation shall not be required when determined not necessary by the code official due to atmospheric or climatic conditions.

Commenter's Reason: See commenter's reason for Part I.

Final Action: AS AM AMPC____ D

G150-09/10
1210.1.1 (New)

Proposed Change as Submitted

Proponent: Timothy Kyle Hantz, PE, General Services Administration, representing self

Add new text as follows:

1210.1.1 Diaper changing station. In assembly occupancies where a toilet room has two or more water closets, a diaper changing station shall be provided in the toilet room. Diaper changing stations shall comply with the work surface requirements of ICC A117.1.

Reason: IBC 101. 3 states that the intent of the code is to provide minimum standards for public health, safety and general welfare. I have noticed diaper changing stations in restaurants, trains, airports, convention centers, etc. It is hard to believe that in 2009, we still have to change our children's diapers on a toilet room floor. This is very unsanitary for the baby and the changer. This proposal would also help people who have trouble bending over, or getting on their hands and knees to change diapers.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: The Code Correlation Committee approved an editorial combining of Sections 1210 and 2903 of the 2009 IBC into a single section 1210 on Toilet and Bathroom requirements. This proposal, if approved would be located as Section 1210.1.1 of the new combined section.

ICCFILENAME: Hantz-G1-1211.1.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The concept of the proposal was welcomed by some of the committee but they were concerned that the threshold numbers would not result in equal access to such stations for both fathers and mothers. The application to just assembly occupancies was too limited. Application to mercantile facilities, especially covered/open malls seemed essential. Other committee members were not convinced that as important as it is to provide these diaper changing stations, that it is an appropriate item for either building or plumbing codes.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Timothy Kyle Hantz, PE, General Services Administration, representing self, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

1210.6. Diaper Changing Stations. A diaper changing station shall be provided in each restroom that contains two or more water closets, or that contains a combination of two or more water closets and urinals, and that serve the following occupancies:

Assembly occupancies; except taverns and bars
Mercantile occupancies.

Exception: Diaper changing stations are not required in restrooms limited to employee use only.

Commenter's Reason: Based on the Committee's reason for disapproval, I have expanded my proposal to include Mercantile occupancies, and also included language for "potty parity" (both restrooms having a diaper changer if only one is required by water closet count.). I also changed the code section from 1210.1.1 to 1210.6. (as a stand alone code reference).

Final Action: AS AM AMPC____ D

G153-09/10, PART I
3001.2.1

Proposed Change as Submitted

Proponent: Philip M. Chandler representing New York State, Department of State, Office of Fire Prevention & Control.

PART I – IBC

Add new text as follows:

3001.2 Referenced standards. Except as otherwise provided for in this code, the design, construction, installation, *alteration*, repair and maintenance of elevators and conveying systems and their components shall conform to ASME A17.1/CSA B44, ASME A90.1, ASME B20.1, ALI ALCTV, and ASCE 24 for construction in flood hazard areas established in Section 1612.3.

<u>**3001.2.1 Certificate of inspection.** The most current certificate of inspection shall be on display at all times within the elevator or attached to the escalator or dumbwaiter, be available for public inspection in the office of the building *operator* or be posted in a publicly conspicuous location *approved* by the *building official*. The inspection and witnessing of tests required by ASME A17.1 shall be performed by an impartial, third-party inspector that meets the minimum qualifications as set forth in the referenced standard. The inspection and tests shall be performed at not less than the periodic intervals listed in ASME A17.1, Appendix N, except where otherwise specified by the authority having jurisdiction.</u>

Reason: These three companion proposals will provide consistent provisions in the IBC, IFC and IPMC regarding elevator inspection and posting the appropriate certificate.

IBC Section 3001.2: As 3001.2 pertains to maintenance as well as to design, construction and installation, it is appropriate to use the same language found in IPMC here. Additionally, it is helpful to reiterate the qualifications needed by elevator inspectors and the importance of their impartiality.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: CHANDLER-G1-3001.2.1.doc

<u>Public Hearing Results</u>

PART I- IBC GENERAL

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal because they felt that the requirement is adequately covered by the standard and the requirement doesn't need to be repeated in the code. In addition, the proposed language is poorly crafted, and would seem to prohibit inspection by qualified inspectors employed by the jurisdiction. The proponent did not clarify why this language was necessary in the code.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Part I – IBC General

Philip M. Chandler, representing New York State Department of State, Office of Fire Prevention & Control, requests Approval as Submitted.

Commenter's Reason: It is urged that proposed changes to IBC 3001.2.1, IFC 607.4 and IPMC 606.1, having been heard together as G153-09/10, be adopted for the following reasons:

First and foremost, it makes good sense to provide consistent language on elevator inspection in the above referenced codes. It is proposed that the language of the IPMC be ostensibly used as the model with some modification. Inasmuch as elevators have a significant impact on a building's overall fire safety, this language is needed in the IFC as well as the IBC and IPMC. There are those conducting life safety inspections of existing buildings, often fire code officials or firefighters, that might conclude that the IBC applies only to new construction and not to elevator maintenance. Similarly, there are those jurisdictions that may not choose to adopt the IPMC altogether. Accordingly, by inserting this same important inspection requirement into the IFC, we ensure the greatest likelihood that elevators will get the inspection and testing they need.

It is also argued that the inspection and testing of elevators be done by impartial, third parties. While inspecting one's own work may violate the canon of ethics subscribed to by those having QEI certification, the actual language of the referenced standards does not unambiguously spell it out. Impartiality is too important a requirement for assuring the safety of the public as well as firefighters and emergency responders to leave to inference alone.

The Committee worried that the language "impartial, third party," might serve to disenfranchise municipal elevator inspectors. This concern is unfounded. Government inspectors are by definition impartial third parties. What this proposal comes to exclude is the inspection and testing of elevators by agents of the building's owner (1^{st} party), or of the installing or maintaining contractor (2^{nd} party). QEI elevator inspection firms, or QEI certified governmental inspectors are exactly the parties that we want inspecting our elevators!

Final Action: AS AM AMPC____ D

G153-09/10, PART II
IFC 607.4

Proposed Change as Submitted

PART II – IFC

Add new text as follows:

607.4 Maintenance. Elevators, dumbwaiters and escalators shall be maintained in compliance with ASME A17.1. The most current certificate of inspection shall be on display at all times within the elevator or attached to the escalator or dumbwaiter, be available for public inspection in the office of the building *operator* or be posted in a publicly conspicuous location *approved* by the *code official*. The inspection and witnessing of tests required by ASME A17.1 shall be performed by an impartial, third-party inspector that meets the minimum qualifications as set forth in the referenced standard. The inspection and tests shall be performed at not less than the periodic intervals listed in ASME A17.1, Appendix N, except where otherwise specified by the authority having jurisdiction.

Reason: These three companion proposals will provide consistent provisions in the IBC, IFC and IPMC regarding elevator inspection and posting the appropriate certificate.

IFC Section 607.4: Elevators, dumbwaiters and escalators have a significant impact on a building's overall fire safety. Accordingly, this new text will coordinate IFC requirements with those of the IBC and IPMC and at the same time, reiterate the qualifications needed by elevator inspectors and the importance of their impartiality.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: CHANDLER-G1-3001.2.1.doc

Public Hearing Results

PART II- IFC

Committee Action: **Disapproved**

Committee Reason: Disapproved for consistency with the action taken on Part I.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip M. Chandler, representing New York State Department of State, Office of Fire Prevention & Control, requests Approval as Submitted.

Commenter's Reason: See commenter's reason for Part I.

Final Action: AS AM AMPC____ D

G153-09/10, PART III
IPMC 606.1

Proposed Change as Submitted

PART III – IPMC

Revise as follows:

606.1 General. Elevators, dumbwaiters and escalators shall be maintained in compliance with ASME A17.1. The most current certificate of inspection shall be on display at all times within the elevator or attached to the escalator or dumbwaiter, be available for public inspection in the office of the building *operator* or be posted in a publicly conspicuous location *approved* by the *code official*. <u>The inspection and witnessing of tests required by ASME A17.1 shall be performed by an impartial, third-party inspector that meets the minimum qualifications as set forth in the referenced standard.</u> The inspection and tests shall be performed at not less than the periodic intervals listed in ASME A17.1, Appendix N, except where otherwise specified by the authority having jurisdiction.

Reason: These three companion proposals will provide consistent provisions in the IBC, IFC and IPMC regarding elevator inspection and posting the appropriate certificate.

IPMC Section 606.1: This eliminates much confusion surrounding the minimum qualifications of elevator inspectors explicit in the referenced standard and the need for impartiality implicit in the requirements for QEI-1certification. The need for impartiality is fundamental to the QEI process.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: CHANDLER-G1-3001.2.1.doc

Public Hearing Results

PART III- IPMC

Committee Action: **Disapproved**

Committee Reason: Disapproved for consistency with the action taken on Parts I and II.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Philip M. Chandler, representing New York State Department of State, Office of Fire Prevention & Control, requests Approval as Submitted.

Commenter's Reason: See commenter's reason for Part I.

Final Action: AS AM AMPC____ D

G154-09/10
3002.3

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry, Inc. (NEII)

Revise as follows:

3002.3 Emergency signs. An approved pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. The sign shall ~~read: IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRS~~ comply with ASME A17.1/CSA B44.

Exceptions:

1. The emergency sign shall not be required for elevators that are part of an *accessible means of egress* complying with Section 1007.4.

2. The emergency sign shall not be required for elevators that are used for occupant self-evacuation in accordance with Section 3008.

Reason: The message for these elevator signs is already addressed in the referenced standard:
ASME A17,1/CSA B44, Section 2.27.9 Elevator Corridor Call Station Pictograph. When the building code requires a sign be posted adjacent to hall call fixtures instructing occupants not to use the elevator in case of fire, the sign shown in Fig. 2.27.9 shall be provided. The sign shall include only the wording and graphics shown in Fig. 2.27.9. When the building code specifies a different design, 2.27.9 shall not apply.

(The Figure 2.27.9 uses the text "IN CASE OF FIRE ELEVATORS ARE OUT OF SERVICE. USE EXIT".)

ASME A17,1/CSA B44 already provides the "standardized design" required by IBC Section 3002.3 but provides non-standardized text to accompany the pictograph. This is essentially a harmonization between the IBC requirement and the code referenced in 3001.2.

Cost Impact: This code change proposal will not increase the cost of construction.

ICCFILENAME: BLACK-G2-3002.3.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This language needs to be provided in the code and not force building officials or designers to consult the standard for 10 simple words.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc., requests Approval as Modified by this Public Comment.

3002.3 Emergency signs. An approved pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. The sign shall read: ~~comply with ASME A17.1/CSA B44~~ IN CASE OF FIRE ELEVATORS ARE OUT OF SERVICE. USE EXIT STAIRS.

Exceptions:

1. The emergency sign shall not be required for elevators that are part of an *accessible means of egress* complying with Section 1007.4.
2. The emergency sign shall not be required for elevators that are used for occupant self-evacuation in accordance with Section 3008.

Commenter's Reason: The intent of this code change was to coordinate the requirements of the IBC with those in the ASME A17.1/CSA B44 Safety Code for Elevators and Escalators. The committee disapproved the direct reference to the ASME code as it felt a code official should not have to go to a separate document "for 10 simple words". It also preferred the word "stairs" be retained in the sign.

The proposed new text is identical to the text on the sign required by ASME A17.1/CSA B44 with the addition of the word "STAIRS". If this is approved, NEII will submit a Technical Revision to the ASME A17 Standards Committee to harmonize that code's text with the IBC.

Final Action: AS AM AMPC____ D

G155-09/10
3003.3 (New), 3007.3

Proposed Change as Submitted

Proponent: Dave Frable, representing U.S. General Services Administration

Revise as follows:

3003. 3 Hoistway lighting. When firefighters' emergency operation is active, the entire height of the hoistway shall be illuminated at not less than 1 foot-candle (11 lux) as measured from the top of the car of each elevator.

~~**3007.3 Hoistway lighting.** When firefighters' emergency operation is active, the entire height of the hoistway shall be illuminated at not less than 1 foot-candle (11 lux) as measured from the top of the car of each fire service access elevator.~~

(Renumber subsequent sections)

Reason: The intent of this code change is to provide illumination within elevator hoistways when firefighter's emergency operation has been enabled. It relocates the provisions currently only applicable to fire service access elevators applicable to high-rise buildings, to be a requirement for all elevator hoistways regardless of height or whether the elevator is designated for a specific use or not.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: FRABLE-G3-3003.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The lighting is only needed for the use of firefighters. It has no relationship to the use of any elevator for accessible means of egress or for occupant self evacuation.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dave Frable, representing U.S. General Services Administration, requests Approval as Submitted

Commenter's Reason: The intent of this code change is to provide illumination within all elevator hoistways of a building when firefighter's emergency operation has been enabled. This requirement would apply to all elevator hoistways within a building in lieu of just the elevator hoistways that are used for fire service access elevators. This new requirement will provide firefighters the ability to view the elevator hoistway for smoke without the need to shine a flashlight up the hoistway prior to using any elevator to transport equipment and/or personnel as well as evacuating mobility impaired individuals from a building regardless of height or whether the elevator is designated for a specifically as a fire service access elevator. Regarding the Committee's reason for disapproval; we feel the reasons stated have no bearing on the overall intent of this code change.

Final Action: AS AM AMPC____ D

G158-09/10

3007.2 (New), 3007.3 (New)

Proposed Change as Submitted

Proponent: Dave Frable, representing U.S. General Services Administration

Add new text as follows:

3007.2 Automatic sprinkler system. The building shall be equipped throughout by an automatic sprinkler system in accordance with Section 903.3.1.1, except as otherwise permitted by Section 903.3.1.1.1 and as prohibited by Section 3007.2.1.

3007.2.1 Prohibited locations. Automatic sprinklers shall not be installed in elevator machine rooms, elevator machine spaces, and elevator hoistways of fire service access elevators.

3007.2.2 Sprinkler system monitoring. The sprinkler system shall have a sprinkler control valve supervisory switch and waterflow-initiating device provided for each floor that is monitored by the building's fire alarm system.

3007.3 Shunt trip. Means for elevator shutdown in accordance with Section 3006.5 shall not be installed on elevator systems used for fire service access elevators.

(Renumber subsequent sections.)

Reason: 3007.2: The intent of this code change is to provide further clarification in meeting the original intent of Section 3007 regarding prohibiting the installation of automatic sprinklers in the associated elevator machine rooms and elevator machine spaces for fire service access elevators. . The subject proposed language is similar to the language in Section 3008.6 for occupant evacuation elevators.

3007.3: The intent of this code change is to provide further clarification in meeting the original intent of Section 3007 regarding prohibiting the installation of shunt trip for fire service access elevators. The subject proposed language is similar to the language in Section 3008.8 for occupant evacuation elevators.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Would this requirement take precedence over Sections 403.2 and 903.2.11.3 which allow certain portions of a high-rise building not to be provided with sprinkler protection?

ICCFILENAME: FRABLE-G9-3007.2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This clarifies that the same exemptions for sprinklers installed in the elevator machine room and shaft and the installation for shunt trips permitted for Occupant Evacuation Elevators in Section 3008.6 should also be permitted in Fire Service Access Elevators.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gerald Anderson, City of Overland Park, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**3007.2 Automatic sprinkler system.** The building shall be equipped throughout by an automatic sprinkler system in accordance with Section 903.3.1.1, except as otherwise permitted by Section 903.3.1.1.1 and as prohibited by Section 3007.2.1.~~

~~**3007.2.1 Prohibited locations.** Automatic sprinklers shall not be installed in elevator machine rooms, elevator machine spaces, and elevator hoistways of fire service access elevators.~~

~~**3007.2.2 Sprinkler system monitoring.** The sprinkler system shall have a sprinkler control valve supervisory switch and waterflow-initiating device provided for each floor that is monitored by the building's fire alarm system.~~

~~**3007.3**~~ **3007.2 Shunt trip.** Means for elevator shutdown in accordance with Section 3006.5 shall not be installed on elevator systems used for fire service access elevators.

Commenter's Reason: The proposed Section 3007.2 Automatic sprinkler systems is not necessary. Automatic sprinkler systems are already required by Chapter 9, another charging statement is not necessary.

Floor control valves are already required in high-rise buildings by section 903.4.3. A water flow initiating device for each floor is required in high-rise by section 907.6.3.2. Section 903.3.1.1.1 already exempts fire service access elevators from the general requirement for fire sprinklers and Section 8.14.5.5 of NFPA 13 exempts sprinklers for the tops of non-combustible elevator shafts.

Therefore the proposed language is not necessary.

I left the requirement for shunt trips in this proposal because I think that it is important to get this requirement into the code. However, this requirement should be an exception to 3006.5 not a stand alone requirement under fire service access elevators. A code change can be submitted for this at a later date.

Final Action: AS AM AMPC____ D

G159-09/10
3007.2 (New)

Proposed Change as Submitted

Proponent: Dave Frable, representing U.S. General Services Administration

Add new section as follows:

3007.2 Phase I Emergency Recall Operation. An independent, three-position, key-operated "Fire Recall" switch shall be provided at the designated level for each fire service access elevator or for each group of fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. In addition, actuation of any building fire alarm initiating device shall initiate Phase I emergency recall operation on all fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. All other elevators shall remain in normal service unless Phase I emergency recall operation is manually initiated by a separate, required three-position key-operated "Fire Recall" switch or automatically initiated by the associated elevator lobby and elevator machine room smoke detectors.

(Renumber subsequent sections)

Reason: The intent of this code change is to provide further clarification in meeting the original intent regarding the design and operation of fire service access elevators. This code change will also ensure the subject elevators can be recalled quickly at the designated level by the responding firefighters.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: FRABLE-G7-3007.2

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

3007.2 Phase I Emergency recall operation. An independent, three-position, key-operated "Fire Recall" switch shall be provided at the designated level for each fire service access elevator or for each group of fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. In addition, actuation of any building fire alarm initiating device shall initiate Phase I emergency recall operation on all fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. All other elevators shall remain in normal service unless Phase I emergency recall operation is manually initiated by a separate, required three-position key-operated "Fire Recall" switch or automatically initiated by the associated elevator lobby ~~and~~ , hoistway or elevator machine room smoke detectors.

Committee Reason: The modification to the proposal is to coordinate with what is required in ASME A17.1 and will require activation of the fire recall from all three locations listed. The proposal provides the fire service a standardized way to initiate the fire recall process.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dave Frable, representing U.S. General Services Administration, request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

3007.2 Phase I Emergency recall operation. ~~An independent, three-position, key-operated "Fire Recall" switch shall be provided at the designated level for each fire service access elevator or for each group of fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. In addition, a~~Actuation of any building fire alarm initiating device shall initiate Phase I emergency recall operation on all fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. All other elevators shall remain in normal service unless Phase I emergency recall operation is manually initiated by a separate, required three-position key-operated "Fire Recall" switch or automatically initiated by the associated elevator lobby, hoistway or elevator machine room smoke detectors. In addition, if the building also employs occupant evacuation

<u>elevators in accordance with Section 3008, an independent, three-position, key-operated “Fire Recall” switch conforming to the applicable requirements in ASME A17.1/CSA B44 shall be provided at the designated level for each fire service access elevator.</u>

Commenter’s Reason: The intent of the modification is for clarification purposes and to correct any misinterpretation of the subject paragraph. As currently written, we are unsure how the subject text will be interpreted and enforced by the Building Official. The subject revised text will not adversely impact the overall intent of the proposal to provide the fire service a standardized way to initiate the fire recall process for the fire service access elevators.

Public Comment 2:

Brian Black, BDBlack Code, Inc., representing National Elevator Industry Inc., request Disapproval.

Commenter's Reason: The ability to place elevators into service while others in a group of elevators are being used to fight a fire is both unnecessary and dangerous. It would allow the public to reenter the upper stories of a building, move from floor to floor within the building, and possibly reach a fire floor during an active fire. In an emergency situation, a firefighter could mistakenly recall a single elevator and not even be aware that the remaining elevators have not been recalled and are thus available to the public.

This type of requirement is appropriate where Occupant Evacuation Elevators (OEE) are in place because it allows fire fighters to release elevators from Phase II operation so that they can return to the affected floors and be used for evacuation purposes. The critical distinction is that the elevators in OEE mode cannot be used by the public to reenter the upper stories of the building or migrate from floor to floor within the building. There is no need for this type of operation where OEE is not installed in the building.

Finally, operation and function of the fire recall elevator keys are controlled by ASME A17.1/CSA B44. Any modifications to the code’s requirements to account for Fire Service Access or Occupant Evacuation Elevators should remain in that reference standard.

Final Action: AS AM AMPC____ D

G160-09/10
3007.2.1

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing: California Fire Safety Advisory Council (CFSAC)

Revise as follows:

3007.2 Hoistway enclosures protection. The fire service access elevator <u>hoistway</u> shall be located in a shaft enclosure complying with Section 708.

<u>**3007.2.1 Structural integrity of hoistway enclosures.** The fire service access elevator hoistway shaft enclosure shall comply with Section 403.2.3.</u>

Reason: This proposed code change is a follow up to the Cal Chiefs Code Change G194-07/08 which was disapproved in Minneapolis.
That code change was disapproved mainly because it was based on a reference to the hose stream test in ASTM E119 for determining the structural integrity of the shaft enclosure. However, Code Change G65-07/08 by the Gypsum Association, which also addressed the issue of structural integrity of exit stairway and elevator hoistway shaft enclosures, was approved as modified in Minneapolis by Public Comment #2. That code change provided for another means for assessing the structural integrity of shaft enclosures, specifically for buildings known as super high-rise buildings (those greater than 420 ft in height). And it was supported by a NIST representative in response to one of the recommendations made in the NIST World Trade Center Report. Since it was approved for those conditions, it also seems appropriate that such structural integrity criteria should also be provided for the protection of fire service access elevator hoistways. These hoistways perform a very critical function protecting the responding fire fighters while the elevator assists them in gaining access to the fire floor in buildings generally more than 120 ft in height.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: Does the reference to Section 403.2.3 in the proposal result in requiring ‘hardening’ of the hoistway shaft at the 120 foot threshold for fire service access elevators or the 420 foot threshold provided in Section 403.2.3?

ICCFILENAME: THORNBERRY-G3-3007.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: With the reference to Section 403.2.3, it is not clear if the requirement for hardened shaft would be applicable for all Fire Service Access elevators (starting at 120 feet), or just those in Seismic Category III and IV or only at buildings taller than 420 feet. The intent of the proponent is for all Fire Service Access elevators to be hardened at 120 feet regardless of seismic category. The correct placement for this requirement is in Section 402.3.2. Justification for the additional costs must be provided.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE, The Code Consortium, Inc., representing California Fire Safety Advisory Council (CFSAC), requests Approval as Modified by the Public Comment.

Modify this proposal as follows:

3007.2.1 Structural integrity of hoistway enclosures. The fire service access elevator hoistway shaft enclosure shall comply with Sections 403.2.3.1 through 403.2.3.4.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This Public Comment responds to the main reason the IBC Means of Egress Code Development Committee recommended disapproval. The Committee was basically in support of the concept of the code change but was concerned about the confusion that would occur based on how Section 403.2.3 was referenced and how it was intended to apply regarding the height and type of high-rise building that would trigger the requirement for the structural integrity of fire service access elevator hoistway enclosures. So the proposed revision in this Public Comment makes specific reference to Sections 403.2.3.1 through 403.2.3.4 which describe how the structural integrity of the hoistway enclosure is to be constructed. Thus, the requirement applies to any fire service access elevator hoistway provided in a building as required by Section 403.6.1 which is triggered at 120 ft in height above the lowest level of fire department vehicle access.

Final Action: AS AM AMPC____ D

G165-09/10
3007.7.1, 3008.15.1

Proposed Change as Submitted

Proponent: Brian Black BDBlack Codes, Inc., representing National Elevator Industry, Inc. (NEII), Sean DeCrane, representing, International Association of Fire Fighters (IAFF), Jack Murphy, representing Fire Safety Directors Association of Greater New York (FSDAGNY)

Revise as follows:

3007.7.1 Protection of wiring or cables. Wires or cables that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, ventilation and fire-detecting systems to fire service access elevators shall be protected by construction having a minimum ~~1-~~2-hour fire-resistance rating or shall be circuit integrity cable having a minimum ~~1-~~2-hour fire resistance rating.

3008.15.1 Protection of wiring or cables. Wires or cables that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, ventilation and fire-detecting systems to fire service access elevators shall be protected by construction having a minimum ~~1-~~2-hour fire-resistance rating or shall be circuit integrity cable having a minimum ~~1-~~2-hour fire resistance rating.

Reason: RE: 3007.7.1: The safety of firefighters during their firefighting operations is dependent upon the life safety support systems listed in Section 3007 being maintained during the critical first 2 hours of their efforts. Locating, surrounding, confining and extinguishing the fire, as well as removing those whose lives are in jeopardy, will take time. If the fire is not under control by 2 hours into the effort, then it is probably time to evacuate. Providing the 2 hour protection will provide the necessary safety factor for firefighters to undertake the firefighting and rescue operations without increased concern for system failure. The 2-hour rating is consistent with the hoistway fire rating and fire pump feeder enclosure rating. This request has the full support of the firefighting community and is not unreasonable when it is considered that this will allow for more time to ensure the full evacuation of the building.

RE: 3008.15.1: The safety of building occupants evacuating a building is dependent upon the life safety support systems listed in Section 3008 being maintained during the critical hours of evacuation. The 2-hour rating is consistent with the hoistway fire rating and fire pump feeder enclosure rating. This request has the full support of the firefighting community and is not unreasonable when it is considered that this will allow for more time to ensure the full evacuation of a building.

Cost Impact: This code change proposal will increase the cost of construction.

ICCFILENAME: BLACK-G8-10-3008.15.1.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because no technical justification was provided for the increase for the fire-resistance rating for cable protection. Most of the wiring for elevators can be run inside the protected shaft.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Brian Black, BDBlack Code, Inc., representing National Elevator Industry Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3007.7.1 Protection of wiring or cables. Wires or cables <u>that are located outside of the elevator hoistway and machine room and</u> that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, ventilation and fire-detecting systems to fire service access elevators shall be protected by construction having a minimum 2-hour fire-resistance rating or shall be circuit integrity cable having a minimum 2-hour fire resistance rating.

3008.15.1 Protection of wiring or cables. Wires or cables <u>that are located outside of the elevator hoistway and machine room and</u> that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, ventilation and fire-detecting systems to occupant evacuation elevators shall be protected by construction having a minimum 2-hour fire-resistance rating or shall be circuit integrity cable having a minimum 2-hour fire resistance rating.

Commenter's reason: The committee stated "no technical justification was provided" for this proposal in that "most of the wiring for elevators can be run inside the elevator shaft". This proposed modification addresses the portion of the wiring that is outside of the 2-hour protected hoistway (power feeders for elevators, HVAC feeders, etc.). It essentially fixes the weak link created by horizontal runs from the transformer to the machine room. The cost will be negligible when compared to the original proposal.

Final Action: AS AM AMPC____ D

G169-09/10
3008.1.1 (New)

Proposed Change as Submitted

Proponent: Bill Ziegert, Smoke Guard, Inc, representing self.

Add new text as follows:

<u>**3008.1.1 Occupant evacuation elevators permitted.** Occupant evacuation elevators shall be permitted only when the elevator code (ASME A17.1/CSA B44 or other) adopted by the jurisdiction contains specific requirements for the design, operation and maintenance of emergency evacuation operation (EEO).</u>

Reason: Occupant Evacuation Elevators require many special operational / design requirements not found in the Building Code, and currently not included in any edition issued or under development of the ASME A17.1/CSA B44 Elevator Code. The proper operation and sequencing of the elevators to efficiently move occupants from the affected floors is the most important part of the occupant evacuation system and incorporation of this functionality currently allowed under the building code should not be allowed until the Elevator systems are designed with this additional functionality adequately addressed.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ZIEGERT-G2-3008.1.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The AMSE standard does not currently include specifics for Occupant Evacuation Elevators. Requiring the standard to have specific requirements before this option could be used would effectively prohibit Occupant Evacuation Elevators at this time. ASME should move forward to include specific information. The IBC needs to move forward to provide direction for this new technology. Involvement of the fire department and code official during construction and development of the fire and safety evacuation plans will address specific control issues on a case by case basis until the ASME standard is complete.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bill Ziegert, Smoke Guard, Inc., representing self, requests Approval as Submitted.

Commenter's Reason: Occupant Evacuation Elevators require many special operational / design requirements not found in the *International Building Code*, and currently not included in any issued edition of the ASME A17.1/CSA B44 Elevator Code. While a volunteer task group chartered by ASME A17.1 including NIST, elevator experts, fire service representatives, human factors experts, and building code representatives from NFPA and ICC, have been working diligently on developing the proper requirements to be included in the elevator code, the new language will not appear before the 2013 version of A17.1.

It is impossible to safely conduct Occupant Evacuation using elevators until significant and substantial design enhancements are included in the elevator system design. The guidance for these is absent in the IBC, since all parties recognize that they should be appropriately included in the elevator code.

This change would not prohibit the consideration of Occupation Evacuation Elevator systems, just delay the implementation until both the adopted building code and elevator code concurrently contain the minimum design requirements for these systems.

The committee rational that "Involvement of the fire department and code official during construction and development of the fire and safety evacuation plans will address specific control issues on a case by case basis until the ASME standard is complete" fails to recognize the exceptional complexity of how these systems must integrate with not only the elevator system, but also fire service protocols during high rise fires. No building or fire official should undertake these decisions, particularly since a high level of understanding of the current requirements of A17.1 is required.

Final Action: AS AM AMPC____ D

G171-09/10

3008.4 (New)

Proposed Change as Submitted

Proponent: Dave Frable, representing U.S. General Services Administration

Add new text as follows:

<u>**3008.4 Phase I Emergency Recall Operation**. An independent, three-position, key-operated "Fire Recall" switch shall be provided at the designated level for each occupant evacuation elevator in accordance with the requirements in ASME A17.1/CSA B44.</u>

(Renumber subsequent sections)

Reason: The intent of this code change is to provide further clarification in meeting the original intent regarding the design and operation of fire service access elevators. This code change will also ensure the subject (as specific) elevators can be recalled quickly at the designated level by the responding firefighters.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: FRABLE-G8-3008.4

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposed text allows flexibility for individual recall in addition to bank recall. This will help fire department efficiency when using the Occupant Evacuation Elevators during evacuation events.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dave Frable, representing U.S. General Services Administration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3008.4 Phase I Emergency recall operation. An independent, three-position, key-operated “Fire Recall” switch complying to the applicable requirements in ASME A17.1/CSA B44 shall be provided at the designated level for each occupant evacuation elevator ~~in accordance with the requirements in ASME A17.1/CSA B44~~.

Commenter’s Reason: The intent of the modification is for clarification purposes and to correct any misinterpretation of the subject paragraph. As currently written, we are unsure how the subject text will be interpreted and enforced by the Code Official. The subject revised text will not adversely impact the overall intent of the proposal.

Public Comment 2:

Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3008.4 Phase I Emergency recall operation. An independent, three-position, key-operated “Fire Recall” switch complying with ASME A17.1/CSA B44 shall be provided at the designated level for each occupant evacuation elevator ~~in accordance with the requirements in ASME A17.1/CSA B44~~.

Commenter’s Reason: This revision makes it clear that it is the three-position, key-operated “Fire Recall” switch and not the Occupant Evacuation Elevator (OEE) system that must comply with ASME A17.1/CSA B44. This is critical as the Safety Code for Elevators and Escalators has yet to have OEE requirements in it. A

Final Action: AS AM AMPC____ D

G173-09/10

3008.9, 3008.9.1 (New)

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing: California Fire Safety Advisory Council (CFSAC)

Revise as follows:

3008.9 Hoistway enclosure protection. ~~The~~ Occupant evacuation elevator~~s~~ hoistways shall be located in ~~a hoistway~~ shaft enclosure~~(s)~~ complying with Section 708.

3008.9.1 Structural integrity of hoistway enclosures. Occupant evacuation elevator hoistway shaft enclosures shall comply with Section 403.2.3.

Reason: This code change is a follow up to Code Change G65-07/08 by the Gypsum Association which also addressed the issue of structural integrity of exit stairway and elevator hoistway shaft enclosures in super high-rise buildings (those greater than 420 ft in height). It was approved as revised by Public Comment #2 at the ICC Final Action Hearings held in Minneapolis, MN.

In our opinion, it follows that the structural integrity requirements for super high-rise building exit stairway and elevator hoistway shaft enclosures should also apply to elevator hoistway shaft enclosures provided for occupant evacuation elevators which are just as critical for life safety protection. Such new technology for evacuation of occupants should be provided with the highest level of fire protection that is reasonably possible in order to assure that the elevators will be available during a fire emergency to serve their intended purpose of evacuating the occupants. Certainly, the structural integrity of the elevator hoistway shaft enclosures should be required to have some reasonable degree of physical protection to assure that the hoistway shaft enclosures will remain in place when needed during a fire or other emergency.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: THORNBERRY-G5-3008.9

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is the wrong place in the code for this requirement. This requirement for structural integrity needs to be incorporated into the high-rise provisions in Section 403.2.3. With this referenced, if the designer chose to provide Occupant Evacuation Elevators in building less than 420 feet it is not clear if the shaft would still have to meet the structural integrity requirements in Category I and II Seismic areas.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE, The Code Consortium, Inc., representing California Fire Safety Advisory Council (CFSAC) requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3008.9.1 Structural integrity of hoistway enclosures. Occupant evacuation elevator hoistway shaft enclosures shall comply with Sections ~~403.2.3~~ 403.2.3.1 through 403.2.3.4.

(Portions or proposal not shown remain unchanged)

Commenter's Reason: This Public Comment responds to the main reason the IBC Means of Egress Code Development Committee recommended disapproval. The Committee was basically in support of the concept of the code change but was concerned about the confusion that would occur based on how Section 403.2.3 was referenced and how it was intended to apply regarding the height and type of high-rise building that would trigger the requirement for the structural integrity of occupant evacuation elevator hoistway enclosures. So the proposed revision in this Public Comment makes specific reference to Sections 403.2.3.1 through 403.2.3.4 which describe how the structural integrity of the hoistway enclosure is to be constructed. Thus, the requirement applies to any occupant evacuation elevator hoistway provided in a building regardless of height.

Final Action: AS AM AMPC____ D

G189-09/10
3401.3

Proposed Change as Submitted

Proponent: David Bonowitz, David Bonowitz, S.E., National Council of Structural Engineers Associations, Code Advisory Committee, Existing Buildings Subcommittee (NCSEA EBS)

Revise as follows:

3401.3 Compliance. Alterations, repairs, additions and changes of occupancy to existing structures shall comply with the provisions for alterations, repairs, additions and changes of occupancy, respectively, in the *International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code, International Residential Code* and NFPA 70. Where provisions of the other codes conflict with provisions of this Chapter, the provisions of this Chapter shall take precedence.

Reason: The proposal clarifies and confirms the intent of Section 3401.3.

Cost Impact: No cost increase.

ICCFILENAME: Bonowitz-G5-3401.3.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The revisions would seem to conflict with the general references to other codes as contained in Chapter 1 and the reasons for the differences are unclear.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David Bonowitz, S.E., representing National Council of Structural Engineers Associations, Code Advisory Committee, Existing Buildings Subcommittee (NCSEA EBS), requests Approval as Submitted.

Commenter's Reason: NCSEA EBS recommends approval as submitted for the following reasons:

The proposal makes two revisions. The first introduces the word "respectively" into section 3401.3. This clarifies that Alterations under Chapter 34, for example, need only comply with the provisions for Alterations in the referenced codes, and need *not* comply with the provisions in referenced codes for repairs, change of occupancy, etc. This should be obvious, but clarification by adding the word "respectively" is certainly consistent with the intent and does no harm.

The second proposed revision again clarifies the intent that *where conflicts occur*, specific provisions in Chapter 34 should take precedence over more general provisions in the referenced codes. The IBC General committee disapproved this change, referring to Chapter 1, presumably to section 101.4 Referenced codes.

However, this reasoning does not acknowledge the special circumstances inherent in Chapter 34 and other provisions for existing buildings. For new construction, it is quite likely that there is no overlap between the IBC and the referenced codes, so section 101.4 is relatively straightforward. For existing buildings, however, there is always a substantial overlap between the intended scope of alteration, repair, etc. covered by Chapter 34 and the condition of associated systems covered by the referenced codes. Thus there is an inherent conflict between Chapter 34 – which triggers compliance only in certain situations, only in prescribed areas, and often with scope reductions – and the general application of any referenced code.

The conflict, real or potential, is easily solved by adding the sentence as proposed, to clarify that where Chapter 34 limits the scope of triggered work, the referenced codes should not override it. (Without this proposed sentence, a full review and coordination of all the referenced codes will be required with each code cycle.)

Four examples of potential conflicts, all solved by adding the proposed additional sentence:

For historic buildings, 3409 clearly (and substantially) limits the extent of triggered work. Section 3401.3, however, does not on its face acknowledge that scope limitation.

For buildings potentially covered by the IRC, section 3401.3 would invoke existing building provisions of that reference code. But the IRC structural upgrade provisions and triggers are substantially different from and less complete than those in Chapter 34 or in the IEBC.

A new section in the 2009 IBC allows the use of the IEBC as deemed to comply with Chapter 34. The IEBC has even more specific and appropriate variations from the referenced codes than Chapter 34 does. It is certainly not the intent to both allow the use of the IEBC and require compliance with all the referenced codes in ways that might be inconsistent.

There are likely other cases where Chapter 34 intends a limited scope of work, but the referenced codes, by addressing a broad range of possibilities, could be invoked improperly under a misreading of 3401.3.

Any such potential conflicts are clearly unintended. To avoid them, the additional sentence should be added as proposed by G189.

Final Action: AS AM AMPC____ D

G192-09/10

3401.5 (New), 3405.1.1 (IEBC [B] 301.3 (New), 304.1.1)

Proposed Change as Submitted

Proponent: David Bonowitz, David Bonowitz, S.E., National Council of Structural Engineers Associations, Code Advisory Committee, Existing Buildings Subcommittee (NCSEA EBS)

1. Add new text as follows:

3401.5 (IEBC [B] 301.3) Dangerous conditions. The building official shall have the authority to require the elimination of conditions deemed dangerous.

(Renumber subsequent sections in IBC.)

2. Delete without substitution:

~~**3405.1.1 (IEBC 304.1.1) Dangerous conditions.** Regardless of the extent of structural or nonstructural damage, the building code official shall have the authority to require the elimination of conditions deemed dangerous.~~

Reason: This proposal relocates a provision from Section 3405.1.1 to Section 3401. This provision, dealing with the elimination of dangerous conditions, should be at the top of the chapter, as proposed, because it has broad applicability throughout Chapter 34, not just in the Repairs subsection.

Cost Impact: No cost increase.

ICCFILENAME: BONOWITZ-G10-3401.6.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The code change appropriately relocates the section on dangerous conditions to the beginning of Chapter 34 to reflect its broad applicability.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael L. Perrino, Code Consultants, Inc., representing self, requests Disapproval.

Commenter's Reason: This change is overly broad. Section 3401.2 already covers maintenance of buildings. Dangerous conditions created by existing materials are already covered in Section 3401.4.1. Within the context of its original location in Section 3405, the relocated language limits the application of the concept of 'dangerous' to those conditions defined in Section 3402.1 relating to structural and/or nonstructural damage.

This change gives the official no guidance as to what constitutes a dangerous condition outside the context of the sections cited above. This change will create conditions for wildly inconsistent code enforcement, defeating one of the main goals for the development and adoption of building codes.

Final Action: AS AM AMPC____ D

G199-09/10

3410.1, 3410.2 through 3410.8 (New)

Proposed Change as Submitted

Proponent: Patrick Vandergriff, Vandergriff Code Consulting Services, representing Modular Building Institute

1. Delete text as follows:

~~**3410.1 Conformance.** Structures moved into or within the jurisdiction shall comply with the provisions of this code for new structures.~~

2. Add new section as follows:

3410.1 General. The relocation of any building to another location where the effects of wind, snow, flood or seismic provisions is greater than the percentage of increased loads allowed by this section relocated buildings shall comply with the requirements of Sections 3410.2 and Section 3410.8.

3410.2 Location on the lot. The building shall be located on the lot in accordance with the requirements of this code, or the *International Residential Code,* as applicable.

3410.3 Foundation. The foundation system of relocated buildings shall comply with Chapter 18, or the *International Residential Code* as applicable.

Exception: Foundations for modular structures are permitted to be of any materials allowed by the code and installed in accordance with either:

1. The manufacturers design requirements; or
2. An approved engineered design.

3410.3.1 Connection to the foundation. The connection of the relocated building to the foundation shall comply with Chapter 18, or the *International Residential Code,* as applicable.

3410.4 Wind loads. Buildings shall comply with Section 1609, or *International Residential Code* wind provisions, as applicable.

Exceptions:

1. Detached one- and two-family dwellings and Group U occupancies where wind loads at the new location are not higher than those at the previous location.
2. Structural elements whose stress is not increased by more than 5 percent.

3410.5 Seismic loads. Buildings shall comply with Section 1613, or *International Residential Code* seismic provisions, as applicable, to the new location.

Exceptions:

1. Structures in Seismic Design Categories A and B and detached one- and two-family dwellings in Seismic Design Categories A, B, and C where the seismic loads at the new location are not higher than those at the previous location.
2. Structural elements whose stress is not increased by more than 5 percent.

3410.6 Snow loads. Structures shall comply with Section 1608, or *International Residential Code* snow loads, as applicable, where snow loads at the new location are higher than those at the previous location.

Exception: Structural elements whose stress is not increased by more than 5 percent.

3410.7 Flood hazard areas. If relocated or moved into a *flood hazard area*, structures shall comply with Section 1612.

3410.8 Required inspection and repairs. The building official shall be authorized to inspect, or to require approved professionals to inspect at the expense of the owner, the various structural parts of a relocated building to verify that structural components and connections have not sustained structural damage. Any repairs required by the building official as a result of such inspection shall be made prior to the final approval.

Reason: This corresponds to several code change proposals establishing more clear definition and use issue with modular construction. This language provides the same language of the International Existing Building Code, Chapter 12 provisions dealing with the relocation of structures.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: This text is a copy of IEBC Chapter 12. If this proposal is approved, the Code Correlation Committee will decide if IEBC or IBC will control these provisions.

ICCFILENAME: VANDERGRIFF-G7-3410.1 NEW.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: At the proponent's request, the committee disapproved the proposal. The proposal is in need of refinement to provide references other than the IRC; to consider if needed provisions were not included and reconsider it all of the repetitive code language and referencing to other sections are truly needed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Patrick Vandergriff, Vandergriff Code Consulting Services, representing Modular Building Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3410.2 Location on the lot. The building shall be located on the lot in accordance with the requirements of this code, ~~or the *International Residential Code,* as applicable~~.

3410.3 Foundation. The foundation system of relocated buildings shall comply with Chapter 18~~, or the *International Residential Code* as applicable~~.

Exception: Foundations for modular structures are permitted to be of any materials allowed by the code and installed in accordance with either:

1. The manufacturers design requirements; or
2. An approved engineered design.

3410.3.1 Connection to the foundation. The connection of the relocated building to the foundation shall comply with Chapter 18~~, or the *International Residential Code,* as applicable~~.

3410.4 Wind loads. Buildings shall comply with Section 1609, ~~or *International Residential Code* wind provisions, as applicable~~.

Exceptions:

1. Detached one- and two-family dwellings and Group U occupancies where wind loads at the new location are not higher than those at the previous location.
2. Structural elements whose stress is not increased by more than 5 percent.

3410.5 Seismic loads. Buildings shall comply with Section 1613~~, or *International Residential Code* seismic provisions, as applicable,~~ to the new location.

Exceptions:

1. Structures in Seismic Design Categories A and B and detached one- and two-family dwellings in Seismic Design Categories A, B, and C where the seismic loads at the new location are not higher than those at the previous location.
2. Structural elements whose stress is not increased by more than 5 percent.

3410.6 Snow loads. Structures shall comply with Section 1608~~, or *International Residential Code* snow loads, as applicable,~~ where snow loads at the new location are higher than those at the previous location.

Exception: Structural elements whose stress is not increased by more than 5 percent.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: At the code committee hearings I discussed the need for this change to the code and then requested that it be disapproved to allow me time to make changes to the language to eliminate the references to the International Residential Code, IRC, as it was too late to submit a modification in writing in the manner prescribed. This language corresponds to the language in the International Existing Building Coded, IEBC, chapter 12 provisions on relocation of structures.

Final Action: AS AM AMPC____ D

G200-09/10

3411.8.8 (IEBC [B] 310.8.8)

Proposed Change as Submitted

Proponent: Karen L. Braitmayer, FAIA, Studio Pacifica, Ltd, representing self

Revise as follows:

3411.8.8 (IEBC [B] 310.8.8) Type A dwelling or sleeping units. Where more than 20 Group R-2 *dwelling* or sleeping units are being <u>altered or</u> added, the requirements for Section 1107 for Type A units apply only to the quantity of spaces being <u>altered or</u> added.

Reason: This proposal retains language that has been in the IBC since 2003. Loss of this language in the 2009 reduces the percentage of Type A housing stock required by IBC.

Cost Impact: This code change will increase the cost of construction.

Analysis: The correlative text in the International Existing Building Code is in Sections 605.1.9 and 706.4.

ICCFILENAME:Braitmayer-G1-3411.8.8

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: It is not clear what level of alteration is required within a dwelling unit before the unit would be expected to comply with Type A dwelling unit requirements.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dominic Marinelli, representing United Spinal Association, requests Approval as Submitted.

Commenter's Reason: United Spinal supports the availability of the more wheelchair friendly apartments (Type A) for it's members. What is being requested is minimal. These Type A units are only requested in facilities where more than 20 units are being altered at one. If they Type A units are already in the complex, there would be no requirements for additional Type A units (per Section 3411.3).

It is also important to note that right now IBC Section 3411.8.8 is copied as IEBC Section 310.8.8 (which addresses only when units are added). IEBC Section 605.1.9 includes a requirement for Type A units when units are being altered. IEBC Section 706.4 is a requirement for when Type A units when units are being added. It is confusing to users of the IEBC why these requirements are not coordinated between Chapters 3, 6 and 7.

Final Action: AS AM AMPC____ D

G208-09/10
Table 602

Proposed Change as Submitted

Proponent: John Berry, AIA – CR architecture + design (formerly Cole & Russell Architects) - representing self

Revise as follows:

TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED UPON FIRE SEPARATION DISTANCE [a,e,h]

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H[f]	OCCUPANCY GROUP F-1, M, S-1[g]	OCCUPANCY GROUP A, B, E, F-2, I, R, S-2[g], U[b]
X <5[c]	All	3	2	1
5 < X < 10	IA	3	2	1
	Others	2	1	1
10 < X < 30	IA, IB	2	1	1[d]
	IIB, VB	1	0	0
	Others	1	1	1[d]
X ≥ 30	All	0	0	0

(No Change to footnotes "a" through "g")

h. Where Table 705.8 permits exterior walls to contain unprotected openings with no limit of the allowable area, the required fire resistance rating for the exterior walls is 0 hours.

Reason: Currently Table 705.8 allows unlimited openings in a building suppressed per NFPA 13 and a fire separation distance as small as 20 feet. However Table 602 would still require the exterior wall to be rated 1 hour. This is a contradiction and makes no sense; why would I rate an exterior wall per Table 602 when that wall could be entirely open per Table 705.8. It is important to note that this would not apply to H-1, H-2 & H-3 Uses, as they are specifically exempted from this provision by footnote “i” to Table 705.8. This would only effect buildings w/ a fire separation distance equal to or greater than 20 feet. There would be no change to buildings with a fire separation distance less than 20 feet.

Cost Impact: The code change proposal will not increase the cost of construction.

Note: This code change was contained in the errata posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/09-10ProposedChanges.aspx.

ICCFILENAME: BERRY-G1-Table 602

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed footnote is so complex with so many references out of the section that this revisions would not make this provision simpler, but definitely more confusing. What happens to the framing needs to be addressed.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, City of Seattle Dept. of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

h. Where Table 705.8 permits nonbearing exterior walls ~~to contain~~ with unlimited area of unprotected openings ~~with no limit of the allowable area~~, the required fire-resistance rating for ~~the~~ those exterior walls is 0 hours.

(Portions of proposal not shown remain unchanged)

Commenter’s Reason: Tables 705.8 and 602 are in conflict. Table 705.8 allows unlimited unprotected openings in exterior walls of a sprinklered building with a fire separation distance of 20 feet or greater. However, Table 602 may require those same exterior walls to be rated 1 hour. An exterior wall that is allowed to be entirely open per Table 705.8 should not be required to be rated by Table 602. With this modification, the footnote specifies that the exterior walls must be nonbearing in order to have the fire-resistance rating reduced to 0 hours, ensuring that load-bearing exterior walls do not get this reduction for fire-resistance rating (which is consistent with Table 602 footnote “a” that states “Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.”) It is important to note that this new footnote would have no effect on H-1, H-2 & H-3 occupancies, as they are specifically exempted from unlimited openings by Table 705.8 footnote “i”. This new footnote would only affect buildings with a fire separation distance greater than 20 feet and less than 30 feet. There would be no change to buildings with a fire separation distance less than 20 feet.

Final Action: AS AM AMPC____ D

FS2-09/10
701.2 (New)

Proposed Change as Submitted

Proponent: Stephen Thomas, Colorado Code Consulting, LLC, representing the Colorado Chapter

Add new text as follows:

701.2 Multiple use fire assemblies. Fire assemblies that serve multiple purposes in a building shall comply with all of the requirements that are applicable for each of the individual fire assemblies.

Reason: A single fire assembly can serve multiple purposes in a structure. For example, a fire barrier along a fire-resistant rated corridor would also serve as a fire partition. The current code does not provide any direction on what requirements apply to that assembly. The intent of this proposal is to clarify that the requirements for each of the different assemblies must be met. In the example above, an opening protective would need to comply with the not only the fire-resistance rating for a fire barrier, but also the smoke and draft control requirements for an opening in a fire partition.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal clarifies the current intent of the code by requiring compliance with all applicable code requirements for fire assemblies that serve multiple purposes.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephen Thomas representing Colorado Chapter ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

701.2 Multiple use fire and/or smoke assemblies. Fire and/or smoke assemblies that serve multiple purposes in a building shall comply with all of the requirements that are applicable for each of the individual fire assemblies.

Commenter's Reason: During the testimony in Baltimore, the committee identified a shortfall in the proposed language. It did not address smoke assemblies. Therefore, language has been added to confirm that this section would apply to fire and/or smoke assemblies. For example, a smoke barrier in a hospital that also serves as a fire barrier would need to comply with the requirements of both types of assemblies. This public comment does not change the overall intent or purpose of the proposed change.

Final Action: AS AM AMPC____ D

FS3–09/10
702.1

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council

Revise as follows:

JOINT. The ~~linear opening~~ void created at the interface in or between adjacent fire-resistance-rated ~~assemblies~~ building elements that is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

Reason: The purpose of this proposal is to clarify that a "Joint", as defined in the IBC, may or may not be linear, and that the Joint is not the "opening" between fire resistance rated assemblies, but rather the materials or methods used to treat these openings

Justification: "Joints" are interfaces created in or between building elements such as walls, floors, columns or other building items. A joint typically involves a continuous void at the interface of two or more distinct components. When joints are designed into a structure, they are intended to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading. However, joints are sometimes created as a result of building construction tolerances.

In fact, a Joint is never an "opening" as the current definition suggests, but instead they are the closures that go into the opening to provide continuity. The existing language in the definition already clarifies that the definition applies to both locations that are "… designed to allow independent movement" and also those created due to construction tolerances, and need to be treated. Consequently, the additional language addresses' that portion of the scope of the definition.

.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CRIMI-FS6-702.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Using the term "building elements" limits the scope of the definition, based on the definition of building elements. Further, the term "linear opening" is specific and descriptive and should remain in the definition. Also, the term "linear" is consistent with terminology used in the referenced standards dealing with joints. Lastly, the term "void" is too broad.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

JOINT. The opening ~~void created at the interface~~ in or between adjacent fire-resistance-rated assemblies ~~building elements~~ that is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

Commenter's Reason: This code change proposal clarifies that joints between fire resistance rated assemblies exist not only for the purposes of relative movement, but due to other reasons as well. The joint protection methods apply equally to all such gaps, regardless of why they exist. The term "Joint", as utilized in Chapter 7, relates to the protective systems installed in gaps, joints, voids, or other discontinuities between (or bounded by) two or more supporting elements even when the opening is created due to building tolerances. Joints are present in buildings by design, to accommodate various movements induced by thermal differentials, seismicity, and wind loads, but they also exist as a clearance separation, or due to acceptable dimensional tolerances between two or more building elements, for example, between non-loadbearing walls and floors. Inadequate design, inaccurate assembly, repairs or damage to the building can also create a need to install joint systems. All of these are still required to be protected when they are located in or between fire-resistance rated assemblies

The proposed language presented here is consistent with the test standards used to test fire-resistant joint systems.

Final Action: AS AM AMPC____ D

FS4-09/10
703.4

Proposed Change as Submitted

Proponent: Tony Crimi, AC Consulting Solutions Inc., representing International Firestop Council

Add new text as follows:

703.4 Automatic sprinklers. The fire resistance rating of a building element, component or assembly shall be established without the use of automatic sprinklers or any other fire suppression system being incorporated as part of the assembly tested in accordance with the fire exposure, procedures, and acceptance criteria specified in ASTM E119 or UL 263.

(Renumber subsequent sections)

Reason: There is a potential for misuse of established fire-resistance test Standards relied upon in the Code to determine performance of elements and assemblies, wherein the established consensus test method are modified outside the scope of the test standard to include a flow of cooling water during the fire exposure portion of the test.

Since some material manufacturers have begun to submit test reports to Authorities Having Jurisdiction with fire-resistance ratings obtained using a flow of cooling water during the fire test, it now becomes important to clarify that the code-required fire resistance rating is in fact a property that is meant to represent the inherent resistance to fire without the assistance of cooling flows. In countless instances, the code already incorporates the risk-reducing effect of a cooling flow from an extinguishing system by reducing the fire-resistance requirements, or by reducing other required safety measures.

The possibility of reducing some code requirements based on the improved behavior of an assembly when subjected to a cooling water flow can already be done via Alternative protection methods as allowed by Section 104.11, or by evaluation as a performance-based option. Thus, the only impact of this code change is to prevent a manufacturer of products from claiming an inflated fire resistance rating. The code change would not restrict anyone from proving that the addition of a cooling and/or extinguishing water flow can reduce some other requirement in the code.

It has never been the intent of either the Codes or the fire resistance testing Standards to incorporate the fire suppression system as part of the fire resistance rating of a building element, component or assembly. It would not be acceptable to have a fire-resistance rating that is determined during a test using a cooling flow, since the need for a fire resistive assembly is usually required by the Code in order to provide a an inherent passive level of fire protection. The notion of multiple safeguards and “Balanced Fire Protection” is not new to the Codes. It has long been a basic tenet that the design of every building or structure intended for human occupancy shall be such that reliance for safety to life does not depend solely on any single safeguard. Additional safeguards are provided for life safety in case any single safeguard is ineffective due to inappropriate human actions or system failure.

The resulting cooling-enhanced fire resistance rating then provides a result that would be incompatible with the required fire resistance ratings specified throughout the I-Codes. The various fire resistance ratings mandated throughout dozens of articles in the Code have been established based on an assumption of the type of construction that would pass the standardized tests without the aid of water cooling during fire exposure. For example, a relatively thin and un-insulated metal panel wall with suitable water cooling could potentially be arranged to pass a 1-hour standardized fire-resistance test, and possibly even longer duration fire-resistance tests. However, where the Code specifies the need for a 1-hour assembly, the intent in the development of that code provision would have clearly been to have an assembly that could survive a fire without being breached and without losing any load-bearing capabilities all by itself, without relying on an external water source for continued cooling. If sprinkler protection was also required for such an occupancy, then the overall intent of the Code is to have these two systems act independently, but in concert with each other.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Standards ASTM E119 and UL 263 are currently referenced in the I-codes.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: CRIMI-FS3-703.4

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee agreed that passive and active fire protection should not be used together, specific to ASTM E119 and UL263 testing. Further, code officials should not be attempting to determine if a proposed test completely meets the requirements of test methods ASTM E119 or UL263. Lastly, adhoc tests that combine active and passive systems are not prohibited and can be reviewed and approved by the code official as alternative methods under Section 104.11 of the code.

Assembly Action: None

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jeffrey M. Shapiro, P. E., International Code Consultants, representing TYCO Fire Suppression and Building Products, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

703.4 Automatic sprinklers. Under the prescriptive fire resistance requirements of the *International Building Code*, ~~T~~the fire resistance rating of a building element, component or assembly shall be established without the use of automatic sprinklers or any other fire suppression system being incorporated as part of the assembly tested in accordance with the fire exposure, procedures, and acceptance criteria specified in ASTM E119 or UL 263. However, this section shall not prohibit or limit the duties and powers of the *building official* allowed by Sections 104.10 and 104.11.

Commenter's Reason: The additional text is a necessary clarification of the new section, and it is consistent with the committee's stated intent to not limit use of Section 104 for approving alternative methods on a case by case basis. The proponent of this code proposal also stated at the hearing that the addition of this section was clarification of the existing prescriptive code requirements for established fire-resistance test standards, and was not intended to usurp the ultimate authority of the code official's powers under Section 104, "Duties and Powers of Building Official".

Nevertheless, as the section is currently written, use of Section 104 would not be permissible since it would directly violate the requirements in Section 704.3. If the code says "you can't use sprinklers as part of the test criteria…period," then one can't simply go to Section 104 and count sprinklers. It is understood that having the code simply accept the use of fire sprinklers as a consideration in any fire resistance test is inappropriate, except on a case-by-case basis when approved by the Code Official, and for that reason, we are not opposing the intent of the proposal, just the text. With the recommended modifications, code application will be clarified in a manner that seems to satisfy all interests that were expressed in Baltimore.

Public Comment 2:

Gene Boecker, Code Consultants, representing The National Association of Theatre Owners, requests Disapproval.

Commenter's Reason: Although not mentioned by name in the reason statement, the obvious subject of this proposal is ICC ESR-2397. No official is forced to accept ESR-2397, because it does not constitute a listed assembly. It is a tested assembly that can be submitted to the code official for approval as an alternative method in accordance with Section 104.11. Section 104.11 specifically requires the submittal of research reports to assist the official in making a decision on the approval of a material or assembly.

The decision for many years was, appropriately, the code official's. Now the ability to selectively apply this alternative, at the official's discretion, will be taken away, despite the proponent's argument to the contrary.

Note that the proposal included no actual data regarding failures of this type of system. Also, note that the code itself allows sprinklered glazing in a number of applications (atrium enclosures, pedestrian walkway separations) as a direct equivalent method for fire resistive rated assemblies. These allowances have been in the codes for years and have not proven to be present an undue hazard.

This change, if allowed to move forward, will place a prohibition on a system that has been used successfully in jurisdictions across the country for many years. It will also create confusion for systems where sprinklers are specifically addressed, as noted above. Based on the language of ESR-2397and Section 104.11, in every case where this system has been used it was ultimately the official's decision that this system constituted an equivalent method for the protection of whatever building separation element the ESR-2397 compliant system was being proposed to protect.

Appropriate limitations on its use are therefore based on the reasonable consideration of the building official, regardless of the proposed use. Unfortunately, what this code change will do is take this decision away from the building official, and add language to the code that will inhibit any future development of this type of technology.

Final Action: AS AM AMPC____ D

FS5–09/10

703.4.1

Proposed Change as Submitted

Proponent: Richard Porter and Robert Sullivan, cfiFOAM, Inc., representing themselves

Revise as follows:

703.4.1 Elementary materials. Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

Exception: Where foam plastic insulation is encased within either the core cells of concrete masonry wall assemblies or within the core spaces of precast hollow core concrete panel wall assemblies, the potential heat of the foam plastic insulation shall be determined in accordance with NFPA 259 and the results shall be expressed in Btu per square feet (MJ/m^2).

Reason: Section 2603 FOAM PLASTIC INSULATION makes no reference to ASTM E 136 but instead points to the significance of testing in accordance with NFPA 259 to measure the potential heat contribution of the foam plastic insulation incorporated into a wall or panel.

On one hand, NFPA 259 data shows that foam plastic insulation contributes very little fuel per square foot (MJ/W) of wall or panel area by virtue of its very low density; therefore, the presence of foam plastic insulation has little or no impact upon the fire resistance performance of a wall or panel assembly.

In measuring fuel contribution per wall or panel area, NFPA 259 data provides superior information vs. ASTM E 136 which provides only pass/fail criteria having to do with temperature rise and the fragility of foam plastic insulation.

On the other hand, foam plastic insulation offers resistance to heat flow as does any insulating material. By virtue of its encased presence within concrete masonry wall and precast concrete panel assemblies, the initial heat-up of assemblies exposed to fire is slightly retarded up to or until the point where the foam plastic insulation thermally degrades. This slight heat flow delay contributes slightly to the fire-rating of the wall assembly.

The positive contribution on the one hand is off-set by the negative contribution on the other hand.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Standard NFPA 259 is currently referenced in the I-codes.

ICCFILENAME: PORTER-SULLIVAN-FS1-703.4.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee agreed that Chapter 26 sufficiently deals with the requirements for foam plastic materials. Further, neither the proposed text nor the proposed test standard (NFPA 259) contains pass fail criteria. Therefore there is no guidance on what to do with the test results. Lastly, these requirements are in the wrong location as foam plastic materials are combustible materials.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael J. Wolfe, CE, M.J. Wolfe & Associates, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

703.4.1 Elementary materials. Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

Exception: Where foam plastic insulation is encased within a wall assembly by noncombustible materials such as concrete and steel ~~either the core cells of concrete masonry wall assemblies or within the core spaces of precast hollow core concrete panel wall assemblies~~, the potential heat of the wall assembly ~~foam plastic insulation~~ shall be determined in accordance with NFPA 259 and the results shall be expressed in Btu per pound (kJ/kg). ~~square feet (MJ/m^2)~~

Commenter's Reason: This commenter agrees that the NFPA 259 test protocol should be used to determine the Potential Heat released by a building material and included under section 703.4 as an additional means of qualifying a building material as either a non-combustible, limited-combustible or combustible material. The NFPA 259 test expresses the Potential Heat of a particular material in btu/lb. and is a superior test method for proving combustibility and fire performance characteristics than the ASTM E-136 test, which provides only pass/fail criteria.

However, the commenter recommends that the test results be expressed in btu/lb, as per the NFPA 259 Standard Test Method for Potential Heat of Building Materials, which can then be converted to btu/sq. ft. by mathematical calculation.

Final Action: AS AM AMPC____ D

FS7-09/10
703.6

Proposed Change as Submitted

Proponent: Valarie Loper, City of North Las Vegas Building Safety

Revise as follows:

703.6 Marking and identification. Fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

1. Be located in accessible concealed floor floor-ceiling or attic spaces;
2. Be ~~repeated~~ located with in 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144mm) measured horizontally along the wall or partition; and
3. Included lettering not less than 3 inches (76 mm) ~~0.5 inch (12.7mm)~~ in height in a contrasting color incorporating the suggested wording. "FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS" or other wording.

> **Exception:** Walls in Group R-2 occupancies that do not have a removable decorative ceiling allowing access to the concealed space.

Reason: I believe this is a needed code to assist in maintaining the integrity of fire resistive construction. The change to a larger size of3 Inches will better ensure that the lettering will be seen by the contractors and subcontractors that will be creating unprotected openings in protected assemblies. The contrasting color will regulate that the lettering be installed in a color that will contrast the base color of the assembly also ensuring a better chance of this identification being achieved. To install this lettering within 15 feet of the end of each wall will also aid in the ability of the persons remodeling the existing wall to be informed of the need to protect any openings made. The maintaining of a fire resistive assembly is as important as the creating of the assembly was to begin with.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: LOPER-FS1-703.6.doc

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

703.6 Marking and identification. Fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

1. Be located in accessible concealed floor floor-ceiling or attic spaces;
2. Be located with in 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144mm) measured horizontally along the wall or partition; and
3. Included lettering not less than 3 inches (76 mm) in height with a minimum 3/8 inch (9.5 mm) stroke in a contrasting color incorporating the suggested wording. "FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS" or other wording.

Exception: Walls in Group R-2 occupancies that do not have a removable decorative ceiling allowing access to the concealed space.

Committee Reason: The committee agreed that the closer spacing and larger letter height would aid in enforcement of these provisions. The modification provides for consistent letter sizing, which again will aid in enforcement of these provisions.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International requests Approval as Modified.

Further modify the proposal as follows:

703.6 Marking and identification. Fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

1. Be located in accessible concealed floor floor-ceiling or attic spaces;
2. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144mm) measured horizontally along the wall or partition; and
3. Include lettering not less than <u>1 inch (25 mm)</u> ~~3 inches (76 mm)~~ in height ~~with a minimum 3/8" (9.5 mm) stroke~~ in a contrasting color incorporating the suggested wording. "FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS" or other wording.

Exception: Walls in Group R-2 occupancies that do not have a removable decorative ceiling allowing access to the concealed space.

Commenter's Reason: The current code provision, new to the 2009 edition, requires 1/2" high characters. This code change increased the minimum height to 3". While this might make sense on a wall where the marking would be observed from a distance away (such as high on an exposed wall, or on a large exposed wall in an equipment room), the provision does not require the markings in locations likely to be viewed from any significant distance. The markings are required only in concealed spaces, where someone is likely to be poking their head up through an opening into a small space. The proposed modification for minimum 1" characters is more than adequate for the short viewing distance that will occur for these markings. With shorter character height, the stroke width issue is less critical, and becomes an unnecessary complication for what is supposed to be a simple marking.

Final Action: AS AM AMPC____ D

FS9-09/10
704.2, 704.3, 704.4

Proposed Change as Submitted

Proponent: Sam Francis representing American Forest & Paper Association

Revise as follows:

704.2 Column protection. Where columns are required to be fire-resistance rated, the entire column shall be provided individual encasement protection by protecting it on all sides for the full column length, including connections to other structural members, with materials having the required fire-resistance rating. Where the column extends through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

<u>**Exception:** Columns complying with Section 602.4, 721.1 or 721.6.3</u>

704.3 Protection of the primary structural frame other than columns. Members of the primary structural frame other than columns that are required to have a fire-resistance rating and support more than two floors or one floor and roof, or support a load-bearing wall or a nonload-bearing wall more than two stories high, shall be provided individual encasement protection by protecting them on all sides for the full length, including connections to other structural members, with materials having the required fire-resistance rating.

Exception<u>s</u>:

<u>1.</u> Individual encasement protection on all sides shall be permitted on all exposed sides provided the extent of protection is in accordance with the required fire-resistance rating, as determined in Section 703.
<u>2.</u> <u>Members complying with Section 602.4, 721.1 or 721.6.3</u>

704.4 Protection of secondary members. Secondary members that are required to have a fire-resistance rating shall be protected by individual encasement protection, by the membrane or ceiling of a horizontal assembly in accordance with 712, or by a combination of both

704.4.1 Light-frame protection. King studs and boundary elements that are integral elements in load- bearing walls of light-framed construction shall be permitted to have required fire-resistance ratings provided by the membrane protection provided for the load-bearing wall.

<u>**704.4.2 Alternative protection.** Structural elements complying with Section 602.4, 721.1 or 721.6.3 shall not be required to comply with Section 704.4.</u>

Reason: Wood members of sufficiently large section to be considered heavy timber have never been required to be protected with a membrane in order to be considered heavy timber. There has been some confusion about the fire resistive properties of heavy timber as compared to the fire resistance of large members determined by the calculation methodology in Section 721. This confusion has led to a misapplication of Section 714 and its provision for protecting the member on all sides by materials having the required fire resistance. In the case of large wood members used in Type IV Construction as defined in Section 602.4, there is an inherent protection afforded the member by the char layer that forms as the timber is pyrolized. Table 601 recognizes this unique characteristic and distinguishes it from a fire resistance by utilizing the term “heavy timber” to describe this type of construction.

Moreover, the calculation methodology in Section 721 also relies on the insulating qualities of the char layer in order to calculate the size of member which will afford a sufficient sacrificial layer and still have adequate section to resist 100% of the required loads imposed on it. Accordingly, neither members complying with Section 602 nor members complying with Section 721 require further protection as required in Section 704. This code change is intended to make it clear that large wood members conforming to 602 or to 721 are not required to have this additional and redundant layer of protection.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FRANCIS-FS2-704.2

<u>Public Hearing Results</u>

Committee Action: Disapproved

Committee Reason: The committee felt that these provisions were confusing and should be located in charging text rather than in an exception. Further, it would be more appropriate for the provisions to be located where the code addresses heavy timber construction.

Assembly Action: None

<u>Individual Consideration Agenda</u>

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Sam Francis, representing the American Wood Council/AF&PA, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

602.4.1 Columns. Wood columns shall be sawn or glued laminated and shall not be less than 8 inches nominal, in any dimension where supporting floor loads and not less than 6 inches nominal in width and not less than 8 inches nominal in depth where supporting roof and ceiling loads only. Columns shall be continuous or superimposed and connected in an approved manner. <u>Protection in accordance with Section 704.2 is not required</u>.

Commenter’s Reason: It is widely understood that heavy timber does not require the encapsulation required of columns in Section 704 in order to achieve its inherent fire performance. The committee believed that the notation that such protection was not required would be better placed in the Heavy Timber section. This comment proposes to place the language in the location and in the manner suggested by the Fire Safety Code Development Committee.

Public Comment 2:

Jonathan Humble, AIA, representing the American Iron & Steel Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

704.2 Column protection. Where columns are required <u>to have protection</u> to be fire-resistance rated, the entire column shall be provided individual encasement protection by protecting it on all sides for the full column length, including connections to other structural members, with materials having the required fire-resistance rating. Where the column extends through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

~~**Exception:** Columns complying with Section 602.4, 721.1 or 721.6.3~~

704.3 Protection of the primary structural frame other than columns. Members of the primary structural frame other than columns that are required to have protection to achieve a fire-resistance rating and support more than two floors or one floor and roof, or support a load-bearing wall or a nonload-bearing wall more than two stories high, shall be provided individual encasement protection by protecting them on all sides for the full length, including connections to other structural members, with materials having the required fire-resistance rating.

Exception~~s~~:

~~1.~~ Individual encasement protection on all sides shall be permitted on all exposed sides provided the extent of protection is in accordance with the required fire-resistance rating, as determined in Section 703.
~~2. Members complying with Section 602.4, 721.1 or 721.6.3~~

704.4 Protection of secondary members. Secondary members that are required to have a fire-resistance rating shall be protected by individual encasement protection, by the membrane or ceiling of a horizontal assembly in accordance with 712, or by a combination of both

704.4.1 Light-frame protection. King studs and boundary elements that are integral elements in load- bearing walls of light-framed construction shall be permitted to have required fire-resistance ratings provided by the membrane protection provided for the load-bearing wall.

~~**704.4.2 Alternative protection**. Structural elements complying with Section 602.4, 721.1 or 721.6.3 shall not be required to comply with Section 704.4.~~

Commenter's Reason: This public comment addresses the concerns of the Code Committee in terms of eliminating the confusing language, and placing the provisions in the charging text rather than in an exception.

The pubic comment also generalizes the original proposal FS9-09/10 to cover not only heavy timber structural members, but all structural members that do not need protection in order to achieve a fire-resistance rating. This would correct an existing conflict within the code language that requires encasement, membrane or ceiling protection regardless of whether the fire resistance rated design required any protection or not.

Approval of this modification would address many types of tested and fire-resistance rated constructions that achieve fire resistance ratings without protection, such as:

Unprotected heavy timber members, rated in accordance with IBC section 721,
Unprotected reinforced concrete members, rated in accordance with IBC section 721,
Steel columns complying with IBC Table 720.1(1) item 1-9.1,
Unprotected concrete-filled tubular steel columns complying with ASCE-29, Section 5.2.3,
Unprotected concrete over steel deck floors, tested and rated in accordance with ASTM E119, and listed by testing agencies.

Final Action: AS AM AMPC____ D

FS11–09/10
705.2, TABLE 705.2 (New)

Proposed Change as Submitted

Proponent: Gary Lampella, City of Redmond, OR, representing Oregon Building Officials Association

1. Revise as follows:

SECTION 705
EXTERIOR WALLS

705.2. Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways shall also comply with Sections 1019 and 1026, respectively. Projections shall not extend beyond the distance determined by the following ~~three~~ two methods, whichever results in the lesser projection:

1. A point one-third the distance ~~from the exterior face of the wall~~ to the lot line ~~where protected openings or a combination of protected and unprotected openings are required in the exterior wall~~ from an assumed vertical plane in accordance with Table 705.2.
~~2. A point one-half the distance from the exterior face of the wall to the lot line where all openings in the exterior wall are permitted to be unprotected or the building is equipped throughout with an automatic sprinkler system installed under the provisions of Section 705.8.2.~~
2 ~~3.~~ More than 12 inches (305 mm) into areas where openings are prohibited.
3. For the purposes of determining allowable projections from buildings, the assumed vertical plane shall be measured at right angles from the lot line or, for buildings on the same lot, an imaginary line in accordance

with Section 705.3. Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this Section. The assumed vertical plane shall be parallel with the lot line or imaginary line.

2. Add new table as follows:

TABLE 705.2
ASSUMED VERTICAL PLANE (feet)

GROUP	TYPE I, II[a]	TYPE III, IV, V[a]
A, B, E, F-2, I, R, S-2, U	3	5[b]
M, S-1, F-1	5	10
H	15	20[c]

a. Based on type of construction in Chapter 6
b. I-2 occupancies are not permitted in Type VB construction
c. H-1 occupancies are not permitted in Type VB construction

3. Revise as follows:

705.2.3 Combustible projections. Combustible projections located ~~where openings are not permitted or where protection of openings is required~~ within 5 feet (1524 mm) of a lot line or imaginary line shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, fire-retardant-treated wood or as required by Section 1406.3.

Exception: Type V construction shall be allowed for R-3 occupancies.

Reason: This code change is necessary to clarify how far projections from a building can extend into the fire separation distance. The purpose is to completely disassociate this section from Table 705.8. The proposal returns this section to its original intent to regulate projections based on occupancy and construction type that was a provision of a legacy code. This is recognizing that different occupancies of differing construction types present different levels of hazards. For instance, projections from an H-2 occupancy present a higher risk than projections from an S-1 occupancy and should be regulated as such. This section has been widely interpreted and misapplied.

The provision for projections in Section 705.2 is language from a legacy code that had definite measurements for when openings were required to be protected and when they were prohibited based on occupancy and construction type. With Section 705.8 and Table 705.8, the absolute measurement that was used in the previous legacy code is no longer present. This makes it very difficult to apply and has created inconsistency in application. There is different terminology between the IBC and the legacy code that does not allow the user to adequately apply this section.

The legacy code also stated that the assumed vertical plane for protection of openings was when they were "first" required to be protected. IBC Table 704.8 does not have a provision where you can definitely apply this assumed vertical plane. Utilizing the provisions of Equation 7-2 in Section 704.8.4 for a non-sprinklered M occupancy of IIIB construction 7 feet from the lot line if the combination of protected and unprotected was less than or equal to 1, there would be some required protected openings in the wall. But looking at the Table 704.8, protected openings could be required at 10 feet from the lot line using the same equation. Does one measure the distance from wall and its location in relation to the lot line or from the point at 10 feet where openings would have been required if they would have used the same equation? Or from some other assumed vertical plane?

The philosophy of this code change is to line up with the recent code changes that have occurred with the Table 508.4, Table 602 and other sections of the code that have based their merit on similar and dissimilar risks as well as similar fuel loads of occupancies. We have taken the approach of using Table 508.4, Table 602 and Table 706.4 to develop this language. As you can see, we tried to fit the occupancies and their exterior wall fire rating from Table 602 into this new table.

By putting some actual measurements into the code, we believe that this will vastly improve the application and consistency in which projections are regulated.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LAMPELLA-FS1-705.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that this proposal did not clarify the requirements for allowable projections. Further, the committee was concerned about the use of the term fire separation distance in that it seemed to conflict with the code-defined term.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary Lampella, City of Redmond, representing Oregon Building Officials Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

705.2. Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways shall also comply with Sections 1019 and 1026, respectively. Projections shall not extend beyond the distance determined by one of the following ~~two~~ three methods. ~~, whichever results in the lesser projection:~~

1. In buildings not equipped throughout with an automatic sprinkler system installed under the provisions of Section 705.8.2, ~~A~~ a point one-third the distance from the exterior face of the wall to the lot line where protected openings or a combination of protected and unprotected openings are required in the exterior wall. ~~from an assumed vertical plane in accordance with Table 705.2.~~
2. In buildings equipped throughout with an automatic sprinkler system installed under the provisions of Section 705.8.2, or where all openings in the exterior wall are permitted to be protected, a point one-half the distance from the exterior face of the wall to the lot line.

~~2.~~ 3. More than 12 inches (305 mm) into areas where openings are prohibited.

~~3. For the purposes of determining allowable projections from buildings, the assumed vertical plane shall be measured at right angles from the lot line or, for buildings on the same lot, an imaginary line in accordance with Section 705.3. Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this Section. The assumed vertical plane shall be parallel with the lot line or imaginary line.~~

~~TABLE 705.2~~
~~ASSUMED VERTICAL PLANE (feet)~~

~~GROUP~~	~~TYPE I, II[a]~~	~~TYPE III, IV, V[a]~~
~~A, B, E, F-2, I, R, S-2, U~~	~~3~~	~~5[b]~~
~~M, S-1, F-1~~	~~5~~	~~10~~
~~H~~	~~15~~	~~20[c]~~

~~a. Based on type of construction in Chapter 6~~
~~b. I-2 occupancies are not permitted in Type VB construction~~
~~c. H-1 occupancies are not permitted in Type VB construction~~

705.2.3 Combustible projections. Combustible projections located where openings are not permitted or where protection of openings is required ~~within 5 feet (1524 mm) of a lot line or imaginary line~~ shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, fire-retardant-treated wood or as required by Section 1406.3.

Exception: Type V construction shall be allowed for R-3 occupancies.

Commenter's Reason: I was the original proponent of the current code language in this section that was approved in Palm Springs, CA in 2008. I purposely put in the provision for buildings that had an automatic sprinkler system throughout under the provisions of Section 508.2. That section gave credit to buildings that where equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and the exterior openings are protected by a water curtain using automatic sprinklers approved for that use. After reading the current code provisions and the requirement that projections are determined by the three methods, whichever results in the lesser projection, the second method could never be applicable because one-third is always going to be a lesser projection than one-half. This Public Comment is just to clarify the original intent of the code change.

The first method is applicable to buildings without the water curtains and sprinkler system and the second method is applicable to water curtains and sprinklers. The Table has been deleted and Section 705.2.3 has been returned to its original verbiage.

Analysis: Public comments to FS11 and FS12 propose differing revisions to Sections 705.2. The membership needs to make its preference clear with respect to these provisions. Further, public comments to FS11, FS12, and FS13 propose differing revisions to 705.2.3. The membership needs to make its preference clear with respect to these provisions.

Final Action: AS AM AMPC____ D

FS12-09/10
705.2, Table 705.2 (New), 705.2.3

Proposed Change as Submitted

Proponent: Stephen Thomas, Colorado Code Consulting, LLC representing the Colorado Chapter ICC

1. Revise as follows:

705.2 Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways shall also comply with Sections 1019 and 1026, respectively. ~~Projections shall not extend beyond the distance determined by the following three methods, whichever results in the lesser projection:~~ Projections shall not extend any closer to a lot line than permitted in Table 705.2.

Exception: Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section.

1. ~~A point one-third the distance from the exterior face of the wall to the *lot line* where protected openings or a combination of protected and unprotected openings are required in the *exterior wall*.~~
2. ~~A point one-half the distance from the exterior face of the wall to the *lot line* where all openings in the *exterior wall* are permitted to be unprotected or the building is equipped throughout with an *automatic sprinkler system* installed under the provisions of Section 705.8.2.~~
3. ~~More than 12 inches (305 mm) into areas where openings are prohibited. Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section.~~

2. Add new Table as follows:

Table 705.2
Minimum Distance of Projection from Lot Lines

Fire Separation Distance	Minimum distance from lot line
0 feet to less than 2 feet	Not Permitted
2 feet to less than 5 feet	24 inches
5 feet or greater	40 inches

3. Revise as follows:

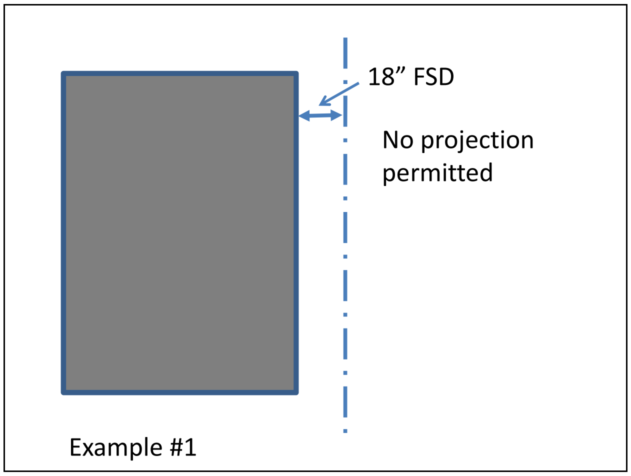
705.2.3 Combustible projections. Combustible projections ~~located where openings are not permitted or where protection of openings is required~~ extending to within 5 feet of the lot line shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, fire-retardant-treated wood or as required by Section 1406.3.

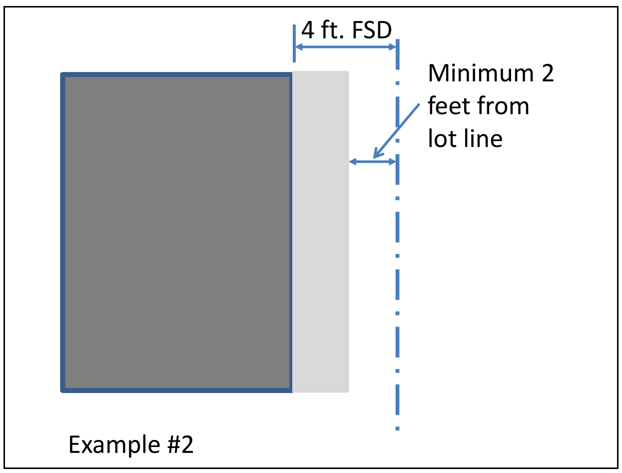
Exception: Type V construction shall be allowed for R-3 occupancies.

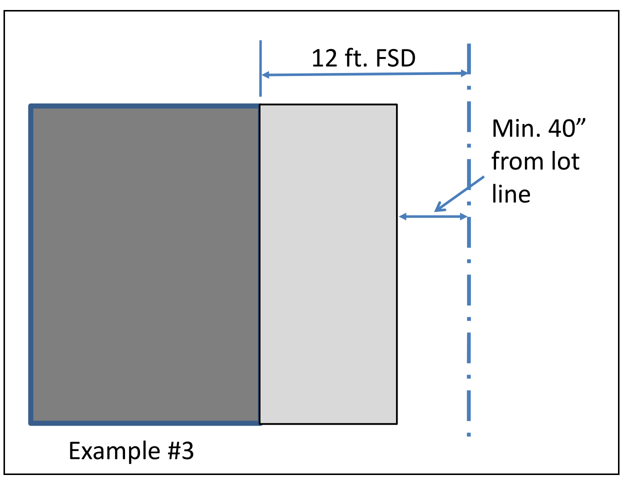
Reason: The current language outlining the requirements for projections is very confusing . Table 704.8 appears to have different distances where openings are required to be protected. However, when you really evaluate the table, the first option in Section 704.2 would occur at 5 feet (where openings are required to be protected) and the third option occurs at 3 feet (where openings are not permitted). The intent of this proposal is to simplify the requirement for determining the location of projections and when combustible projections are required to be protected. The proposal takes the language of the current first and third items and specifies the distance in a table format. The extent of the projection is now related to the fire separation distance. The 24-inch requirement is based on item 3 of the current language and the 40-inch requirement is based on option 1 of the current requirement.

Item 2 in the current language is confusing and actually makes the code more restrictive than the language in the 2006 IBC. For example if a building is located 22 feet from the lot line, the projection would only be allowed to extend to within 11 feet from the lot line. The 2006 IBC and this proposal would allow the projection to extend to a point no closer than 40 inches from the lot line. Therefore, the item has been deleted and not addressed in the table.

Examples of how this table would work are shown below.







Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Code change proposals FS12, FS13 and FS14 propose revisions to Section 705.2.3. The committee needs to make its intent clear with respect to these revisions.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal seems to allow for projections where the fire separation distance is 24 inches with no substantiation. Further, the committee was concerned about the use of the term fire separation distance in that it seemed to conflict with the code-defined term.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephen Thomas representing Colorado Chapter ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

705.2 Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways shall also comply with Sections 1019 and 1026, respectively. ~~Projections shall not extend any closer to a lot line than permitted in Table 705.2.~~ Projections shall not extend any closer to the line used to determine the fire separation distance than shown in Table 705.2

> **Exception:** Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section.

Table 705.2 Minimum Distance of Projection ~~from Lot Lines~~

Fire Separation Distance (FSD)	Minimum distance from ~~lot line~~ line used to determine FSD
0 feet to less than 2 feet	Projections not permitted
2 feet to less than 5 feet	24 inches
5 feet or greater	40 inches

705.2.1 Type I and II construction. Projections from walls of Type I or II construction shall be of noncombustible materials or combustible materials as allowed by Sections 1406.3 and 1406.4.

705.2.2 Type III, IV or V construction. Projections from walls of Type III, IV or V construction shall be of any approved material.

705.2.3 Combustible projections. Combustible projections extending to within 5 feet of the ~~lot line~~ line used to determine the fire separation distance shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, fire-retardant-treated wood or as required by Section 1406.3.

> **Exception:** Type V construction shall be allowed for R-3 occupancies.

Commenter's Reason: The intent of this proposal is to simplify the projection requirements in the code. Every time I meet with an architect or teach seminars on this subject, there is enormous confusion on what the projection section is saying. The current language is based on a legacy code that based the protection of exterior walls and associated openings on the occupancy and type of construction. The distances changed from occupancy to occupancy. The IBC does not base the protection on either. It bases it on the fire separation distance. Table 705.8 in the 2009 IBC makes the provisions even more confusing since it incorporates the sprinkler provisions in the code. The question that always comes up is "When are openings required to be protected?" and "When are openings not permitted?" The answer is they are required to be protected at 3-5 feet fire separation distance and prohibited at a 3 feet fire separation distance. So, if you use that premise, the current language allows the projection to extend 12 inches into the 3 foot fire separation distance or 1/3 the distance into the 5 foot separation distance which is 1 foot, 8 inches. That means that a projection cannot be any closer than 2 feet from or 3 feet, 4 inches (40 inches) from the interior lot line, the center of the street or the imaginary line between two buildings. What I did was take these answers an put them into a table.

The revision to Section 705.2.3 is the same. The current language states combustible projections have to be protected when openings are either not permitted or required to be protected. Again, where is that? The answer is again 5 feet because that is where openings are required to be protected. Therefore, the proposed language just states what the dimension is where the projection must be protected.

The committee was concerned that the provision would allow projections within 2 feet of a property line. The current language in the 2009 IBC does not permit projections within 2 feet of a property line. There was no intent of changing the requirements for these projections, only to clarify the current requirements. The table has been revised to specifically say that projections are not permitted when a building has a fire separation distance of less than 2 feet.

The committee was also confused about the use of the term fire separation distance in the table. The current code requirements are based on where opening are either prohibited or required to be protected in Section 705.8.1 and Table 705.8. The requirements in table 705.8 are based on the fire separation distance. Therefore, it seems logical that the dimension used in Table 705.8 be brought back into the projection section and the proposed table.

Analysis: Public comments to FS11 and FS12 propose differing revisions to Sections 705.2. The membership needs to make its preference clear with respect to these provisions. Further, public comments to FS11, FS12, and FS13 propose differing revisions to 705.2.3. The membership needs to make its preference clear with respect to these provisions.

Final Action: AS AM AMPC____ D

FS13-09/10
705.2.3

Proposed Change as Submitted

Proponent: Ali M. Fattah, City of San Diego, representing SD Area Chapter ICC Code Committee

Revise as follows:

705.2.3 Combustible projections. Combustible projections located where openings are not permitted, or where protection of openings is required or where a combination of protected and unprotected openings are required shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, fire-retardant-treated wood or as required by Section 1406.3.

> **Exception:** Type VB construction shall be allowed for combustible projections in R-3 occupancies with a fire separation distance greater than or equal to 5 ft (1524 mm).

Reason: The proposed change adds clarity to the IBC. Code change FS14-07/08 amended Section 704.2 to improve the code section to make clear when the length of projections is to be limited due to fire separation; the section was brought to the IBC from a legacy Code that did not include table like Table 704.8 where the area of openings is limited and protected openings are an option to include more openings in a an exterior wall based on fire separation distance within ranges of distance. The initial portion of the code change merely continues the effort that was started in the prior code change cycle and extends the same logic to this Section. Using the word "location" makes clear that if the projection falls within the distance range it is subject to the requirement.

ICC has indicated that they believe that Code intends only portions of the eave extending into the regulated area to be protected since the protection is intended to prevent ignition; additionally the IBC in Table 602 requires measurement of fire separation perpendicular to the face of a wall so it is possible for portions of a wall at an angle to be connected to portions of a wall that are not protected. The proposed code change does not seek to make a change to current practice insofar as the extent of the protection along the projection is concerned.

The exception has been amended to require the same level of protection as the IRC and eliminates ambiguity as to whether rated or non rated projections are required. Table R302.1 of the 2009 IRC requires eaves located at a fire separation distance less than 5 ft to be protected with one-hour construction on the underside. Both the 2009 IRC ad 2009 IBC require sprinkler protection in R-3 occupancies so the codes should be comparable.

Without changing the exception, the code user could conclude that an exposed 12 inch long wood eave located within 24 inches from a lot line and supported on an exterior one hour rated wall located 3 ft from a lot line is permissible which makes no sense. The IBC and IRC have increased the level of exterior fire protection due to fire separation distance recognizing the vulnerability of least protected occupancies such R-3 from conflagration hazards.

Cost Impact: This proposal will minimally impact the cost of construction.

Analysis: Code change proposals FS12, FS13 and FS14 propose revisions to Section 705.2.3. The committee needs to make its intent clear with respect to these revisions.

ICCFILENAME: FATTAH-FS1-705.2.3

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

705.2.3 Combustible projections. Combustible projections located where openings are not permitted, or where protection of openings is required or where a combination of protected and unprotected openings are permitted ~~required~~ shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, fire-retardant-treated wood or as required by Section 1406.3.

> **Exception:** Type VB construction shall be allowed for combustible projections in R-3 occupancies with afire separation distance greater than or equal to 5 ft (1524 mm).

Committee Reason: The committee agreed that the proposal provides for coordination with Section 705.3 and Section 705.2.3 by including projections located where a combination of protected and unprotected openings are permitted. Further, the revisions to the exception clarify that the intent of the exception is not to allow a combustible projection within 24 inches of a lot line. Lastly, the modification provides for consistent code terminology.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Ali M. Fattah, P.E, City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

705.2.3 Combustible projections. Combustible projections located where openings are not permitted, or where protection of openings is required or where a combination of protected and unprotected openings are permitted shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, *fire-retardant-treated wood* or as required by Section 1406.3.

Exception: Type VB construction shall be allowed for combustible projections in R-3 <u>and U</u> occupancies with a fire separation distance greater than or equal to 5 ft.

Commenter's Reason: The original code change inadvertently omitted Group U occupancies. The committee approved the code change with a modification to correct an error in the second sentence. Changes shown in double underline or double strike through were made by the committee or as a result of the correction shown in this public comment. We urge the voting governmental members support for this public comment. The "or where protection of openings is required or where a combination of protected and unprotected openings are permitted" had been added in the original code change as approved by the committee for consistency with the prior Section.

Public Comment 2:

Name: Maureen Traxler, representing City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

705.2.3 Combustible projections. Combustible projections located where openings are not permitted~~,~~ or where protection of <u>some</u> openings is required ~~or where a combination of protected and unprotected openings are permitted~~ shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, fire-retardant-treated wood or as required by Section 1406.3.

Exception: Type VB construction shall be allowed for combustible projections in R-3 occupancies with a fire separation distance greater than or equal to 5 ft (1524 mm).

Commenter's Reason:
Because protected openings are permitted wherever openings are allowed, the phrase "where a combination of protected and unprotected openings are permitted" actually means "where some percentage of openings are required to be protected and some unprotected openings are permitted." In the case of such a combination, some amount of protected openings are required so the second condition (where protection of openings is required) would apply. Therefore there is no need to indicate the combination as a separate condition.

Analysis: Public comments to FS11, FS12, and this public comment propose differing revisions to 705.2.3. The membership needs to make its preference clear with respect to these provisions.

Final Action: AS AM AMPC____ D

FS17–09/10
705.6

Proposed Change as Submitted

Proponent: Sam Francis representing American Forest & Paper Association

Revise as follows:

705.6 Structural stability. The wall shall extend to the height required by Section 705.11 and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required fire-resistance rating. <u>Interior structural elements which brace the exterior wall but are not within the plane of the exterior wall nor on the outside of it shall have the fire resistance rating required by Table 601.</u>

Reason: This section of the code is a direct descendent of the following section of the BOCA National Building Code which read in part:

Section 302.2.3 Method 3: The fire resistance rated wall shall be so constructed that it will remain structurally in place against an exterior exposing fire, for the duration of time indicated by the required fire resistance rating.

The 2006 IBC, Section 714.5, required all load-bearing structural members located within an exterior wall or exterior to it (outside of the exterior wall meaning outdoor side, not the enclosed side) to have the higher of the fire resistance ratings required for that element in:

(1) Table 601;
(2) Table 601 for the exterior bearing wall; or,
(3) Table 602 based upon fire separation distance.

It may be inferred from this requirement that load-bearing structural members located internally within the building need only have the fire resistance rating required of them in Table 601. The fire resistance ratings for exterior walls are based upon exterior exposure or conflagration. Thus, it is not reasonable to assume that because an interior element braces, to any extent, an exterior wall that it follows that the bracing element interior to that exterior wall must then have the same fire resistance rating as the exterior wall. The 2009 IBC has this requirement relocated to 705.6 and the base fire resistance requirements were "mixed with fire separation distance requirements" so the base requirement is not so readily discernable.

This proposal would clarify the intent of Section 705.6. It is clear that the code has a long standing provision which permits the various elements of a building for a given construction type to have differing fire resistance ratings based upon the function of the individual element and the duration of time deemed necessary for that element to continue to perform that function.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FRANCIS-FS1-705.6

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that referencing only Table 601 could lead to confusion, in that Table 602 should also be considered and may result in a higher fire resistance rating.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sam Francis representing American Wood Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

705.6 Structural stability. The wall shall extend to the height required by Section 705.11 and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required fire-resistance rating. Where exterior walls have a minimum fire separation distance of not less than 30 feet, interior structural elements which brace the exterior wall but which are not located within the plane of the exterior wall ~~nor on the outside of it~~ shall have the minimum fire resistance rating required in Table 601 for that structural element. Structural elements which brace the exterior wall but are located outside of the exterior wall or within the plane of the exterior wall shall have the minimum fire resistance rating required in Table 601 and Table 602 for the exterior wall.

Commenter's Reason: This section of the code is a direct descendent of the following section of the BOCA National Building Code which read in part:

Section 302.2.3 Method 3: The fire resistance rated wall shall be so constructed that it will remain structurally in place against an exterior exposing fire, for the duration of time indicated by the required fire resistance rating.

The 2006 IBC, Section 714.5 (now section 704.10 in IBC 2009) required all load-bearing structural members located within an exterior wall or exterior to it (outside of the exterior wall meaning outdoor side, not the enclosed side) to have the higher of the fire resistance ratings required for that element in:

(1) Table 601;
(2) Table 601 for the exterior bearing wall; or,
(3) Table 602 based upon fire separation distance.

It may be inferred from this requirement that load-bearing structural members located internally within the building need only have the fire resistance rating required of them in Table 601. The fire resistance ratings for exterior walls are based upon exterior exposure or conflagration. Thus, it is not reasonable to assume that because an interior element braces, to any extent, an exterior wall that it follows that the bracing element interior to that exterior wall must then have the same fire resistance rating as the exterior wall. The 2009 IBC has this requirement relocated to 705.6 and the base fire resistance requirements were "mixed with fire separation distance requirements" so the base requirement is not so readily discernable.

Following immediately in the 2009 IBC is 705.7 Unexposed surface temperature and then, later 705.11 Parapets. 705.7 specifically addresses the limitation on temperature rise on the unexposed surface of the exterior wall based on equivalent unprotected openings OR on fire separation distance. Fire separation distance is a response to exposure as indicated in the NBC section302.2.3 cited above. The conditions for parapets on exterior walls in 705.11 also is based on exposure.

This proposal would clarify the intent of Section 705.6. It is clear that the code has a long standing provision which permits the various elements of a building for a given construction type to have differing fire resistance ratings based upon the function of the individual element and the duration of time deemed necessary for that element to continue to perform that function. This means that any structural element interior to the exterior wall need only have the fire resistance rating of Table 601, Table 602 or an exterior wall for elements outside of the "unexposed face of the exterior wall".

Final Action: AS AM AMPC____ D

FS18–09/10
705.6

Proposed Change as Submitted

Proponent: Dennis Richardson PE, dbr group inc. representing self

Revise as follows:

705.6 Structural stability. The wall shall extend to the height required by Section 705.11 and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required *fire-resistance rating*.

Exceptions:

1. Building elements providing out of plane structural stability for fire-resistance rated exterior walls shall be considered to remain in place for 2 hours if they are one hour fire resistance rated or heavy timber construction and the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Building elements providing out of plane structural stability for fire-resistance rated exterior walls shall be considered to remain in place for 2 hours if they are one hour fire resistance rated or heavy timber construction and the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 and the fire-resistance rated exterior wall conforms with any of the conditions listed in the exception to Section 705.11 for parapets.
3. Building elements providing out of plane structural stability for fire-resistance rated exterior walls shall be considered to remain in place for 1 hour in construction that is not otherwise fire-resistance rated if the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
4. Building elements providing out of plane structural stability for fire-resistance rated exterior walls shall be considered to remain in place for 1 hour in construction that is not otherwise fire-resistance rated if the building equipped with an automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 and the fire-resistance rated exterior wall conforms with any of the conditions listed in the exception to Section 705.11 for parapets.

Reason: Section 705.6 which requires structural stability of exterior fire resistance rated walls is rarely, if ever, enforced because it provides no criteria for "sufficient structural stability" and does not consider protection to supporting elements provided in part by automatic sprinkler systems and partially by passive fire resistance. An informal phone survey of a number of building officials and code consultants including review of numerous interpretation manuals did little to shed light on the application of this section. Lack of enforcement and a wide range of interpretations justifies this section needs to be clarified or removed from the code.

The proposed exceptions are superior to the existing code language because they provide a prescriptive way to address the intent of this code section giving credit to the combination of fire sprinklers and passive fire resistance of one hour fire restive or heavy timber construction. Credit is given for NFPA 13 systems referenced in 903.3.1.1 and NFPA 13R or 13D systems referenced in 903.3.1.2 or 903.3.1.3 of the IBC.

Footnote c. of Table 601 refers to heavy timber construction as an equivalent to one hour fire resistance rated construction.

Footnote d. of table 601 allows non rated construction with a NFPA 13 sprinkler system throughout to be substituted for 1-hour fire-resistance rated construction provided the system is not otherwise required by the other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. Footnote c. goes on to state the 1-hour substitution for the fire resistance of exterior walls is not permitted.

This proposed code change does not provide an exception to the fire resistance rating for the exterior wall itself or for the elements providing vertical support of the wall. The code proposal only clarifies the anticipated effectiveness and required protection of secondary structural elements providing out of plane stability for the fire resistance rated exterior wall. As such the proposed use of the proposed exceptions would not disqualify the use of sprinklers for allowable area or height increases.

This proposed code change relies on NFPA 13R and 13D sprinkler systems when used for residential construction. It is acknowledged these systems are based on lower water flow than a NFPA 13 system and do not require sprinkler heads in attic areas. However residential construction typically is highly compartmentalized typically with one hour construction between multi-family units and noncombustible interior finish materials and a great deal of structural redundancy. Because of the lack of sprinkler heads in attic areas, the proposed exceptions as written for 13R and 13D systems only apply if the fire-resistance rated exterior wall conforms with any of the conditions listed in the exception to Section 705.11 for elimination of parapets. These exceptions for parapets either rely on additional passive fire resistance in lieu of a parapet or are limited by size or location of the structure.

In addition to this change, a proposal is also being submitted to add Section 1604.14 to establish out of plane structural design criteria for the instances where these exceptions would not apply.

The author of this proposed code change acknowledges there is little data or full scale research to specifically address this issue however the current code language provides absolutely no basis or guidance whatsoever as to the intent or application of this code section. Because of the wide variety of configurations materials and conditions and the need to show performance of structural stability during a wide variety of fire conditions, it is not clear how a structural engineer would provide a rational analysis if requested under the present code language.

Because of this Section 705.6 appears to be almost universally ignored by designers and code officials alike. At a minimum, this code change proposal is intended to provide a reasonable basis (or at minimum a starting point for a healthy discussion) for consistent application and enforcement acknowledging the contributions of both active systems and passive fire-resistance construction.

Cost Impact: Since the proposed code change incorporates exceptions to be utilized if desired by the designer, it is anticipated this change would result in a cost savings.

ICCFILENAME: RICHARDSON-FS1-705.6

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt more substantiation was required to justify this sprinkler trade-off and to clarify why in some cases an NFPA 13R or NFPA 13D system are considered appropriate protection to allow the trade-off.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dennis Richardson PE, CBO, Building Official, City of Salinas, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

705.6 Structural stability. The wall shall extend to the height required by Section 705.11 and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required *fire-resistance rating*.

Exceptions:

1. Building elements providing out of plane structural stability for fire-resistance rated exterior walls shall be considered to remain in place for 2 hours if they are one hour fire resistance rated or heavy timber construction and the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
~~2. Building elements providing out of plane structural stability for fire-resistance rated exterior walls shall be considered to remain in place for 2 hours if they are one hour fire resistance rated or heavy timber construction and the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 and the fire-resistance rated exterior wall conforms with any of the conditions listed in the exception to Section 705.11 for parapets.~~
2. ~~3.~~ Building elements providing out of plane structural stability for fire-resistance rated exterior walls shall be considered to remain in place for 1 hour in construction that is not otherwise fire-resistance rated if the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
~~4. Building elements providing out of plane structural stability for fire-resistance rated exterior walls shall be considered to remain in place for 1 hour in construction that is not otherwise fire-resistance rated if the building equipped with an automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 and the fire-resistance rated exterior wall conforms with any of the conditions listed in the exception to Section 705.11 for parapets.~~

Commenter's Reason: Section 705.6 requires exterior fire resistance rated walls to have sufficient structural stability to keep the exterior wall in place for the duration of the fire resistance rating of the wall. The code gives no criteria for "sufficient structural stability" and does not consider protection to supporting elements provided in part by automatic sprinkler systems and partially by passive fire resistance.

Since horizontal floor and roof diaphragms and perpendicular structural walls or frames typically provide out of plane structural stability for exterior walls, Section 705.6 would require them to continue to provide out of plane bracing for the wall for the same duration as the wall. In the case of two hour exterior walls, these elements providing out of plane bracing would need to be themselves rated for two hours or the wall would need to be designed to stand on it's own and remain stable out of plane for the duration of the rating of the exterior wall.

An informal phone survey of a number of building officials and code consultants including review of numerous interpretation manuals did little to shed light on the application of this section. Lack of enforcement and a wide range of interpretations justifies this section needs to be clarified in the code or practical alternatives identified. In cases where the building department did enforce the letter of the code, the staff at the department described a difficult argument and typically some sort of alternate method being utilized. This is especially true with multiple story buildings with two hour exterior walls.

A strict reading of this code section would practically prohibit Type II and III construction since one hour or non rated roof-ceiling and floor-ceiling assemblies would not remain in place for the duration of the two hour exterior wall rating.

A similar situation would affect exterior fire resistance rated walls parallel to the property line and perpendicular to the storefront for infill construction in any city. Table 602 requires the exterior fire rated wall within five feet of the property line to be 2 hour fire resistant rated for M, F1 and S1 occupancies regardless of the type of construction.

How many jurisdictions are requiring the floor-ceiling and roof-ceiling assembly providing out of plane support to be rated 2 hours in this condition?

This code change proposal would deem a one hour rated roof-ceiling assembly and/or floor-ceiling to be acceptable in a building that is protected throughout by a NFPA 13 sprinkler system. It would also accept non-rated framing providing out of plane support to a one hour wall if the building is protected throughout by a NFPA 13 sprinkler system.

Similar exceptions utilizing NFPA 13R and 13D systems (with limitations) have been removed from this proposal due to concerns about water supply and the placement of head in these life-safety systems.

The proposed exceptions are superior to the existing code language because they provide a prescriptive way to address the intent of this code section giving credit to the combination of fire sprinklers working together with passive fire resistance of one hour fire restive or heavy timber construction.

Footnote c. of Table 601 refers to heavy timber construction as an equivalent to one hour fire resistance rated construction.

Footnote d. of table 601 allows non rated construction with a NFPA 13 sprinkler system throughout to be substituted for 1-hour fire-resistance rated construction provided the system is not otherwise required by the other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. Footnote c. goes on to state the 1-hour substitution for the fire resistance of exterior walls is not permitted.

This proposed code change does not provide an exception to the fire resistance rating for the exterior wall itself or for the elements providing vertical support of the wall. The code proposal only clarifies the anticipated effectiveness and required protection of secondary structural elements providing out of plane stability for the fire resistance rated exterior wall. As such the use of the proposed exceptions would not disqualify the use of sprinklers for allowable area or height increases.

The author of this proposed code change acknowledges there is little data or full scale research to specifically address this issue however the current code language provides absolutely no basis or guidance whatsoever as to the intent or application of this code section. The requirement of 705.6 was not found in two of the three legacy codes and it appears no justification or testing was utilized to put this in the code. Common sense and reason by code officials should conclude that a two hour wall braced out of plane by a one hour roof-ceiling assembly in a fully sprinklered building does not pose a threat of collapse to fire fighters or a threat to the adjacent building.

In Summary this code change as modified by public comment provides reasonable relief from an unreasonable and often ignored code requirement that had its origins in only one of three legacy codes.

Final Action: AS AM AMPC____ D

FS20-09/10
705.8.6

<u>Proposed Change as Submitted</u>

Proponent: Homer Maiel, PE, CBO, City of San Jose**,** representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay)

Revise as follows:

705.8.6 Vertical exposure. <u>Opening protectives of buildings shall comply with this section.</u>

<u>705.8.6.1</u> Vertical exposure <u>for buildings on the same lot</u>. For buildings on the same lot, opening protectives having a *fire protection rating* of not less than 3/4 hour shall be provided in every opening that is less than 15 feet (4572 mm) vertically above the roof of an adjacent building or structure based on assuming an imaginary line between them. The opening protectives are required where the *fire separation distance* between the imaginary line and the adjacent building or structure is less than 15 feet (4572 mm).

Exceptions:

1. Opening protectives are not required where the roof assembly of the adjacent building or structure has a fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the exterior wall facing the imaginary line and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly has a fire-resistance rating of not less than 1 hour.
2. Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with Section 705.8.6<u>.1</u>.

<u>**705.8.6.2 Vertical exposure for buildings on separate lots.** When a new building or an addition is to be erected adjacent to an existing building, all openings in the exterior wall of the new building or addition are required to be not less than ¾ hour protectives when these openings are less than 15' vertically above the roof of the existing building or structure. The opening protectives are required where the distance between buildings or structures is less than 15' feet. When the roof of the new building or an addition is at lower elevation from the existing building, the roof construction of the new building or the addition shall have fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the exterior wall facing the existing building and the entire length and span of the</u>

supporting elements for the fire-resistance-rated roof assembly shall have a fire-resistance rating of not less than 1 hour. The roof protections are required where the distance between the buildings or structures is less than 15' feet.

Reason: A fire in a lower building that is adjacent to a taller building can be a source of fire exposure to openings in the taller building. Since fire does not differentiate between buildings on same lot or separate adjacent lots, the existing provisions for buildings on the same lot need to be expanded to cover buildings on separate lots too. The requirements for the buildings on the separate lots should not be different from those on the same lot. The buildings on the same lots are under one ownership and the imaginary property lines can be moved so that it will serve all buildings in the most efficient way.

On the other hand, the buildings on separate lots are under different ownerships. The property lines are legal property lines and can not be moved around. An existing building on one site should not dictate the design and construction of the future building nor a future building should not alter the design and construction of an existing building. In other words, between two neighboring buildings, whichever is built last will need to comply with requirements of this section. The 15-foot separation requirement between buildings on the separate lots, is consistent with the same requirement for buildings on the same lot.

Also not to leave out the additions to existing buildings, additions are also included in these requirements. So for the sake of argument, imagine that there are two existing buildings, with same height, on separate lots. If one building is adding more stories, then these requirements could apply to the windows of new stories.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Code change proposals FS20 and FS21 propose similar requirements for vertical exposure for buildings on separate lots. The committee needs to make its intent clear with respect to these revisions.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal is impractical to enforce based on verification of the conditions of an existing building. Further, the language is confusing in that it could be interpreted to be more restrictive for buildings on the same lot than for buildings on separate adjacent lots.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, PE, CBO, City of San Jose, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Chapters), requests Approval as Submitted.

Commenter's Reason: In Baltimore, the committee disapproved the proposal stating; "The proposal is impractical to enforce based on verification of the conditions of an existing building." It is unfortunate that this misconception was not clarified during the testimony before the committee, but the way the proposal is written there is NO requirement to obtain or verify ANY information regarding the construction of the neighboring existing building. Instead, only dimensional information is necessary. The two pieces of information needed to apply this provision are the horizontal distance between the new and existing buildings, and a vertical distance between the roof of the lower building (new or existing) and openings in the exterior wall of the neighboring building (new or existing). In addition, only the new building or new addition to an existing building must comply with the construction requirements of this provision.

If the new building or the addition is taller than the neighboring existing building, then the windows of the new building or the addition will need to be rated; irregardless of the type of the roof the existing neighboring building has. If the new building or the addition to an existing building is lower in height than the neighboring existing building, then the roof of the new building or the roof of the addition to an existing building will have to comply with these requirement; irregardless of the ratings of the windows on the existing neighboring building. No verification of the construction of the roof or windows, or any other portion of an existing building are necessary to apply these provisions.

To explain the paragraph above, a graphical illustration is presented. In Fig. 1, a multi story building is erected adjacent to a property which has an existing one-story building. A real, legal property line is shown as "PL". In this situation if L is less than 15', any openings in the new building (wall facing the PL) that are less than 15' (dimension H) above the roof of the existing building, are required to be rated not less than ¾ hour. In Fig. 2, a new one-story building is erected next to an existing multi-story building. If L is less than 15'and there are openings in the existing building that are less than 15' (H dimension) above the roof of the new building, the roof of the new building is required to be minimum 1 hour construction for at least 10' from the exterior wall (X dimension). In Fig. 3, an addition, in form of more stories, is made to an existing building. This creates the same situation as Fig 1. In Fig. 4, an addition is made to a single story building that is adjacent to an existing multi-story building. This creates the same situation as Fig. 2.

As it can be seen from these cases, at no time verification of the conditions of an existing building is warranted. Only dimensions L and H need to be established.

Analysis: Public comments to FS20 and FS21 contain similar provisions for vertical exposure for buildings on the same lot. The membership needs to make its preference clear with respect to these provisions.

Final Action: AS AM AMPC____ D

FS21-09/10
705.8.6, 705.8.6.1 (New), 705.8.6.2 (New)

Proposed Change as Submitted

Proponent: Gary Lampella, City of Redmond, Oregon, representing: Oregon Building Officials Association

Revise as follows:

705.8.6 Vertical exposure. <u>Opening protectives of buildings shall comply with this section.</u>

<u>705.8.6.1</u> Vertical exposure <u>for buildings on the same lot</u>. For buildings on the same lot, opening protectives having a fire protection rating of not less than 3/4 hour shall be provided in every opening that is less than 15 feet (4572 mm) vertically above the roof of an adjacent building or structure based on assuming an imaginary line between them. The opening protectives are required where the ~~fire separation~~ distance between the ~~imaginary line and the adjacent~~ building**<u>s</u>** or structure**<u>s</u>** is less than 15 feet (4572 mm).

Exceptions:

1. Opening protectives are not required where the <u>lower</u> roof assembly of the adjacent building or structure has a fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the exterior wall facing the imaginary line and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly has a fire-resistance rating of not less than 1 hour.
2. Buildings on the same lot and considered as portions of one building in accordance with Section 704.3 are not required to comply with Section 704.8.6.

<u>705.8.6.2 Vertical exposure for buildings on separate lots.</u> <u>When a new building is to be erected adjacent to an existing building, all openings in the exterior wall of the new building are required to be not less than ¾ hour when these openings are less than 15 feet (4572 mm) vertically above the roof of existing building or structure. The opening protectives are required where the distance between the buildings or structures is less than 15 (4572 mm) feet. When the roof of the new building is at lower elevation from the existing building, the roof construction of the new building shall have fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the exterior wall facing the new building and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly shall have a fire-resistance rating of not less than 1 hour. The roof protections are required where the distance between the buildings or structures is less than 15 feet (4572 mm).</u>

Reason: I was the original proponent in Palm Springs of a similar proposal that was approved by the Fire Safety Committee. The Committee agreed that buildings with a real property line should be treated the same as two buildings on the same lot in regards to vertical fire exposure. In Minneapolis there was a Public Comment submitted pointing out some flaws in the code change. Rather than attempt to keep it in the code I opted to ask ICC staff to simply withdraw it and I would work with the author of the Public Comment and come back with a new proposal in Baltimore.

The purpose of this submittal is clean up inconsistent provisions between buildings on the same lot with an imaginary line for fire separation distance and the lack of the same provision for buildings on adjacent lots with real property lines. The purpose of assuming an imaginary line between buildings on the same lot is to mirror the fire separation distance of those buildings with actual property lines and determining opening and wall protection. Currently, the provisions of buildings on the same lot with an imaginary line have more restrictive requirements than those buildings with a real line.

If one is concerned about fire spread from one building to another, should the provisions be the same for a real lot line as opposed to an imaginary one? Yes, we believe so. The probability of a fire spreading from one building to another via openings and fire separation distance to other buildings is the same regardless of real or imaginary lines. Based on the current code language, we can only assume that a recorded property line somehow adds an additional level of protection over and above an imaginary one.

We have divided this Section into three parts now. We are proposing to delete the language “imaginary line and the adjacent” in the Section 704.8.6.1 because it only addresses the fire separation for one building and ignores the other. There are many reasons to have fire separation from an imaginary line at different place and one building may have less than 15 feet of fire separation distance and the other may have 20. In this case the lower roof would be required to have a 1 hour roof assembly, which doesn’t make sense. The reference to “fire separation” is being deleted because we believe the crucial distance is the true distance between the buildings, which clears up the confusion over where the measurement is taken. We have also added the word “lower” in the first exception to make it clear that it is the lower roof that is required to be of 1 hour fire-resistive construction. Lastly, we have created a new Subsection 704.8.6.2 to address buildings and structures with real property lines.

Cost Impact: The code change proposal will not increase the cost of construction. There could be some minimal costs in providing the 1 hour roof assemblies.

Analysis: Code change proposals FS20 and FS21 propose similar requirements for vertical exposure for buildings on separate lots. The committee needs to make its intent clear with respect to these revisions.

ICCFILENAME: LAMPELLA-FS2-704.8.6

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal is impractical to enforce based on verification of the conditions of an existing building. Further, the language is confusing in that it could be interpreted to be more restrictive for buildings on the same lot than for buildings on separate adjacent lots. Also, Section 705.8.6.1 appears to reduce the distance between buildings from 30 feet to 15 feet without technical justification.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gary Lampella, City of Redmond, representing Oregon Building Officials Association, requesting Approval as Modified by Public Comment.

Modify the proposal as follows:

~~**705.8.6 Vertical exposure.** Opening protectives of buildings shall comply with this section.~~

705.8.6.~~1~~ Vertical exposure for buildings on the same lot. For buildings on the same lot, opening protectives having a fire protection rating of not less than 3/4 hour shall be provided in every opening that is less than 15 feet (4572 mm) vertically above the roof of an adjacent building or structure based on assuming an imaginary line between them. The opening protectives are required where the aggregate fire separation distance between the imaginary line and the adjacent buildings or structures is less than ~~15~~ 30 feet (~~4572~~ 9144 mm).

Exceptions:

1. Opening protectives are not required where the lower roof assembly of the adjacent building or structure has a fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the exterior wall facing the imaginary line and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly has a fire-resistance rating of not less than 1 hour.
2. Buildings on the same lot and considered as portions of one building in accordance with Section 704.3 are not required to comply with Section 704.8.6.

705.8.6.1 ~~2~~ Vertical exposure for buildings on separate lots. When a new building is to be erected adjacent to an existing building on a separate lot, opening protectives having a fire protection rating of not less than 3/4 hour shall be provided in every opening that is less than 15 feet (4572 mm) vertically above the roof of the existing building. ~~all openings in the exterior wall of the new building are required to be not less than ¾ hour when these openings are less than 15 feet (4572 mm) vertically above the roof of existing building or structure.~~ The opening protectives are required where the aggregate fire separation distance between the buildings or structures and the lot line is less than ~~15~~ 30 (~~4572~~ 9144 mm) feet. When the roof of the new building is at lower elevation from the existing building, the roof construction of the new building shall have fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the exterior wall facing ~~the new building~~ the lot line and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly shall have a fire-resistance rating of not less than 1 hour. The roof and supporting element protection~~s~~ are required where the aggregate fire separation distance between the buildings or structures and the lot line is less than ~~15~~ 30 feet (~~4572~~ 9144 mm).

Commenter's Reason: The Fire Safety Committee in Baltimore disapproved this code change based on three concerns.
1) was that it was impractical to enforce based on verification of the conditions of an existing building; and
2) the language is confusing in that it could be interpreted to be more restrictive for buildings on the same lot than for buildings on separate adjacent lots; and,
3) Section 705.8.6.1 appears to reduce the distance between buildings from 30 feet to 15 feet without technical justification.

The purpose of this submittal is clean up inconsistent provisions between buildings on the same lot with an imaginary line for fire separation distance and the lack of the same provision for buildings on adjacent lots with real property lines. The purpose of assuming an imaginary line between buildings on the same lot is to mirror the fire separation distance of those buildings with actual property lines and determining opening and wall protection. Currently, the provisions of buildings on the same lot with an imaginary line have more restrictive requirements than those buildings with a real line.

If one is concerned about fire spread from one building to another, should the provisions be the same for a real lot line as opposed to an imaginary one? Yes, we believe so. The probability of a fire spreading from one building to another via openings and fire separation distance to other buildings is the same regardless of real or imaginary lines. Based on the current code language, we can only assume that a recorded property line somehow adds an additional level of protection over and above an imaginary one.

The change to Section 705.8.6 is to clean up very confusing language. The change makes the fire separation distance determination by measuring the aggregate or total of the distances of the two buildings to the imaginary line, regardless of where that imaginary line is placed. Currently, you could have the buildings separated by 40 plus feet but because of design considerations and site constraints, you could have the imaginary line less than 15 feet from the adjacent building and the other building 30 feet from the imaginary line, and you would still have to rate the windows or roof without the proposed type of measurement, simply because the code only requires measurement of one building. If you read the code carefully, you realize that the lower elevation building is always the adjacent building. Changing the way you determine the fire separation distance to the aggregate of both buildings, meets the intent of what we believe this section intended. Currently, we believe the code could be overly restrictive in some cases (See Examples 1, 2 and 3)

The new modified language in Section 705.8.6.1 addresses the committee's concerns (See Examples 4 and 5).

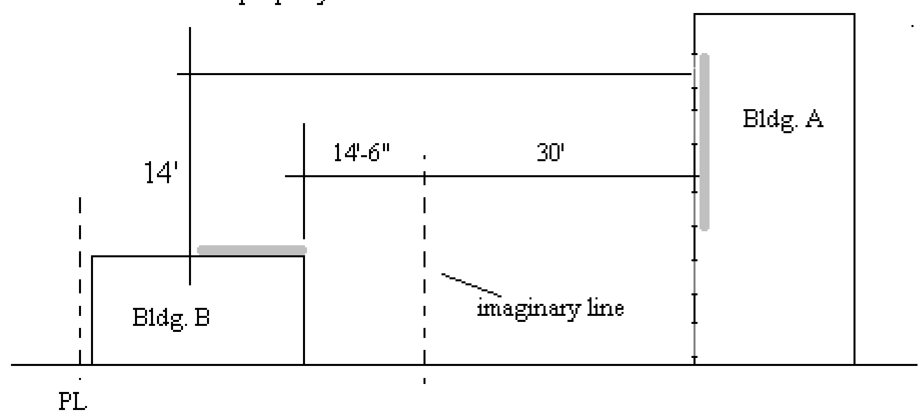
1) The code change as written is not impractical to enforce based on verification of the conditions of an existing building.
The code change identifies the fire resistive application is only applicable to the proposed newer building. It does not require the existing building to be upgraded in any way. The first part of Section 705.8.6.1 tells the user that if a new building is proposed and has openings that are less than 15 feet (4572 mm) vertically above the roof of existing building or structure on an adjacent lot, and the aggregate fire separation distance to the lot line of both buildings is less than 30 feet, then opening protectives are required. If the proposed building is has a roof height lower that the existing building, then roof protection and supporting elements are required for 10 feet from the wall facing the lot line. Both of these conditions use the same criteria as buildings on the same lot in Section 705.8.6.

2) The modification cleans up the language and is clear that provisions for buildings on the same lot are identical to those of buildings on separate adjacent lots.

3) The distance between buildings was indeed reduced to 15 feet in the initial proposal. We have modified the code change to clearly indicate that the fire separation distance should be 30 feet. We have modified the way it is measured to make easier to enforce and easier to interpret and apply. The measure between the buildings is now the <u>aggregate</u> or <u>total</u> of the measurements between the two buildings, which is 30 feet.

Of course, other provisions of the code may require protected openings other than these section.

Bldg. A is non-sprinklered and needs 30 feet of separation to keep glazing. Building B has site constraints because of a property line.

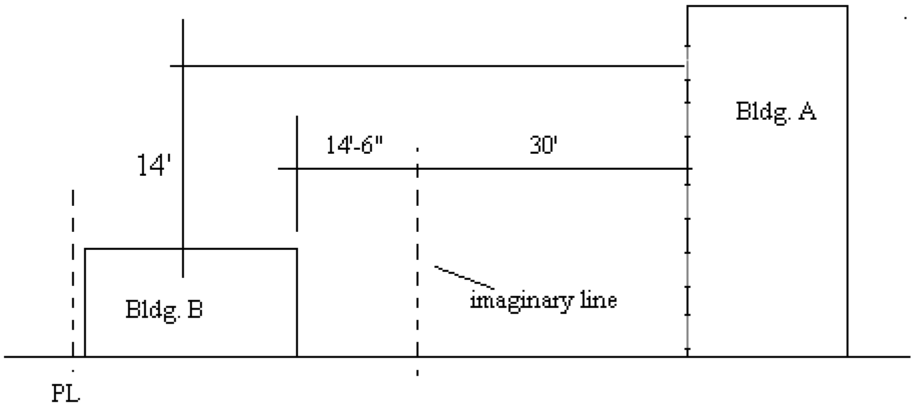


Current code language would require either to opnings in Building A, or the roof of Building B to be protected because Building B is the adjacent building.

Current code language has only one measurement, that of the separation distance to the adjacent building. So since the measurement to Bldg. B (adjacent building) is less than 15 feet, then the code provisions apply regardless of how far Bldg. A is from the imaginary line.

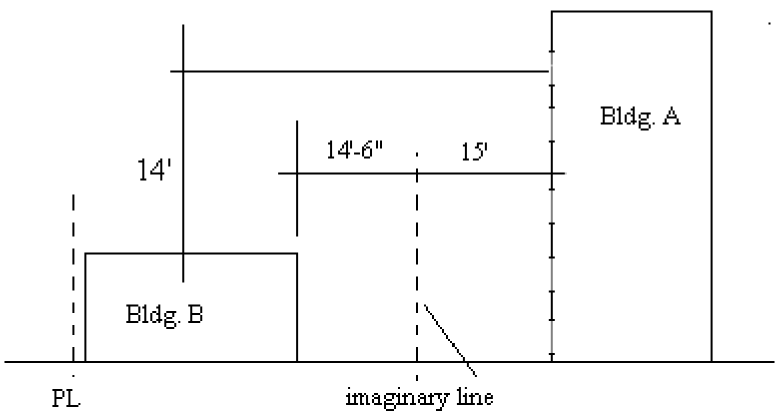
EXAMPLE 1
BUILDINGS ON THE SAME LOT
CURRENT LANGUAGE

Bldg. A is non-sprinklered and needs 30 feet of separation to keep glazing. Building B has site constraints because of a property line.



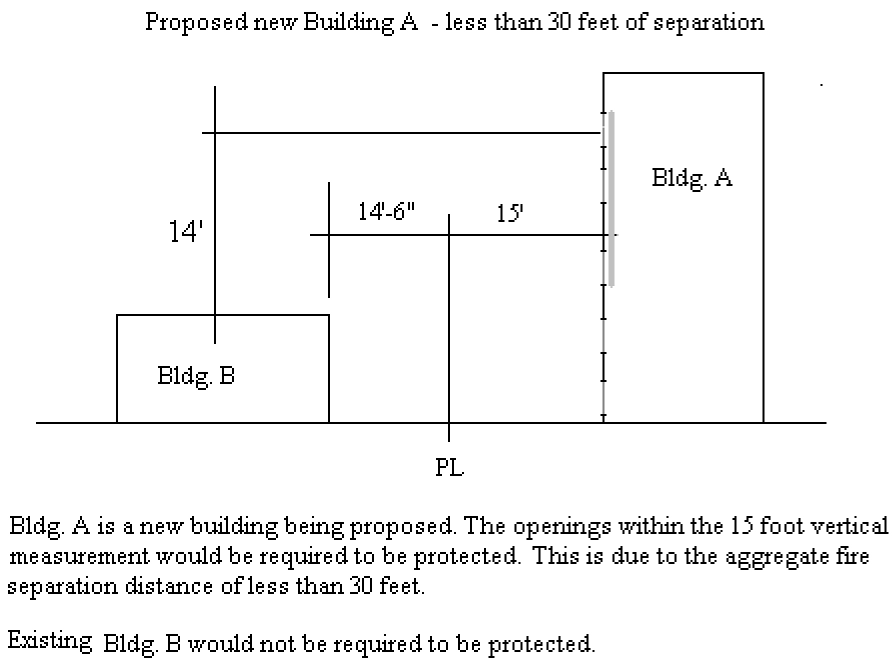
Proposed code language would have no requirements for protection of either the galzing or the roof under Section 705.8.6. This is because the aggregate fire separation distance of the two buildings is not less than 30 feet.

EXAMPLE 2
BUILDINGS ON THE SAME LOT
PROPOSED LANGUAGE
30 FEET OR MORE OF SEPARATION

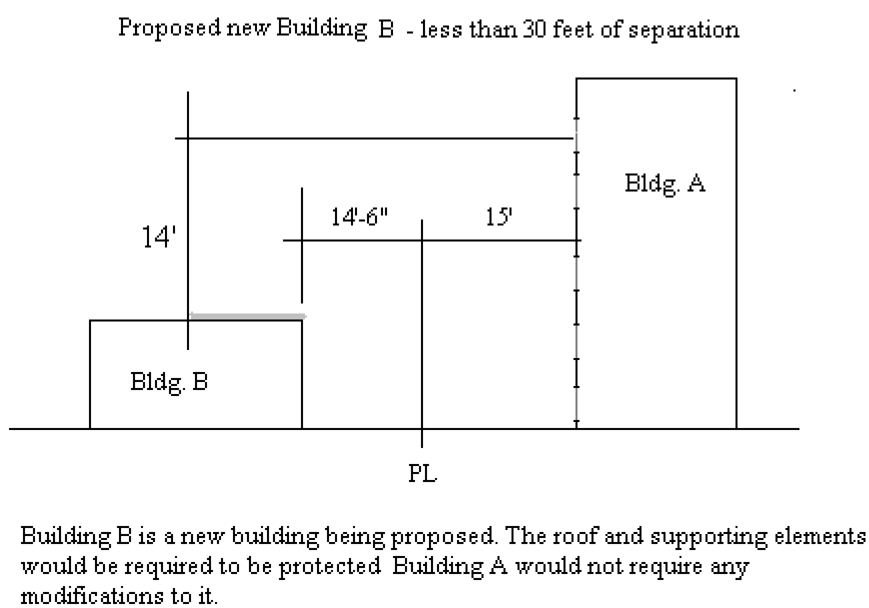


With the proposed new language, either the openings in Bldg. A or the roof of Bldg. B would be required to be protected since the aggregate of the two separation distances is less than 30 feet. Again, this is consistent with what we believe this section intended.

EXAMPLE 3
BUILDINGS ON THE SAME LOT
PROPOSED LANGUAGE
LESS THAN 30 FEET OF SEPARATION



EXAMPLE 4
BUILDINGS ON SEPARATE LOTS
BUILDING A IS PROPOSED



EXAMPLE 5
BUILDINGS ON SEPARATE LOTS
BUILDING B IS PROPOSED

Analysis: Public comments to FS20 and FS21 contain similar provisions for vertical exposure for buildings on the same lot. The membership needs to make its preference clear with respect to these provisions.

Public Comment 2:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee (GICC), a committee of the Glass Association of North America (GANA) requests Approval as Submitted.

Commenter's Reason: Property lines are invisible, non-physical boundary lines that run between adjoining lots. They, simply, have no ability to protect buildings on one lot from fire spread from nearby buildings on an adjoining lot. However, as currently written, Section 705.8.6 only applies to "buildings on the same lot." Accordingly, in the absence of a provision of the code providing protection from fire spread across lot lines, one can only conclude that if a lot line happens to exist between two buildings, that line alone will somehow stop fire from spreading from a building on one side of the line to a building on the other side.

FS21 fixes this problem by proposing new and clear fire protection requirements intended to protect buildings from fire spread across lot lines. Final Action Agenda voters are urged to vote against the standing motion to disapprove FS21 and to vote in favor of a motion to adopt it "As Submitted."

Analysis: Public comments to FS20 and FS21 contain similar provisions for vertical exposure for buildings on the same lot. The membership needs to make its preference clear with respect to these provisions.

Final Action: AS AM AMPC____ D

FS23-09/10
706.2, Chapter 35

Proposed Change as Submitted

Proponent: Sarah A. Rice, CBO, representing self

706.2 Structural stability. Fire walls shall have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall for the duration of time indicated by the required fire-resistance rating <u>or shall be double fire walls constructed in accordance with NFPA 221</u>.

2. Add new standard to Chapter 35 as follows:

NFPA
<u>221-09</u> <u>Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls, 2009 Edition</u>

Reason: To allow what today would be considered a design using 2 exterior walls to be classified as a fire wall and thus also allowed to have openings when the wall is not located on a lot line (party wall).

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, NFPA 221-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: RICE-FS4-706.2

Public Hearing Results

Analysis: The standard was not received by ICC staff.

Committee Action: **Disapproved**

Committee Reason: Disapproval was based on the proponents request for disapproval. Further, the proposed standard NFPA 221-09 has not been submitted.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Sarah A. Rice, CBO, The Preview Group, representing self, requesting Approval as Submitted.

Commenter's Reason: For years both the legacy codes and the now the IBC, have struggled with how to erect a new building right next to an existing building when they are both situated on the same lot (no lot line between them). Each building meets the all the code requirements. The answer seems simple enough, just erect your new building right next to the existing building (they are not structurally tied together) and then if you want to have communications between the two building punch some holes in the walls. This design seems to works great – by putting two exterior walls right next to each the design has achieved the same level of "independence as a single "firewall" would, e.g., should one wall collapse the other wall will remain standing.

But the code does not regulate this design as a "firewall," rather the code looks at this design as two (2) exterior walls situated right next to each other. The code requires there be an imaginary line created between the walls from which the fire resistance ratings and opening limitations can be established – fundamentally there is 0-feet of fire separation distance from the imaginary line to each of the walls. And It is at this point where the provisions for exterior walls and firewalls diverge immensely.

If there had been a firewall that met Section 7____, Section 7____ would allow there to be openings as long as they don't occupy more than 25% of the length of the wall. But in Table 70____ (which regulates openings in exterior walls) it very clearly states that where the fire separation distance is less than 3 feet, NO openings are permitted in that wall.

It is simple- Firewall (no lot line) – openings allowed, two exterior walls (no lot line) – NO openings allowed.

The arguments, and there have been plenty, are mostly directed at how would you ensure that the two exterior walls would be built to function the same as a fire wall. Well there is a way – build the two exterior walls so that they comply with the provisions in NFPA 221 for "double fire walls."

In NFPA 221 contains the construction details that will ensure that two exterior walls will provide the same level of independence between buildings that a firewall would.

Public Comment 2:

Jason Thompson, National Concrete Masonry Association (NCMA), representing Masonry Alliance for Codes and Standards (MACS), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

706.2 Structural stability. Fire walls shall have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall for the duration of time indicated by the required fire-resistance rating or shall be <u>constructed as</u> double fire walls ~~constructed~~ in accordance with NFPA 221.

NFPA

221-09 Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls, 2009 Edition

Commenter's Reason: This Public Comment has made a slight editorial modification to the original code change proposal to help clarify the intent. We believe the original intent of this code change proposal is to allow double fire walls designed and constructed in accordance with NFPA 221 Standard for High Challenge Fire Walls, Fire Walls, and Fire Barriers Walls (2009) to be used to satisfy the requirements of Section 706 for fire walls separating buildings.

Unfortunately, the new 2009 edition of NFPA 221 was not provided to the IBC Fire Safety Code Development Committee for their review prior to the hearings in Baltimore last year. Thus, the proponent requested that the code change proposal be disapproved. However, the standard has now been available for public review and, in our opinion, is acceptable as a referenced standard for use by the IBC in determining the design and construction requirements for double fire walls which will serve the same purpose of subdividing buildings into separate buildings as required in Section 706 for fire walls. In fact, one of the members of MACS, as well as our code consultant, are voting members of the NFPA Technical Committee on Building Construction which is responsible for the development and maintenance of NFPA 221.

Double wall assemblies constructed to serve as a fire wall are regulated by Section 4.5 Double Wall Assemblies of NFPA 221, as well as Section 6.5 Double Fire Walls. These sections allow two independent walls to serve as the required fire wall separation where the fire-resistance rating of each wall is allowed to be reduced to 1-hour less than the required fire-resistance rating for a single fire wall. For example, where a 3-hour fire-resistance-rated single fire wall is required by the IBC, two 2-hour fire-resistance rated (double) fire walls could be utilized based on NFPA 221. Similarly, for a 2-hour fire-resistance-rated single fire wall, two walls serving as a double fire wall could each have a 1-hour fire-resistance rating.

In conclusion, we believe that the use of double fire walls designed and constructed in accordance with NFPA 221 should be allowed as comparable construction to that specified in Section 706 for fire walls in the IBC. Therefore, we respectfully request that the Class A voting members overturn the Committee recommendation for disapproval and vote to approve this Public Comment for approved as modified for Code Change FS23-09/10.

Final Action: AS AM AMPC____ D

FS24–09/10

702.1, 705.6, 706.2, 706.2.1 (New), 706.2.2 (New), 706.2.3 (New), 706.4, Table 706.X (New)

Proposed Change as Submitted

Proponent: Marshall P. Carman, Structural Engineers Association of Ohio

Revise as follows:

702.1 Definitions

FIRE WALL. A fire-resistance rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof ~~with sufficient structural stability under fire conditions to allow.~~ designed to safely support loads as required by Chapter 16 following collapse of construction on either side. ~~without collapse of the wall.~~

Fire wall, cantilevered. Self supporting fire wall which is independent from construction on either side of the fire wall.

Fire wall, double. Two independent parallel walls meeting the exterior wall requirements of section 705 and having an equivalent combined assembly fire-resistance rating equal to the required fire-resistance rating.

Fire wall, tied. Fire wall connected to a diaphragm on both sides of the wall, with the fire wall relying on the diaphragm on either side for structural support, but not at the same time.

705.6 Structural ~~stability~~ requirements. The wall shall extend to the height required by Section 705.11 and shall ~~have sufficient structural stability such that it will remain in place for~~ be designed to safely support loads as required by Chapter 16 for the duration of time indicated by the required fire-resistance rating

706.2 Structural ~~stability~~ requirements. ~~Fire walls shall have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall for the duration of time indicated by the required fire-resistance rating.~~ *Fire walls* shall be designed to safely support loads as required by Chapter 16 for the duration of time indicated by the required fire-resistance rating, assuming collapse of construction due to fire on either side of the wall. For application of wind loads and lateral live loads, it is permitted to consider the portions of the fire wall that are interior prior to assumed collapse as interior walls after assumed collapse. Load combinations with earthquake loading need not be considered after assumed collapse. Fire walls shall meet the additional requirements of 706.2.1, 706.2.2, or 706.2.3.

706.2.1 Tied fire walls. Tied fire walls and supporting structure opposite of the assumed collapse of construction, shall resist an applied lateral load induced by collapse of construction on either side of the wall. Lateral loads applied to the wall and supporting structure due to collapse are permitted to be determined in accordance with equation 7-2 provided both of the following conditions are met.

1. Framing supported by the fire wall is detailed to permit rotation of the framing element at the fire wall support.
2. Framing, other than tension ties, is not continuous through the fire wall

$$h_f = 1.5 \omega l \qquad \textbf{(Equation 7-2)}$$

Where:

h_f = lateral load applied at framing support
l = span of framing perpendicular to fire wall
ω = equivalent uniform applied gravity load to framing member

The applied lateral load due to collapse need not exceed the maximum force that can be developed in the system.

Construction on both sides of the fire wall shall be considered a single structure for structural design and analysis.

(Renumber subsequent equations)

706.2.2 Cantilevered fire walls. Separation between a cantilevered fire wall and building elements on all sides shall meet the requirements of 1613.6.7.

706.2.3 Double fire walls. Each wall of a double fire wall shall be considered an exterior wall as required by section 705. Construction on either side of the fire wall shall be considered separate structures and shall meet the building separation requirements of 1613.6.7.

706.4 Fire-resistance rating. *Fire walls* shall have a fire-resistance rating of not less than that required by table 706.4(1). Double fire walls shall be considered to have an equivalent combined fire resistance rating as specified in table 706.4(2).

TABLE 706.4(1)
FIRE WALL FIRE-RESISTANCE RATINGS

GROUP	FIRE-RESISTANCE RATING (hours)
A, B,E, H-4, I, R-1, R-2, U	3[a]
F-1, H-3[b], H-5, M, S-1	3
H-1, H-2	4[b]
F-2, S-2, R-3, R-4	2

a. In Type II or V construction, walls shall be permitted to have a 2-hour fire–resistance rating
b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5

Add new Table as follows:

TABLE 706.4(2)
EQUIVALENT COMBINED FIRE-RESISTANCE RATING FOR DOUBLE FIRE WALLS.

Required fire-resistance rating for each wall of a double fire wall (hours)	Equivalent single wall fire-resistance rating (hours)
3	4
2	3
1	2

Reason: The language of Section 706.2 requires that fire walls have sufficient structural stability to prevent collapse of the fire wall under fire conditions. However, there is no definition of *sufficient structural stability* or design loads provided for fire conditions. While this provides a legitimate performance goal, it is inconsistent with typical structural code requirements which require specific resistance against defined loading.

This code change proposal attempts to clearly define loading and resistance requirements for fire walls, reference already defined strength and stability requirements in chapter 16, as well as clarify / define types of firewalls.

A provision has been added permitting the application of interior lateral live loads on fire walls based upon their condition prior to collapsed construction on either side of the wall. NFPA 221 applies 5psf for the lateral design load on fire walls, which is also the typical lateral live load applied to interior walls per 1607.13.

The types of fire walls are typical walls defined in NFPA 221. NFPA 221 provides an equation for determining the lateral load applied to a tied fire wall, which is based upon a catenary action due to sagging of the member. The equation provided in this proposal is based upon the horizontal reaction due the centripetal force of a swinging member that lost support at the far end. While lateral loads due to catenary action are possible, the horizontal reaction due to centripetal force provides a larger horizontal load than the catenary action equation provided in NFPA 221.

Reference:
NFPA 221, Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls (2009 Edition). National Fire Protection Association (NFPA)

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: CARMAN-FS1-702.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that current language is clear and describes appropriate performance requirements for fire walls. Further, there are apparent differences between the proposed requirements and NFPA 221, which may be of concern. Lastly, reference to Secton 705 in Section 706.2.3 would trigger weather resistance and exterior finishes requirements, which do not appear to be applicable.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edwin Huston, National Council of Structural Engineers Association, NCSEA Code Advisory Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

702.1 Definitions

FIRE WALL. A fire-resistance rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof ~~designed to safely support loads as required by Chapter 16 following collapse of construction on either side~~.

> ~~**Fire wall, cantilevered.** Self supporting fire wall which is independent from construction on either side of the fire wall.~~
>
> ~~**Fire wall, double.** Two independent parallel walls meeting the exterior wall requirements of section 705 and having an equivalent combined assembly fire-resistance rating equal to the required fire-resistance rating.~~
>
> ~~**Fire wall, tied.** Fire wall connected to a diaphragm on both sides of the wall, with the fire wall relying on the diaphragm on either side for structural support, but not at the same time.~~

705.6 Structural requirements. The wall shall extend to the height required by Section 705.11 and shall be designed to safely support loads as required by Chapter 16 for the duration of time indicated by the required fire-resistance rating

706.2 Structural requirements. *Fire walls* shall be designed to safely support loads as required by Chapter 16 for the duration of time indicated by the required fire-resistance rating, assuming collapse of construction due to fire on either side of the wall. ~~For application of wind loads and lateral live loads, it is permitted to consider the portions of the fire wall that are interior prior to assumed collapse as interior walls after assumed collapse. Load combinations with earthquake loading need not be considered after assumed collapse. Fire walls shall meet the additional requirements of 706.2.1, 706.2.2, or 706.2.3.~~

~~**706.2.1 Tied fire walls.** Tied fire walls and supporting structure opposite of the assumed collapse of construction, shall resist an applied lateral load induced by collapse of construction on either side of the wall. Lateral loads applied to the wall and supporting structure due to collapse are permitted to be determined in accordance with equation 7-2 provided both of the following conditions are met.~~

1. ~~Framing supported by the fire wall is detailed to permit rotation of the framing element at the fire wall support.~~
2. ~~Framing, other than tension ties, is not continuous through the fire wall~~

$$\cancel{h_f = 1.5\omega l}$$ (~~**Equation 7-2**~~)

~~Where:~~

~~h_f~~	=	~~lateral load applied at framing support~~
~~l~~	=	~~span of framing perpendicular to fire wall~~
~~ω~~	=	~~equivalent uniform applied gravity load to framing member~~

~~The applied lateral load due to collapse need not exceed the maximum force that can be developed in the system.~~

~~Construction on both sides of the fire wall shall be considered a single structure for structural design and analysis.~~

~~**706.2.2 Cantilevered fire walls.** Separation between a cantilevered fire wall and building elements on all sides shall meet the requirements of 1613.6.7.~~

~~**706.2.3 Double fire walls.** Each wall of a double fire wall shall be considered an exterior wall as required by section 705. Construction on either side of the fire wall shall be considered separate structures and shall meet the building separation requirements of 1613.6.7.~~

706.4 Fire-resistance rating. *Fire walls* shall have a fire-resistance rating of not less than that required by table 706.4~~(1). Double fire walls shall be considered to have an equivalent combined fire resistance rating as specified in table 706.4(2)~~.

TABLE 706.4~~(1)~~
FIRE WALL FIRE-RESISTANCE RATINGS

GROUP	FIRE-RESISTANCE RATING (hours)
A, B,E, H-4, I, R-1, R-2, U	3[a]
F-1, H-3[b], H-5, M, S-1	3
H-1, H-2	4[b]
F-2, S-2, R-3, R-4	2

a. In Type II or V construction, walls shall be permitted to have a 2-hour fire–resistance rating
b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5

~~**TABLE 706.4(2)**~~
~~**EQUIVALENT COMBINED FIRE-RESISTANCE RATING FOR DOUBLE FIRE WALLS.**~~

~~Required fire-resistance rating for each wall of a double fire wall (hours)~~	~~Equivalent single wall fire-resistance rating (hours)~~
~~3~~	~~4~~
~~2~~	~~3~~
~~1~~	~~2~~

Commenter's Reason: In lieu of the original code change proposal which attempted to add requirements for specific types of firewalls and provide guidance for various firewall systems, this modification is more editorial in nature. It still removes the undefined term Structural Stability, and references chapter 16 for loading requirements. It also leaves the statement regarding *"safely support loads as required by Chapter 16 for the duration of time indicated by the required fire-resistance rating, assuming collapse of construction due to fire on either side of the wall"* out of the definition of Fire Wall, since it is restated in section 706.2 as a requirement for Fire Walls.

There are potential conflicts between commonly employed firewall design methodologies and the requirements of sections 12.1.3 and 12.11 of ASCE 7-10 which require the interconnectivity of structural elements and minimum wall to diaphragm connection capacities. Referencing chapter 16 for the loading / support criteria, as opposed to having undefined stability criteria within section 706, is a 1st step towards addressing these conflicts.

Final Action: AS AM AMPC____ D

FS31-09/10
TABLE 707.3.9

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing self

Revise as follows:

TABLE 707.3.9
FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES OR HORIZONTAL ASSEMBLIES BETWEEN FIRE AREAS

OCCUPANCY GROUP	FIRE-RESISTANCE RATING (hours)
H-1, H-2	4
F-1, H-3, S-1	3
A, B, E, F-2, H-4, H-5, I, M[a], R, S-2	2
U	1

a. For Group M occupancies containing display shelves or storage racks where the top of the merchandise is greater than 12 feet (3658 mm) in height above the floor, the minimum fire-resistance rating shall be 3 hours.

Reason: The purpose of this proposed code change is to increase the required fire-resistance rating from 2-hours to 3-hours for fire barriers and horizontal assemblies used to separate fire areas of Group M occupancies where the Group M occupancy contains display shelves and/or storage racks where the top of the merchandise is greater than 12 ft in height. This is intended to recognize the fact that the fire load will be significantly greater in those Group M occupancies where the heights of the merchandise on display or on storage racks in the retail sales area exceed 12 ft. For the most part where Group M occupancies have display racks less than 8 ft in height, the fire load will generally not exceed 20 pounds per sq ft which is roughly equivalent to a 2-hour fire duration. However, for those stores where the display shelving and storage racks allow for merchandise to be placed greater than 12 ft above the floor such as in the typical "big box" stores where the fire load is significantly greater, the fire load can greatly exceed 20 pounds per sq ft and can be as high as 30 to 40 pounds per sq ft. A 30 pound per sq ft fire load is roughly equivalent to a 3-hour fire duration.

We believe this is especially important since fire areas are used to avoid the requirements triggering automatic sprinkler system protection in accordance with Section 903.2.7 for Group M occupancies. If a Group M occupancy building is separated into fire areas of 12,000 sq ft or less, then the building is not required to be sprinklered unless the combined fire areas exceed 24,000 sq ft. In reality, this means that a 1-story building could be divided into two 12,000 sq ft fire areas without having to provide for automatic sprinkler protection. Similarly, a 3-story Group M occupancy limited to 8,000 sq ft per story with the floors (horizontal assemblies) having the required fire-resistance rating to create the fire area separations would also not be required to be sprinklered. In those nonsprinklered cases, it is very important to limit the fire load for the Group M occupancies based on the height of the merchandise displayed and stored in the building. So for those cases which generally encompass most retail sales situations, the 2-hour fire-resistance rating would be suitable. But for those cases such as the "big box" stores where the display shelves and storage racks are greater than 12 ft in height, the fire-resistance rating of the fire barriers and horizontal assemblies should be increased to a minimum of 3-hours.

The proposed 12 ft height limit is also consistent with Chapter 23 of the International Fire Code for high-piled combustible storage which is defined as "storage of combustible materials in closely packed piles or combustible materials on pallets, in racks or on shelves where the top of the storage is greater than 12 ft (3658 mm) in height…" Chapter 23 recognizes that high-piled combustible storage creates a much greater fire hazard than storage of lesser heights. Thus, there are more restrictive fire safety requirements incorporated into Chapter 23 as enumerated in Table 2306.2 General Fire Protection and Life Safety Requirements. This recognizes the fact that the fire load is significantly greater in these types of storage occupancies.

Increasing the minimum fire-resistance rating from 2-hours to 3-hours for these Group M occupancies would also be consistent with the minimum 3-hour fire-resistance rating specified for Group F-1, H-3, and S-1 occupancies in the table based on the relative fire load and fire hazard. And it is also consistent with Table 706.4 Fire Wall Fire-Resistance Ratings.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Thornberry-FS3-707.3.9

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that high merchandise display in Group M occupancies is a fire safety concern, which warrants the 3 hour separation regardless of the display area or the presence of automatic sprinklers.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rob Geislinger representing the Fire Marshals Association of Colorado, and Tim Pate, representing the Colorado Chapter of ICC, requests Disapproval.

Commenter's Reason: Chapter 23 of the International Fire Code adequately addresses concerns with high piled combustible storage. This proposal creates some confusion and conflict with that Code. In some cases, the proposal would be overly restrictive. For example, the proposal would require an increase in the fire resistance rating if only one display shelf in an occupancy exceeded twelve feet in height. The Fire Code does not require any special protection for small high-piled combustible storage areas under 500 square feet. This provision would also apply regardless of the commodity class being displayed, even for noncombustible items such as metal work or similar items. The Fire Code does not regulate high-piled noncombustible storage.

While the proposal is sometimes over restrictive, in other cases, it may not be restrictive enough. Chapter 23 of the Fire Code recognizes that, "certain high-hazard commodities, such as rubber tires, Group A plastics, flammable liquids, idle pallets, and similar commodities…," may be considered high-piled storage at heights above six, not twelve feet.

The Fire Code adequately addresses the hazards of high-piled combustible storage. This proposal is not necessary.

Final Action: AS AM AMPC____ D

FS35–09/10
708.5

Proposed Change as Submitted

Proponent: Sharon Halpert, representing self

Revise as follows:

708.5 Continuity. Shaft enclosures shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 712, or both, and shall have continuity in accordance with Section 707.5 for *fire barriers* or Section 712.4 for *horizontal assemblies* as applicable. <u>Joints created at every intersection between the bottom of a shaft wall assembly and the top of the floor or slab shall also comply with Section 714.</u>

Reason: Where used, shafts are critical building elements in preventing the passage of heat, flame and toxic gases to stories beyond the floor of fire origin. While the requirements for continuity of vertical and horizontal shafts through floors and walls are quite detailed, there is a lack of specific information for the construction detail required when the shaft wall is not a continuous membrane, but rather is interrupted at one or more floors by the floor slab.

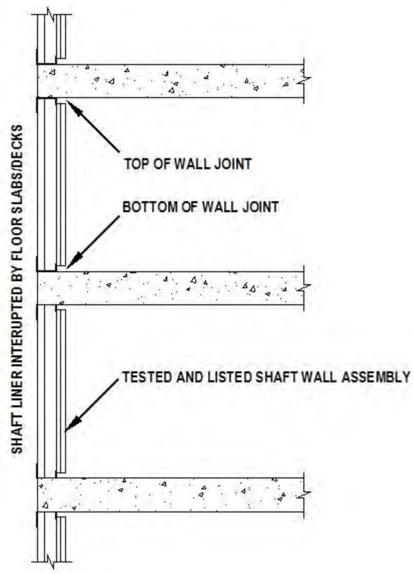
Substantiation: A shaft is intended to be a continuous assembly (fire barrier) from its lowest point to its highest point, with all openings, joints and penetrations suitably protected or sealed. This revision serves simply to clarify the intent of how this protection will be maintained.

When a shaft is hung entirely from the floors it traverses and is constructed of wall materials (e.g. gypsum boards, concrete masonry units) that are joined one to another from top to bottom, there would normally not be any intermediate floor slabs that would bisect the shaft wall, and therefore no fire resistive joint systems within the wall.

On the other hand, when a shaft enclosure is constructed of independent wall segments that rest on top of each floor slab/deck that the shaft traverses, there will be a joint between the wall segments and the floor slab/deck above, as well as between the wall and the floor slab/deck below it. Clearly both types of joints will occur at each level this shaft wall assembly is intended to protect. Shaft construction is unique in that the joint at the top of the wall and at the bottom of wall are equally important in maintaining the anticipated protection.

Since the code already maintains provisions for the continuity of shaft wall construction, this proposed clarification will simply serve to enhance this intent. Smoke and fire inside a shaft, in a multi-story building, will not delineate between the head of wall joint on the underside of a deck and the bottom of wall joint on the top side of this same deck. Once the pressure builds and the temperatures rise, fire and smoke will find its way through any unprotected areas. An illustration of this condition is enclosed.

There are dozens of bottom-of-wall fire resistance rated joint systems that have been tested by nationally recognized testing organizations and have been listed in their directories. Information concerning these details is described in the individual systems. Bottom-of-wall joint systems have been investigated using the general methods and conditions of acceptance specified for the four defined types of joint systems in ANSI/UL 2079 and ASTM E1966.



Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HALPERT-FS1-708.5

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that these requirements did not belong in the requirements for shafts and that this particular concern was already covered in the portion of the code dealing with joint requirements.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions, representing International Firestop Council, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

708.5 Continuity. Shaft enclosures shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 712, or both, and shall have continuity in accordance with Section 707.5 for *fire barriers* or Section 712.4 for *horizontal assemblies* as applicable. Joints created at the ~~every~~ intersection between the bottom of every segment of the ~~a~~ shaft enclosure ~~wall assembly~~ and the top of the floor or slab shall also comply with Section 714.

Commenter's Reason: While the need to ensure proper protection of bottom-of-wall joints exists for most fire rated wall assemblies, shafts are particularly critical because they are designed to contain both fire and smoke. They are intended to be continuous assemblies (fire barriers) from their lowest point to their highest point, with all openings, joints and penetrations suitably protected or sealed. Shafts are critical building elements used to prevent the passage of fire and pressurized smoke to stories beyond the floor of fire origin. While the requirements for continuity of vertical and horizontal shafts through floors and walls are quite detailed, there is a lack of clarity in the construction detail required when the shaft wall is not continuous through the floor, but rather is interrupted at one or more floors by the floor slab.

During its deliberations, the Committee pointed out that this is currently required based on the fire barrier continuity requirements in section 709. Nonetheless, the bottom-of-wall joint is often overlooked. When a shaft enclosure is constructed of independent wall segments that rest on top of each floor slab/deck that the shaft traverses, there will be a joint between the wall segments and the floor slab/deck above, as well as between the wall and the floor slab/deck below it, at each level.

During a fire, stack effect is often responsible for the side distribution of smoke through a building. Stack effects are present to varying degrees in all multi-storey buildings. They normally occur when the indoor air temperature is greater than the outdoor air temperature. They are characterized by a strong draft from the ground floor to the roof of the building. However, they can also occur when the reverse is true, but in the opposite direction. The magnitude of the stack effect depends on how large the temperature difference is, and the height of the building, but can be very large in colder months. The following Table illustrates some simple examples of building stack effects (assuming normal barometric pressures and air density, and an approximate height of 10 ft per storey):

Building Height* (ft)(No. of Storeys)	Temperature Difference (indoor/outdoor) (^oF)	Stack Effect Pressure[1] (In. of Water) (Pa)
100 (10)	30	5.7 (1,425)
100 (10)	70	66.8 (16,624)
300 (30)	30	17.1 (4,275)
300 (30)	70	200 (49,872)

1 Fire Protection Handbook, NFPA, Nineteenth Edition, Volume 2, 2003.
* "Building Height" in this example actually denotes vertical height between the inlet and outlet pressure measurement.

At these pressures, smoke is driven through the bottom-of-wall joints in each segment of the vertical shaft that rests on the floor or slab, both inward and outward, with the amount of smoke and products of combustion driven through an unsealed joint being a function of the story (height) at which each such joint is located.

There are dozens of bottom-of-wall fire resistance rated joint systems that have been tested by nationally recognized testing organizations for this purpose and have been listed in their directories. Information concerning these details is described in the individual systems. Bottom-of-wall joint systems have been investigated using the general methods and conditions of acceptance specified for the four defined types of joint systems in ANSI/UL 2079 and ASTM E1966 for several years.

Final Action: AS AM AMPC____ D

FS36-09/10
708.8

Proposed Change as Submitted

Proponent: David S. Collins, FAIA, The Preview Group, Inc. representing The American Institute of Architects

Revise as follows:

708.8 Penetrations. Penetrations in a shaft enclosure shall be protected in accordance with Section 713 as required for fire barriers. <u>Structural elements, such as beams or joists, where they and their supporting construction are protected in accordance with Section 713 shall be permitted to penetrate a shaft enclosure.</u>

Reason: It is virtually impossible to design a shaft enclosure over a few stories tall without some support from adjoining structural elements. This change will allow a beam or other structural member to penetrate a shaft as long as it is also protected as required.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Collins-FS2-708.8

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee was concerned about the phrase "…and their supporting construction…" in that they were not clear on how this related to penetration protection.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment:

William E. Koffel, P.E, Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

708.8 Penetrations. Penetrations in a shaft enclosure shall be protected in accordance with Section 713 as required for fire barriers. Structural elements, such as beams or joists, where ~~they and their supporting construction are~~ protected in accordance with Section 713 shall be permitted to penetrate a shaft enclosure.

Commenter's Reason: The proposed language meets the intent of the original Public Proposal. The language in the proposal was confusing to the Code Development Committee due to the reference to "supporting construction."

The proposed language clarifies that structural members may penetrate a shaft enclosure in addition to those that are already permitted because they are necessary for the purpose of the shaft enclosure. Recently, several manufacturers have obtained listings for structural members penetrating fire barriers and protected in accordance with Section 713. In addition, some recent testing conducted by Southwest Research Institute and Koffel Associates, Inc., for a specific construction project, has demonstrated that not only will the through penetration firestop system obtain an F-rating but the system is also very effective at limiting the temperature of the steel on the unexposed surface.

Final Action: AS AM AMPC____ D

FS40-09/10
708.14.1

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing self

Revise as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than ~~three~~ <u>two</u> stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 709 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

(Exceptions to remain unchanged)

Reason: This proposed code change is a follow up to Code Change FS46-07/08 which was submitted by Cal Chiefs. During the public hearings in Palm Springs, the Cal Chiefs representative at the hearings requested that the Fire Safety Committee disapprove the code change since it needed further development. No other testimony was offered on that code change proposal. It is not clear as to why this position was taken, especially since a Public Comment was never developed to follow up. At any rate, the following text in the remainder of this supporting statement is taken from that original code change submittal.

Currently, this Section triggers the requirement for enclosed elevator lobbies when the elevator shaft enclosure connects more than three stories. The purpose of this code change proposal is to reduce that threshold to where the elevator shaft enclosure connects more than two stories.

This is generally consistent with Section 708 Shaft Enclosures which requires shaft enclosures for openings that pass through floor/ceiling assemblies but allows specific exceptions for two consecutive stories to be interconnected with floor openings without a shaft enclosure. Refer to Exceptions 7 and 11 to Section 708.2. Thus, for those cases smoke will be able to readily migrate from one story to the next through the unenclosed floor openings. In that case it seems reasonable that it would not be critical to require the elevator lobby to protect elevator hoistway enclosures from smoke migration. However, we believe that once the elevator shaft interconnects three or more stories, it should be protected against smoke movement through the shaft so as to prevent smoke spread from floor to floor.

It has been well documented that smoke spreads readily throughout the building via the elevator shafts even though the elevator hoistway doors are protected with fire protection rated fire doors. The fact is that such doors are very loose fitting. Even though they pass the fire door test, they will still allow significant quantities of smoke to pass around the edges of the door. Since stack effect occurs in multi-story buildings, the natural tendency for smoke is to migrate toward the elevator shafts. Then the smoke will move either upward or downward, depending upon where the origin of smoke is in relationship to the neutral pressure plane within the building. And then the smoke will leak out of the elevator shafts and spread onto floors remote from the fire floor.

Therefore, we believe that it is important to provide protection for the elevator shaft hoistway doors against the movement of smoke from floor to floor once the elevator intercommunicates more than two stories.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Thornberry-FS2-708.14.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that reducing the elevator lobby threshold from 3 stories to 2 stories was not technically justified. Also the code currently allows a two story unprotected opening to be directly adjacent to what is proposed to be an enclosed elevator lobby, so it is unclear what is being achieved with this proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry PE, The Code Consortium Inc, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than two stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 709 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the street floor, provided the entire street floor is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 708.2 are not required to have enclosed elevator lobbies.
3. Where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1. Group I-2 occupancies,
   4.2. Group I-3 occupancies, and
   4.3. High-rise buildings.
5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 711 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 711.5.2, 711.5.3, and 715.4.8 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 716.5.4.1.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 708.14.2.
7. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.3.
8. Enclosed elevator lobbies are not required at floors where a shaft enclosure is not required by Exceptions 7 or 11 to Section 708.2.

Commenter's Reason: We believe the revision proposed in this Public Comment to add a new Exception 8 responds to the IBC Fire Safety Committee's main concern for disapproving this code change proposal. New Exception 8 indicates that enclosed elevator lobbies would not be required at floors where a shaft enclosure is not required by either Exception 7 or Exception 11 to Section 708.2 Shaft Enclosure Required. Basically, these are the only two Exceptions to the requirements for shaft enclosures that allow a shaft enclosure to be omitted on two adjacent floors (stories) meeting the conditions described in the Exceptions. Thus, there would be no need to provide special elevator lobby enclosures to protect against smoke movement between those two adjacent floors since they would be allowed to have open shafts between those floors.

Approving this Public Comment will make the elevator lobby enclosure requirements for the protection of smoke movement through elevator hoistway shafts consistent with the requirements for shaft enclosures which protect against fire spread in shafts connecting multiple stories in a building. For good and consistent fire protection it follows that where the spread of fire is to be limited and controlled, the spread of smoke should also be limited and controlled. Therefore, we urge the ICC Class A voting members to approve this Public Comment to modify our original Code Change Proposal FS40-09/10.

Final Action: AS AM AMPC____ D

FS44-09/10
708.14.1

Proposed Change as Submitted

Proponent: Bob Eugene, representing Underwriters Laboratories Inc

Revise as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall be also comply with Section 715.4.3 as required for *corridor* walls with the UL 1784 test conducted without an artificial bottom seal. ~~and p~~Penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

(Exceptions to remain unchanged)

Reason: This proposal clarifies that the air leakage rating of smoke and draft control doors protecting openings in elevator lobby enclosure walls shall be determined without an artificial bottom seal in order to replicate the stack effect present in an elevator shaft and hence the elevator lobby. This proposal is consistent with the artificial bottom seal requirements for smoke and draft control doors protecting the lobby of the new Fire Services Access Elevator found in Section 3007.4.3.
Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Code change proposals FS43 and FS44 address lobby fire door testing without an artificial bottom seal. The committee needs to make its intent clear with respect to these provisions. Standard UL 1784 is currently referenced in the I-codes.

ICCFILENAME: EUGENE-FS1-708.14.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee did not agree that the proposed language was a coordination issue with Section 3007.4 and that the requirements for testing fire doors in fire partitions currently in the code were sufficient.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jon Siu representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for fire partitions, doors protecting openings in the elevator lobby enclosure walls, other than the door to the hoistway, shall be also comply with Section 715.4.3 as required for *corridor* walls with the UL 1784 test conducted without an artificial bottom seal. Penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

(Exceptions to remain unchanged)

Commenter's Reason: UL 1784 for the testing of fire door assemblies is well referenced in Section 715 for smoke and draft control fire door assemblies. The test records the data from the testing and the manufacturer with may test doors assemblies or without an artificial bottom seal- most commonly a layer of duct tape is used for the undercut. The responsibility for the referencing of design or result data from testing is with the Code that references UL 1784. If it simply states testing according to UL 1784, then any door tested with or without an artificial bottom seal can be utilized. Listed fire doors can have as much as ¾ inch undercut to allow for door swing and uneven floors. Heat and smoke flow from the underside of the door can be significant, placing both the occupants and the fire responders at risk.

In the case of elevator lobbies, the fire rated elevator shaft protected by fire rated doors in 708.14.1 requires an additional box or lobby in front of it to stall the impact of heat or smoke upon the elevator shaft or in certain cases the movement of heat and smoke from the elevator shaft to upper floors based upon the heat stratification. Pressure differentials between the fire floor, non-fire floors, elevator shafts, interior HVAC operation, and wind loads upon the exterior of the building can all contribute to pressure differences at the elevator lobby. The lobby doors logically should be able to restrict the passage of smoke on all four sides of the door opening- to include the undercut. This recommended restriction is best achieved by requiring the door assembly to be tested without the duct tape across the bottom of the door assembly.

This would be consistent with the existing requirements where a supplemental hoistway door is used in lieu of an elevator lobby as currently allowed by Exception 3.

Final Action: AS AM AMPC____ D

FS45-09/10
708.14.1

<u>Proposed Change as Submitted</u>

Proponent: Bill Ziegert, representing Smoke Guard, Inc.

Revise as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code. <u>Access to an exit through an elevator lobby shall be permitted provided that access to at least one other required exit does not require passing through the elevator lobby.</u>

Exceptions:

(Exceptions to remain unchanged)

Reason: Currently there is no prohibition in the code for occupied spaces exiting directly into an elevator lobby. Irrespective of whether the corridors leading to the elevator lobby are rated or not, the elevator lobby is a potentially hazardous area that can be filled with smoke. This change would insure that building occupants would have access to at least one exit without being forced to pass through the elevator lobby. Note that this language is already part of the current New York City Building Code which is based upon the IBC.

Cost Impact: No additional costs, since it is possible with the beginning design to structure the corridor system to provide direct access to at least one exit.

ICCFILENAME: ZIEGERT-FS3-708.14.1

<u>Public Hearing Results</u>

Committee Action: **Approved as Modified**

Modify the proposal as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code. Access to an exit through an <u>enclosed</u> elevator lobby shall be permitted provided that access to at least one other required exit does not require passing through the elevator lobby.

Exceptions:

(Exceptions to remain unchanged)

Committee Reason: The committee agreed that the proposed language clarified the intent of the code by allowing egress through an elevator lobby as long as one other required exit was available without having to egress through the lobby.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dave Frable, representing U.S. General Services Administration, requests Disapproval.

Commenter's Reason: We are opposed to this proposed code change based on the fact that the Fire Safety Committee stated in their reason statement that the subject new text clarified the intent of the Code. On the contrary, if in fact this was an egress issue, it should have been heard by the Means of Egress Code Committee and not the Fire Safety Committee. Regardless, no technical justification has been provided by the proponent that supports his hypothesis that all enclosed elevator lobbies are a potentially hazardous area and therefore occupants need at least one exit available without passing through an enclosed elevator lobby. It should be noted that based on past National of Institute of Standards and Technology (NIST) research, smoke travel through enclosed or unenclosed elevator lobbies has not been a contributing factor to fire deaths in buildings protected throughout by automatic sprinklers. This has also been documented in the NIST research that showed that such flows will **NOT** result in untenable conditions beyond the fire floor with operating sprinklers regardless of whether elevator lobbies are provided. Therefore, we believe this requirement is unwarranted since the risk is minimal and also will cause unintended design considerations when trying to meeting exit stair remoteness and travel distance requirements and therefore should be removed. For example, a design such that an office space is located south of an elevator lobby with both exits on the north side of the elevator lobby would no longer be permitted. In addition, we also disagree with the proponent that this code change will not increase the cost of construction as the proponent has stated in his reason statement. We believe there will be extra construction costs associated with this requirement to meet all means of egress requirements.

Public Comment 2:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

Commenter's Reason: This code change should be disapproved for the following reasons:

1. "The lobby is a potentially hazardous area that can be filled with smoke." That is the full extent of technical substantiation offered for this significant change.
2. If adding lobbies has created a hazard that did not previously exist, perhaps lobbies themselves should be reconsidered. The modification that was approved to clarify what the intent of the proposal only points to the questionable rationale. One building is not required to provide any elevator separation or protection; that building can have egress travel directly past the elevator doors. Another building chooses to provide 'additional doors' in front of the elevator hoistway openings; that building can have egress travel directly past the elevator doors. A third building that provides enclosed elevator lobbies now has created a condition in front of the elevator doors that warrants prohibiting passing by them for egress purposes?
3. Where is the hazard coming from? If the lobby is enclosed on a lower floor where a fire is occurring, the lobby at that floor provides separation from the fire and smoke.
4. The extent of building area that could be arranged with the only egress through the elevator lobby is already limited due to dead end limits.
5. This is an egress issue, not an elevator lobby issue. If such a provision is to be included in the code, it should be in Chapter 10, not in Chapter 7.
6. The Committee statement indicates the proposal 'clarifies the intent of the code', which clearly is not what the intent of the IBC has ever been. In fact, there is even an ICC interpretation that addresses egress through elevator lobbies. Interpretation 01-07, reads as follows:

   1017.5 Corridor continuity. Fire-resistance-rated corridors shall be continuous from the point of entry to an exit, and shall not be interrupted by intervening rooms.

   Exception: Foyers, lobbies or reception rooms constructed as required for corridors shall not be construed as intervening rooms.

   Q: Where an elevator lobby is required by the provisions of Section 707.14.1 of the *International Building Code*, is egress to the exits permitted through the lobby?

   A: Yes. The provisions in Section 707.14.1 require an elevator lobby to be enclosed and separated from an exit access corridor with fire-resistance-rated construction equal to the fire-resistance rating of the corridor, but does not prohibit egress through the enclosed elevator lobby.

Final Action: AS AM AMPC____ D

FS48-09/10
708.14.1

<u>Proposed Change as Submitted</u>

Proponent: Gregory J. Cahanin, Cahanin Fire & Code Consulting representing the Smoke Safety Council

Revise as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the street floor, provided the entire street floor is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 708.2 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial ~~bottom~~ <u>horizontal or vertical</u> seal.
4. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1. Group I-2 occupancies,
   4.2. Group I-3 occupancies, and
   4.3. High-rise buildings.
5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 711 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 711.5.2, 711.5.3, and 715.4.8 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 716.5.4.1.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 708.14.2.
7. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.3.

Reason: UL 1784 for the testing of fire door assemblies is well referenced in Section 715 for smoke and draft control fire door assemblies. Newer applications of in-the-field or aftermarket seals may not have been tested in the orientation utilized on elevator doors they are being installed upon. This change by its simple removal or either artificial horizontal or vertical bottom seals (duct tape) from material tested will insure that the as-installed assembly is an as-tested assembly consistent with IBC Section 715.4.3.1 intent.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Cahanin-FS1-708.14.1

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed replacing bottom seal with "horizontal of vertical seal" is more appropriate in that it reflects current testing practices.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Woestman, Kellen Company, representing Builders Hardware Manufacturers Association (BHMA), requests Disapproval.

Commenter's Reason: BHMA members agree with the proponent of FS48 that these doors are to be tested in accordance with UL 1784 without artificial seals.

However, BHMA members recommend disapproval of FS48 as the proposed changes of FS48 are addressed in UL1784 and including this language in the code will require revising door assembly test reports to unnecessarily affirm test conditions explicitly required by UL 1784.

UL 1784 states, in Section 1.3, "These requirements apply to complete door assemblies or to gasketing systems intended for use with specific door assemblies."

Section 5.4.5 of UL 1784 permits the air leakage testing of door assemblies using an artificial seal along the bottom edge only. There are no provisions in UL 1784 for testing with artificial vertical edge seals. As such, this code change is not needed. In addition, a provision in the code which is inconsistent with the referenced test standard and resulting listings will be confusing to code users.

Final Action: AS AM AMPC____ D

FS51–09/10
708.14.1-708.14.2.11

Proposed Change as Submitted

Proponent: Mike Ashley, CBO, representing Alliance for Fire & Smoke Containment & Control, Inc.

Revise as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the street floor, provided the entire street floor is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 708.2 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1. Group I-2 occupancies;
   4.2. Group I-3 occupancies; and
   4.3. High-rise buildings.
5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 711 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 711.5.2, 711.5.3, and 715.4.8 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 716.5.4.1.

~~6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 708.14.2.~~

~~7~~ 6. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.3.

Delete without substitution:

~~**708.14.2 Enclosed elevator lobby.** Where elevator hoistway pressurization is provided in lieu of required enclosed elevator lobbies, the pressurization system shall comply with this section.~~

~~**708.14.2.1 Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inches of water (25 Pa) and a maximum positive pressure of 0.25 inches of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.~~

~~**708.14.2.2 Rational analysis.** A rational analysis complying with Section 909.4 shall be submitted with the *construction documents*.~~

~~**708.14.2.3 Ducts for system.** Any duct system that is part of the pressurization system shall be protected with the same *fire-resistance rating* as required for the elevator shaft enclosure.~~

~~**708.14.2.4 Fan system.** The fan system provided for the pressurization system shall be as required by this section.~~

~~**708.14.2.4.1 Fire resistance.** When located within the building, the fan system that provides the pressurization shall be protected with the same *fire-resistance rating* required for the elevator shaft enclosure.~~

~~**708.14.2.4.2 Smoke detection.** The fan system shall be equipped with a smoke detector that will automatically shut down the fan system when smoke is detected within the system.~~

~~**708.14.2.4.3 Separate systems.** A separate fan system shall be used for each elevator hoistway.~~

~~**708.14.2.4.4 Fan capacity.** The supply fan shall either be adjustable with a capacity of at least 1,000 cfm (.4719 m3/s) per door, or that specified by a *registered design professional* to meet the requirements of a designed pressurization system.~~

~~**708.14.2.5 Standby power.** The pressurization system shall be provided with standby power from the same source as other required emergency systems for the building.~~

~~**708.14.2.6 Activation of pressurization system.** The elevator pressurization system shall be activated upon activation of the building fire alarm system or upon activation of the elevator lobby smoke detectors. Where both a building fire alarm system and elevator lobby smoke detectors are present, each shall be independently capable of activating the pressurization system.~~

~~**708.14.2.7 Special inspection.** *Special inspection* for performance shall be required in accordance with Section 909.18.8. System acceptance shall be in accordance with Section 909.19.~~

~~**708.14.2.8 Marking and identification.** Detection and control systems shall be marked in accordance with Section 909.14.~~

~~**708.14.2.9 Control diagrams.** Control diagrams shall be provided in accordance with Section 909.15.~~

~~**708.14.2.10 Control panel.** A control panel complying with Section 909.16 shall be provided.~~

~~**708.14.2.11 System response time.** Hoistway pressurization systems shall comply with the requirements for smoke control system response time in Section 909.17.~~

Reason: This proposed change deletes the option to provide for pressurization of the elevator shaft as an equivalent solution to the use of the enclosed elevator lobby and other alternatives described in Section 708.14.1. The intent of this section is to define compliance alternatives that provide equivalent protection of the elevator shaft from vertical smoke migration. In the case of the elevator shaft pressurization option defined in Section 708.14.2, questions have been raised as to the effective equivalency of this option with the others. If elevator shaft pressurization is chosen as an alternative solution, it must work effectively in conjunction with other building systems, and particularly with stair shaft pressurization which is a requirement for buildings as required in Sections 403.5, 1022.9 and 909.20.5. Stair shaft pressurization must maintain a minimum pressure differential of 0.10 inches of water (25 Pa) (Section 909.20.5) and a maximum pressure differential of 0.35 inches of water (87 Pa). Section 708.14.2.1 requires a pressurization differential of between 0.10 (minimum) and 0.25 (maximum) inch water gauge. This can cause interference between the two pressurization systems as the two systems must be balanced so that they can operate simultaneously. This balance is difficult to attain as the stair shaft pressurization system operates with only one leakage point per floor at the egress door into the stair shaft. The elevator shaft pressurization system must maintain the designated pressure differential across a much larger leakage area, usually multiple elevator door and frame systems at each floor. The leakage at the stair shaft at the door will typically be 200 cfm or less, while the leakage across a standard two leaf 3.5 ft by 7 ft elevator door and frame will be 600 – 900 cfm. Most floors will have two to three openings per floor, providing for a much larger leakage area to be overcome by the elevator shaft pressurization system.

A recent study published in *Building and Environment Journal* raised this question of competing pressurization systems. The study, “On stairwell and elevator shaft pressurization for smoke control in tall buildings”, by Dr. Richard S. Miller and Dr. Don Beasley, with the Department of Mechanical Engineering at Clemson University, studied three scenarios: operation of the stair shaft pressurization system alone, operation of the elevator shaft pressurization system alone, and operation of the two systems simultaneously. They used the CONTAM simulation software to model these three scenarios in both a residential and commercial building thirty stories in height. The two occupancy types selected used data driven exterior leakage rates from documented sources. CONTAM is one of the key tools developed and used by NIST in modeling computational fluid dynamics scenarios for smoke travel in building fires.

The study found that stair shaft pressurization was feasible because the stair shaft has only one entry point per floor, and the single gasketed swing door at that point of entry represents a relatively small leakage area. When elevator shaft pressurization air flow was analyzed, the study found that (quoting for the abstract section) “…elevator shaft pressurization systems are found to produce prohibitively large pressure differences across both the elevator and stairwell doors if (1) minimum pressure differences must be maintained at both open and closed elevator doors, and (2) if the system must function properly when the ground floor exterior building doors are closed.” This was found to be true even with the revised positive pressure limits provided in Section 708.14.2.1 (minimum positive pressure of 0.10 inches of water (25 Pa) and a maximum positive pressure of 0.25 inches of water (67 Pa) with respect to adjacent occupied space on all floors.

The study concluded that this was due primarily to the much larger leakage rates at the elevator door and frame, and the substantially added leakage that occurs on the Phase I recall floor where the doors are parked in the open position. Because the ground floor exterior doors (typically the Phase I recall floor) are normally closed, this results in over pressurization of this floor. The effect is that “the across elevator door pressure difference is increased substantially on the second floor (as well as on all the remaining floors). The elevator shaft pressurization system also interfered with the stair shaft pressurization system in the modeling scenarios due to the high pressures that were needed to provide positive pressure in the elevator shaft. The study also found that “fan location, vents, and louvers were all found to be ineffective as means of controlling the shaft pressures.” In addition, the study found that “…substantially different fan flow rates are required based on the exterior temperature (Table 3). Therefore, a system calibrated and tested during one season may have significantly different behavior during other seasons.”

The data generated by this study raises the question as to whether or not elevator shaft pressurization should be considered as a functionally equivalent solution to the other code compliant solutions defined in Section 707.18.1 for protecting the elevator shaft from vertical smoke migration. It is also generally known that testing and commissioning elevator shaft pressurization systems is difficult and susceptible to daily variations in atmospheric temperature.

For these reasons, we urge the membership to approve this code change as submitted.

References:

Miller, Richard S. and Beasley, D. On stairwell and elevator shaft pressurization for smoke control in tall buildings, Building and Environment (2008), doi:10.1016/j.buildenv.2008.09.015

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Code change proposals FS51, FS52 and FS53 address elevator lobby pressurization requirements. FS51 deletes the requirements and FS52 and FS53 revise the requirements. The committee needs to make its intent clear with respect to these provisions.

ICCFILENAME: ASHLEY-FS1-708.14.1.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee agreed that the deletion hoistway pressurization option was not warranted based on the feasibility of designing a pressurization system as currently provided for in the code.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bill Ziegert, Smoke Guard, Inc., representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

708.14.2 Enclosed elevator lobby. Where elevator hoist-way pressurization is provided in lieu of required enclosed elevator lobbies, the pressurization system shall comply with this section.

708.14.2.1 Pressurization requirements.
Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inches of water (25 Pa) and a maximum positive pressure of 0.25 inches of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. <u>The pressure differentials shall be measured between the hoistway and the adjacent area. In residential buildings the pressure differential is permitted to be measured between the hoistway and the dwelling unit.</u> The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

<u>**Exception:** The pressure differential is permitted to be measured relative to the outdoor atmosphere on floors other than the following</u>

1. <u>The fire floor</u>
2. <u>The two floors immediately below the fire floor, and</u>
3. <u>The floor immediately above the fire floor</u>

<u>**708.14.2.1.1 Use of Ventilation Systems** Ventilation systems, other than hoistway supply air systems, are permitted to be used to exhaust air from adjacent spaces on the fire floor, two floors immediately below, and one floor immediately above the fire floor to the building exterior when necessary to maintain the positive pressure relationships as required in 708.14.2.1 during the operation of the elevator shaft pressurization system.</u>

Commenter's Reason: FS 51 09/10 originally was submitted for the Committee hearings to remove the alternative to an enclosed elevator lobby if elevator shaft pressurization was employed under Exception 6 of 708.14.1 due to concerns that the prescriptive requirements of 708.14.2 were exceptionally difficult to achieve in most high rise buildings. The FS committee voted to Disapprove the change and during their comments, suggested that options be proposed to make this design option acceptable. This modification is based upon work by the City of Seattle that should accomplish those goals of maintaining elevator shaft pressurization as an option to enclosed elevator lobbies.

The issue with the current requirements of 708.14.2 are primarily due to the requirement to meet a minimum differential pressure requirement across hoistway doors of 0.10 inches of water <u>including the recall floor hoistway doors</u>. Achieving the required minimum pressure across the open hoistway doors on the recall floor required such a large volume of pressurization air, that all other floors will be over pressurized. In addition, it is believed that these high volumes in the elevator shaft negatively impact the performance of the pressurization systems for the exit stairs.

The City of Seattle has been at the forefront of allowing elevator shaft pressurization systems for many years and has done significant research with noted smoke control experts on the issues of pressuring elevator shafts. They have developed an approach that allows differential pressures for most of the shaft to be measured to the outside of the building and utilizes a venting approach to increase the differential pressure on the floors closest to the fire incident. Specifically, allowing the differential pressure to be measured to the outside on most floors substantially reduces the pressurization volumes required. In addition, in Seattle they also allow the fire floor and three adjacent floors be vented (exhausted) to the exterior. This venting / exhausting serves to substantially increase the differential pressure across the hoistway doors on the most critical floors which keeps smoke from entering the elevator shaft. The combination of measuring to ambient on most floors, and the option of venting the floors in the vicinity of the fire floor allows all floors to achieve the minimum / maximum pressures with substantially lower pressurization volumes.

Dr. Miller of Clemson University has done extensive modeling of different elevator shaft pressurization designs using the CONTAM model and has concluded that the "Seattle approach" does indeed meet all the prescriptive requirements of the IBC 2009.

Final Action: AS AM AMPC____ D

FS53-09/10
708.14.2.3 (New)

Proposed Change as Submitted

Proponent: Bill Ziegert, representing Smoke Guard, Inc.

Add new text as follows:

<u>**708.14.2.3. Exit Discharge door position**. When elevator hoistway pressurization is activated at least two exit discharge doors to the outside of the building shall be automatically opened and shall remain open for the duration of the operation of the pressurization system. The open exit discharge doors shall be in addition to other doors required to be open for atrium air flow or smoke control systems.</u>

(Renumber subsequent sections)

Reason: Recent computer modeling by experts has called into question the ability of an elevator pressurization system to meet the differential pressure requirements of Section 708.14.2.1 across the hoistway doors. The difficulty is caused by the necessity to design the system to work properly during Elevator Phase 1 Recall where the elevators return to the recall floor and park with the hoistway doors open for the duration of the emergency or until the Fire Service commandeers them under Phase 2.

Unless other precautions are undertaken, the models suggest that if the minimum differential pressure is achieved across the hoistway door openings on the recall floor, all other floors above this will see excessive pressures beyond the code limits and beyond the ability of the elevator doors to operate properly.

Two solutions were proposed including a) opening doors to the outside, or alternately b) providing an enclosed elevator lobby at the recall floor. Only the option of opening doors to the outside is viable however since elevator lobbies at the recall floor would serve minimal benefit as occupants would continually be opening the lobby doors during evacuation thereby defeating the intended purpose.

For additional information see http://www.ces.clemson.edu/~rm/PDF/BandE.pdf

Cost Impact: Minimal cost impact for automatic door opener systems

Analysis: Code change proposals FS51, FS52 and FS53 address elevator lobby pressurization requirements. FS51 deletes the requirements and FS52 and FS53 revise the requirements. The committee needs to make its intent clear with respect to these provisions.

ICCFILENAME: ZIEGERT-FS5-708.14.2.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that this proposal was not technically justified as being a problem in current practice. Further, requiring these exterior doors to open during the operation of the pressurization system could be a health and safety risk to the occupants of the building.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bill Ziegert, Smoke Guard, Inc., representing self, requests Approval as Submitted.

Commenter's Reason: Recent computer modeling by experts has called into question the ability of an elevator pressurization system to meet the (expanded) differential pressure requirements of IBC 2009 - Section 708.14.2.1 across the hoistway doors (minimum of 0.10 inches of water to a maximum of 0.25 inches of water). The difficulty is caused by the mandate in the elevator code that during Phase 1 elevator recall, all elevator cabs return to the exit discharge floor, park with the hoistway doors open, and remain in this position throughout the emergency (unless the Fire Service commandeers them for Phase 2 use). Achieving the minimum differential pressure across the open hoistway doors on the recall floor requires such a substantial volume of pressurization air, that all the upper floors end up being over pressurized. Alternately if the maximum differential pressure is not exceeded on the upper floors, the minimum differential pressure cannot be achieved on the recall floor.

Additional modeling has suggested three solutions including a) leaving the hoistway doors closed during Phase 1 recall (in violation of ASME A17.1), b) providing an enclosed lobby on the ground floor, and c) opening multiple doors to the outside.

For additional information see http://www.ces.clemson.edu/~rm/PDF/BandE.pdf

Final Action: AS AM AMPC____ D

FS54-09/10
708.14.1

Proposed Change as Submitted

Proponent: Dave Frable, U.S. General Services Administration, representing the U.S. General Services Administration

Revise as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the street floor, provided the entire street floor is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 708.2 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1. Group I-2 occupancies;
   4.2. Group I-3 occupancies; and
   4.3. High-rise buildings<u>, except as permitted in exception 5</u>.

<u>5.</u> <u>Enclosed elevator lobbies are not required in Group B occupancies with an occupied floor not greater than 420 feet in height above the lowest level of fire department vehicle access that are protected throughout by an automatic fire sprinkler system designed and installed in accordance with Section 903.3.1.1 and maintained in accordance with Section 903.5.</u>

<u>6</u> ~~5.~~ Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 711 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 711.5.2, 711.5.3, and 715.4.8 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 716.5.4.1.

<u>7.</u> ~~6.~~ Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 708.14.2.

<u>8.</u> ~~7.~~ Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.3.

Reason: The intent of this code change is to acknowledge that Group B occupancies with an occupied floor not greater than 420 feet in height above the lowest level of fire department vehicle access that are protected by an operational automatic fire sprinkler system provide an acceptable level of safety for building occupants and therefore do not warrant the need for enclosed elevator lobbies.

During the 2006/2007 ICC Code Development Hearings in Orlando, the Fire Safety Code Committee approved a similar code change proposal (FS54-06/07) that acknowledged that Group B occupancies of any height that are protected by an operational automatic fire sprinkler system provided an acceptable level of safety for building occupants and therefore did not warrant the need for enclosed elevator lobbies for the following reasons:

1. The proposal ties the exception to a specific occupancy which has a good fire record.
2. The NIST analysis is new technical data that shows a justification for this proposal.
3. The NIST study did address smoke flow in both winter and summer for this low hazard occupancy. When combined with the excellent fire safety record for high-rise buildings, both sprinklered and unsprinklered, this exception appears justified and will help to eliminate this contentious issue which has come before the committee for several years.

However, at the Final Action Hearings of the ICC in May 2007, the ICC membership voted to overturn the Fire Safety Code Committee's recommendation and disapproved the subject code change. At the Hearings, no new technical information was provided to discount any of the Fire Safety Committee's aforementioned rationale for approval as submitted other than several opponents were concerned that it would apply to high-rise office buildings of any height; even those super high-rise office buildings greater than 420 feet in height, where the potential for stack effect in certain areas of the country may be greater and result in the vertical smoke migration through the elevator hoistways.

Therefore, to address this concern, we have limited exception 5 to only apply to Group B occupancies with an occupied floor not more than 420 feet in height above the lowest level of fire department vehicle access.

In addition, the previous research conducted by the National Institute of Standards and Technology (NIST) has shown that sprinklered fires do not represent a significant hazard to the building occupants because the automatic sprinklers activated and extinguished the fire prior to releasing a significant energy or mass. Little or no smoke or gases entered the hoistways, and none reached remote locations in any building regardless of height or other conditions examined[1]. Therefore, it can be concluded that smoke spread in shafts and elevator hoistways is not a problem in Group B occupancies protected throughout with an operational fire sprinkler system since the fire sprinklers both control the burning rate (and thus limit smoke production) and maintain near ambient temperature which limits the buoyancy forces that drive smoke to the shafts where stack affect may cause smoke spread to other floors. It is also widely accepted that operating fire sprinklers will prevent room flashover and full floor fires, and will limit the size of room fires[2]. This conclusion can also be substantiated from a paper presented by Dr. John Klote at the Elevator Symposium on Emergency Use of Elevators in March 2004 and in an article titled "Is There A Need to Enclose Elevator Lobbies In Tall Buildings?", written by Richard Bukowski in the August 2005 *Building Safety Journal*.

In addition, all high-rise fires where smoke spread has been a problem have either been in unsprinklered buildings or partially sprinklered buildings. A recent comprehensive analysis in 2005 of high-rise fires by NFPA identified that no fatalities had occurred for more than a decade in any U.S. high-rise occupancy (> 10 story) other than the 6 fatalities in the unsprinklered Cook County Office Building (2003); the 1 fatality in the unsprinklered First Interstate Bank Building (1991); and 3 firefighter fatalities in the partially sprinklered (unsprinklered on floor of fire origin and several floors above) Meridan Plaza Building (1991). The Murrah Federal Building (1995) and the World Trade Center (1993 & 2001) bombings were excluded from this analysis.

Fire sprinklers control the burning rate (and thus limit smoke production) and maintain near ambient temperature which limits the buoyancy forces that drive smoke to the shafts where stack affect may cause smoke spread to other floors. It is also widely accepted that operating fire sprinklers will prevent room flashover and full floor fires, and will limit the size of room fires. The reliability of sprinklers should not be called into question as an NFPA report issued in 2005 indicated that automatic fire sprinklers successfully operating in reported structural fires was an exemplary 93%. This same report indicated that two-thirds of the automatic fire sprinkler system failures were because the automatic fire sprinkler systems were shut off, an unlikely scenario where jurisdictions adopt the IBC since the IBC requires the supervision of the automatic fire sprinkler system. Hence, the successful operation of an automatic fire sprinkler system designed and installed in compliance with the IBC requirements could be reasonably estimated at 98% (or better, since NFPA indicated that a number of fire incidents extinguished by sprinklers may not even be reported).

In addition to fire sprinklers in these buildings, the 2009 edition of the IBC now requires a number of additional safety enhancements such as: enclosed elevator lobbies for fire service access elevators in buildings greater than 120 feet; enclosed elevator lobbies for occupant evacuation elevators where utilized; two way communication at all elevator landings; an increase of 50% in egress capacity for exit stairs in all buildings; increased cohesive/adhesive bond strength for sprayed fire resistive materials; exit stair path markings in all high rise buildings; etc.

Given the aforementioned protection coupled with the excellent track record for sprinklered B occupancies, and keeping in mind that the purpose of the IBC is to provide minimum requirements to safeguard occupants of buildings from fire and other hazards attributed to the built environment based on sound technical documentation. Also keep in mind that fatalities are very rare in office buildings, even rarer in high-rise office buildings, and surpassingly rare in high-rise office buildings protected with an operational fire sprinkler system.

Last but not least, it should be noted that a similar proposal regarding the enclosure of elevator lobbies was also addressed by the National Fire Protection Association (NFPA) 101 Technical Committee on Industrial, Storage, and Miscellaneous (e.g., High-rise) Occupancies. The NFPA Technical Committee did not approve the proposal to separate elevator hoistways with smoke barriers in sprinkler high-rise buildings based on a lack of technical substantiation. In addition, on June 9, 2005 the NFPA membership approved the 2006 edition of NFPA 101 and supported the Technical Committee's decision to not include a requirement to separate elevator hoistways with smoke barriers in sprinkler high-rise buildings.

Based on all these points stated above, we strongly believe that it is reasonable to state that Group B occupancies that are not more than 420 feet in height, and protected throughout with automatic fire sprinkler system is not a rationale alternative to enclosed elevator lobbies and that automatic fire sprinklers are not an effective method for slowing or stopping the spread of smoke throughout a building protected throughout with an operational automatic fire sprinkler system. In addition, we believe the current requirement for enclosing elevator lobbies in Group B occupancies not more than 420 feet in height, protected throughout by an operational automatic fire sprinkler system has not been based on sound technical documentation and will significantly increase building construction and maintenance costs without increasing the overall safety to the building occupants.

References:

Klote, J.H., Analysis of the Consequences of Smoke Migration through Elevator Shafts, Use of Elevators in Fires and Other Emergencies Workshop. Proceedings. Co-Sponsored by American Society of Mechanical Engineers (ASME International); National Institute of Standards and Technology (NIST); International Code Council (ICC); National Fire Protection Association (NFPA); U.S. Access Board and International Association of Fire Fighters (IAFF). March 2-4, 2004, Atlanta, GA, Guide on Methods for Evaluating Potential for Room Flashover, NFPA 555 2000 ed., Nat Fire Prot Assn, Quincy, MA.

Bukowski, R. W., Is There A Need to Enclose Elevator Lobbies In Tall Buildings?, Building Safety Journal, 26-31 pp, August 2005.

Rohr, K.D and Hall, J.R., Jr., U.S. Experience With Sprinklers and Other Fire Extinguishing Equipment, August 2005.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Frable-FS3-708.14.1-2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The wording is confusing in that it is not clear if the sprinkler system is required for the building or only the B occupancy. Further, sprinkler systems can fail and redundant safety features in a highrise building are needed.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dave Frable, representing U.S. General Services Administration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:
1. Enclosed elevator lobbies are not required at the street floor, provided the entire street floor is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 708.2 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   - 4.1. Group I-2 occupancies;
   - 4.2. Group I-3 occupancies; and
   - 4.3. High-rise buildings, except as permitted in exception 5.

5. Enclosed elevator lobbies are not required in Group B occupancies with an occupied floor not greater than 420 feet in height above the lowest level of fire department vehicle access that are ~~protected~~ <u>equipped throughout the entire building</u> by an automatic fire sprinkler system designed and installed in accordance with Section 903.3.1.1 and maintained in accordance with Section 903.5.

(re-number remaining text accordingly)

Commenter's Reason: The intent of this code change is to acknowledge that high-rise Group B occupancies protected by an operational fire sprinkler system throughout the entire building provides an acceptable level of safety for building occupants and therefore does not warrant the need for enclosed elevator lobbies in buildings < 420 feet in height.

The proposed modifications to G54 have addressed the two concerns raised by the Fire Safety Code Committee regarding this code change proposal. We have revised the text so that it is now clear that the entire building would need to be protected throughout by automatic sprinkler system. In addition, we have included the NFPA website to view the complete 2009 NFPA report on "U.S. Experience With Sprinklers and Other Automatic Fire Extinguishing Equipment" which includes statistics on sprinkler performance. This report can be viewed at:

http://www.nfpa.org/itemDetail.asp?categoryID=521&itemID=18245&URL=Research%20&%20Reports/Fire%20reports/Fire%20protection%20 systems

In essence, we strongly believe that the reliability of sprinklers for office buildings should not be called into question as the subject NFPA report issued in 2009 indicates that automatic wet-pipe fire sprinklers successfully operating in reported structural fires large enough to activate fire sprinklers was an exemplary 96%. This same report indicated that two-thirds of the automatic fire sprinkler system failures were because the automatic fire sprinkler systems were shut off, an unlikely scenario where jurisdictions adopt the IBC since the IBC requires the supervision of the automatic fire sprinkler system. Hence, the successful operation of an automatic fire sprinkler system designed and installed in compliance with the IBC requirements could be reasonably estimated at 98% (or better, since NFPA indicated that a number of fire incidents extinguished by sprinklers may not even be reported). In addition, the report also indicated that in office buildings with wet-pipe fire sprinklers that operated were 99% effective.

It should also be noted that fire sprinklers control the burning rate (and thus limit smoke production) and maintain near ambient temperature which limits the buoyancy forces that drive smoke to the shafts where stack affect may cause smoke spread to other floors. It is also widely accepted that operating fire sprinklers will prevent room flashover and full floor fires, and will limit the size of room fires. Therefore, we believe it is reasonable to state that Group B occupancies that are not more than 420 feet in height, and protected throughout with automatic fire sprinkler system is a rationale alternative to enclosing elevator lobbies in office buildings.

Final Action: AS AM AMPC____ D

FS56-09/10

702.1, 708, 708.1, 708.2, 712.4, 711.4.1 (NEW), 715.5,712.1.1 (NEW), 712.1.4, through 712.1.18, 713 (New), 713.1 (NEW), 713.3, 713.4, 713.4.1, 713.4.1.2,713.4.1.3,713.4.1.4, 713.4.2, 713.4.2.1, 713.4.2.2, 713.5, 714.6

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

Revise as follows:

SECTION 702
DEFINITIONS

702.1 Definitions. The following words and terms shall, for the purposes of this chapter, and as used elsewhere in this code, have the meanings shown herein.

JOINT. The linear opening in or between adjacent ~~fire resistance rated~~ assemblies that is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

L RATING. The air leakage rating of a through penetration firestop system or a fire-resistant joint system when tested in accordance with UL 1479 or UL 2079, respectively.

MEMBRANE PENETRATION. ~~An opening made through one side (wall, floor or ceiling membrane) of an assembly.~~ . A breach in one side of a floor-ceiling, roof-ceiling or wall assembly to accommodate an item installed into or passing through the breach.

MEMBRANE-PENETRATION FIRESTOP. A material, device or construction installed to resist for a prescribed time period the passage of flame and heat through openings in a protective membrane in order to accommodate cables, cable trays, conduit, tubing, pipes or similar items.

MEMBRANE-PENETRATION FIRESTOP SYSTEM. An assemblage consisting of a fire-resistance-rated floor-ceiling, roof-ceiling or wall assembly, one or more penetrating items installed into or passing through the breach in one side of the assembly and the materials or devices, or both, installed to resist the spread of fire into the assembly for a prescribed period of time.

PENETRATION FIRESTOP. A through-penetration firestop or a membrane-penetration firestop.

THROUGH PENETRATION. ~~An opening that passes through an entire assembly.~~ A breach in both sides of a floor, floor-ceiling or wall assembly to accommodate an item passing through the breaches.

THROUGH-PENETRATION FIRESTOP SYSTEM. ~~An assemblage of specific materials or products that are designed, tested and fire-resistance rated to resist for a prescribed period of time the spread of fire through penetrations. The F and T rating criteria for penetration fire stop systems shall be in accordance with ASTM E814 or UL 1479. See definition of "F" rating and "T" rating".~~ An assemblage consisting of a fire-resistance-rated floor, floor-ceiling, or wall assembly, one or more penetrating items passing through the breaches in both sides of the assembly and the materials or devices, or both, installed to resist the spread of fire through the assembly for a prescribed period of time.

(Relocate Section 708 to Section 712 and 713. Renumber subsequent sections)

SECTION ~~709~~ 708
FIRE PARTITIONS

SECTION ~~710~~ 709
SMOKE BARRIERS

SECTION ~~711~~ 710
SMOKE PARTITIONS

SECTION ~~712~~ 711
HORIZONTAL ASSEMBLIES

~~712.4~~ 711.4 Continuity. Assemblies shall be continuous without openings, penetrations or joints except as permitted by this section and Sections ~~708.2~~ 712.1, ~~713.4~~ 714.4, ~~714~~ 715 and 1022.1. Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof construction is maintained. Unprotected skylights shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 704.10. The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.

> **Exception:** In buildings of Type IIB, IIIB or VB construction, the construction supporting the *horizontal assembly* is not required to be fire-resistance-rated at the following:
>
> 1. Horizontal assemblies at the separations of incidental uses as specified by Table 508.2.5, provided the required *fire-resistance rating* does not exceed 1 hour.
> 2. Horizontal assemblies at the separations of *dwelling units* and *sleeping units* as required by Section 420.3.
> 3. Horizontal assemblies at *smoke barriers* constructed in accordance with Section ~~710~~ 709.

711.4.1 Nonfire-resistance-rated assemblies. ~~Linear openings~~ Joints in or between floors assemblies without a required fire-resistance rating shall comply with one of the following:

1. The linear opening shall be concealed within the cavity of a wall.
2. The linear opening shall be located above a ceiling.
3. The linear opening shall be sealed, treated or covered with an approved material or system to resist the free passage of flame and the products of combustion.

   Exception: Joints meeting one of the joint exceptions listed in 715.1

~~712.5~~ 711.5 Penetrations. Penetrations of horizontal assemblies, whether concealed or unconcealed, shall comply with Section ~~713~~ 714.

SECTION ~~708~~ 712
~~SHAFT ENCLOSURES~~ VERTICAL OPENINGS

~~708.1~~ 712.1 General. The provisions of this section shall apply to the vertical opening applications listed in Sections 712.1.1 through 712.1.18. ~~shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.~~

~~**708.2 Shaft enclosure required.** Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.~~

> ~~**Exceptions:**~~

712.1.1 Smoke compartments. Vertical openings contained entirely within a shaft enclosure complying with Section 709 shall be permitted.

~~1.~~ 712.1.2 Individual dwelling unit. ~~A shaft enclosure is not required for~~ Unconcealed vertical openings totally within an individual residential dwelling unit and connecting four stories or less shall be permitted.

~~2.~~ 712.1.3 Escalator and Stairway Openings. ~~A shaft enclosure is not required in~~ Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~for~~ an escalator opening or stairway that is not a portion of the means of egress shall be protected according to Item ~~2.1 or 2.2~~ 712.1.3.1 or 712.1.3.2:

~~2.1~~ 712.1.3.1 Opening size. Where the area of the ~~floor~~ vertical opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.

~~2.2~~ 712.1.3.2 Automatic shutters. Where the vertical opening is protected by approved power-operated automatic shutters at every penetrated floor. The shutters shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.11 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.

~~3.~~ 712.1.4 Penetrations. ~~A shaft enclosure is not required for~~ Penetrations by pipe, tube, conduit, wire, cable and vents shall be protected in accordance with Section ~~713.4~~ 712.4.

~~4.~~ 712.1.5 Ducts. ~~A shaft enclosure is not required for~~ Penetrations by ducts shall be protected in accordance with Section 716.6. Grease ducts shall be protected in accordance with the *International Mechanical Code*.

~~5.~~ 712.1.6 Atriums. In other than Group H occupancies, ~~a shaft enclosure is not required for floor openings complying with the provisions for~~ atriums ~~in~~ complying with Section 404 shall be permitted.

~~6.~~ 712.1.7 Masonry chimney. ~~A shaft enclosure is not required for~~ Approved masonry chimneys shall be permitted where the annular space is fireblocked at each floor level in accordance with Section 717.2.5.

~~7.~~ 712.1.8 Two story openings. In other than Groups I-2 and I-3~~, a shaft enclosure is not required for~~ a floor opening that is not used as one of the applications listed in this section shall be permitted if it complies with all the items below ~~or an air transfer opening that complies with the following:~~

- ~~7.1~~ 1. Does not connect more than two stories.
- ~~7.2~~ 2. Does not contain a stairway or ramp required by Chapter 10. ~~Is not part of the required means of egress system~~.
- 3. Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.
- ~~7.3~~ 4. Is not concealed within the construction of a wall or a floor/ceiling assembly.
- ~~7.4~~ 5. Is not open to a corridor in Group I and R occupancies.
- ~~7.5~~ 6. Is not open to a corridor on nonsprinklered floors ~~in any occupancy~~.
- ~~7.6~~ 7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
- ~~7.7.~~ ~~Is limited to the same smoke compartment~~.

~~8.~~ 712.1.9 Parking garages. ~~A shaft enclosure is not required for~~ Automobile ramps in open and enclosed parking garages shall be permitted where constructed in accordance with Sections 406.3 and 406.4, respectively.

~~9.~~ **712.1.10 Mezzanine.** ~~A shaft enclosure is not required for~~ Vertical ~~floor~~ openings between a mezzanine complying with Section 505 and the floor below shall be permitted. ~~and the floor below.~~

~~10.~~ 712.1.11 Joints. ~~A shaft enclosure is not required for~~ Joints shall be permitted where complying ~~protected by a fire-resistant joint system in accordance~~ with Section ~~714~~ 715.

~~11.~~ 712.1.12 Unenclosed stairs and ramps. A ~~shaft enclosure shall not be required for~~ vertical floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1 shall be permitted.

~~12.~~ 712.1.13 Floor Fire Doors. ~~Floor~~ Vertical openings shall be permitted where protected by floor fire doors in accordance with Section ~~712.8~~ 711.8.

~~13.~~ 712. 1.14. Group I-3. In Group I-3 occupancies, ~~a shaft enclosure is not required for floor~~ vertical openings shall be permitted in accordance with Section 408.5.

~~14.~~ 712.1.15 Elevators in parking garages. ~~A shaft enclosure is not required for e~~ vertical openings for elevator hoistways in open or enclosed parking garages that serve only the parking garage, and complying with 406.3 and 406.4 respectively, shall be permitted..

~~15.~~ **712.1.16 Duct systems in parking garages.** Vertical openings for mechanical exhaust or supply duct systems in open or enclosed parking garages ~~a shaft enclosure is not required to enclose mechanical exhaust or supply duct systems~~ complying with 406.3 and 406.4 respectively, shall be permitted to be unenclosed where ~~when~~ such duct system is contained within and serves only the parking garage.

712.1.17 Nonfire-resistance-rated joints. Joints in or between floors without a required fire-resistance rating shall be permitted in accordance with section 711.4.1.

~~16.~~ **712.1.18 Openings otherwise permitted.** Vertical openings shall be ~~Where~~ permitted where allowed by other sections of this code.

SECTION 713
SHAFT ENCLOSURES

713.1 General. The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 711, or both.

~~708.3~~ 713.2 Materials. *(No change to text)*

~~708.4~~ 713.3 Fire-resistance rating. *(No change to text)*

~~708.5~~ 713.4 Continuity. *(No change to text)*

~~708.6~~ 713.5 Exterior Walls. *(No change to text)*

~~708.7~~ 713.6 Openings. *(No change to text)*

~~708.7.1~~ 713.6.1 Prohibited openings. *(No change to text)*

~~708.8~~ 713.7 Penetrations. *(No change to text)*

~~708.8.1~~ 713.7.1 Prohibited penetrations. *(No change to text)*

~~708.9~~ 713.8 Joints. *(No change to text)*

~~708.10~~ 713.9 Duct and air transfer openings. *(No change to text)*

~~708.11~~ 713.10 Enclosure at the bottom. *(No change to text)*

~~708.12~~ 713.11 Enclosure at top. *(No change to text)*

~~708.13~~ 713.12 Refuse and laundry chutes. *(No change to text)*

~~708.13.1~~ 713.12.1Refuse and laundry chute enclosures. *(No change to text)*

~~708.13.2~~ 713.12.2 Materials. *(No change to text)*

~~708.13.3~~ 713.12.3 Refuse and laundry chute access rooms. *(No change to text)*

~~708.13.4~~ 713.12.4 Termination room. *(No change to text)*

~~708.13.5~~ 713.12.5 Incinerator room. *(No change to text)*

~~708.13.6~~ 713.12.6 Automatic sprinkler system. *(No change to text)*

~~708.14~~ 713.13 Elevator, dumbwaiter and other hoistways. *(No change to text)*

~~708.14.1~~ 713.13.1 Elevator lobby. *(No change to text)*

~~708.14.1.1~~ 713.13.1.1 Areas of refuge. *(No change to text)*

~~708.14.2~~ <u>713.13.2</u> Enclosed elevator lobby. *(No change to text)*

~~708.14.2.1~~ <u>713.13.2.1</u> Pressurization requirements. *(No change to text)*

~~708.14.2.2~~ <u>713.13.2.2</u> Rational analysis. *(No change to text)*

~~708.14.2.3~~ <u>713.13.2.3</u> Ducts for system. *(No change to text)*

~~708.14.2.4~~ <u>713.13.2.4</u> Fan system. *(No change to text)*

~~708.14.2.4.1~~ <u>713.13.2.4.1</u> Fire resistance. *(No change to text)*

~~708.14.2.4.2~~ <u>713.13.2.4.2</u> Smoke detection. *(No change to text)*

~~708.14.2.4.3~~ <u>713.13.2.4.3</u> Separate systems. *(No change to text)*
.
~~708.14.2.4.4~~ <u>713.13.2.4.4</u> Fan capacity. *(No change to text)*

~~708.14.2.5~~ <u>713.13.2.5</u> Standby power. *(No change to text)*

~~708.14.2.6~~ <u>713.13.2.6</u> Activation of pressurization system. *(No change to text)*

~~708.14.2.7~~ <u>713.13.2.7</u> Special inspection. *(No change to text)*

~~708.14.2.8~~ <u>713.13.2.8</u> Marking and identification. *(No change to text)*

~~708.14.2.9~~ <u>713.13.2.9</u> Control diagrams. *(No change to text)*

~~708.14.2.10~~ <u>713.13.2.10</u> Control panel. *(No change to text)*

~~708.14.2.11~~ <u>713.13.2.11</u> System response time. *(No change to text)*

SECTION ~~713~~ <u>714</u>
PENETRATIONS

~~713.3~~ <u>714.3</u> Fire-resistance-rated walls. Penetrations into or through fire walls, fire-barrier walls, smoke-barrier walls and fire partitions shall comply with Sections ~~713.3.1~~ <u>714.3.1</u> through ~~713.3.4~~ <u>714.3.4</u>. Penetrations in smoke barrier walls shall also comply with Section ~~713.5~~ <u>714.5</u>.
~~713.3.1~~ <u>714.3.1</u> Through penetrations. *(No change to text)*

~~713.3.1.1~~ <u>714.3.1.1</u> Fire resistance rated assemblies. *(No change to text)*

~~713.3.1.2~~ <u>714.3.1.2</u> Through penetration firestop system. *(No change to text)*

~~713.3.2~~ <u>714.3.2</u> Membrane penetrations. *(No change to text)*

~~713.3.3~~ <u>714.3.3</u> Dissimilar materials. *(No change to text)*

~~713.4~~ <u>714.4</u> Horizontal assemblies. Penetrations of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a shaft by Section 708.2 shall be protected in accordance with Sections ~~713.4.1~~ <u>714.4.1</u> through ~~713.4.2.2~~ <u>714.4.2.2</u>.

~~713.4.1~~ <u>714.4.1</u> Fire-resistance rated assemblies. Penetrations of the fire-resistance rated floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall comply with Sections ~~714.4.1.1~~ <u>713.4.1.1</u> through ~~713.4.1.4~~ <u>714.4.1.4</u>. Penetrations in horizontal smoke barriers shall also comply with ~~713.5~~ <u>714.5</u>.

~~713.4.1.1~~ <u>714.4.1.1</u> Through penetrations. *(No change to text)*

~~713.4.1.1.1~~ <u>714.4.1.1.1</u> Installation. *(No change to text)*

~~713.4.1.1.2~~ 714.4.1.1.2 Through penetration firestop system. *(No change to text)*

~~713.4.1.2~~ 714.4.1.2 Membrane penetrations. Penetrations of membranes that are part of a horizontal assembly shall comply with Section ~~713.4.1.1.1~~ 714.4.1.1.1 or ~~713.4.1.1.2~~ 714.4.1.1.2. Where floor/ceiling assemblies are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

Exceptions:

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or masonry items where the *annular space* is protected either in accordance with Section 713.4.1.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm2) in any 100 square feet (9.3 m2) of ceiling area in assemblies tested without penetrations.
2. Ceiling membrane penetrations of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm2) in area, provided the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm2) in any 100 square feet (9.29 m2) of ceiling area, and the annular space between the ceiling membrane and the box does not exceed 1/8 inch (3.2 mm).
3. Membrane penetrations by electrical boxes of any size or type, which have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed 1/8 inch (3.2 mm) unless *listed* otherwise.
5. The *annular space* created by the penetration of a fire sprinkler, provided it is covered by a metal eschutcheon plate.
6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.

~~**713.4.1.3 Ducts and air transfer openings.** Penetrations of horizontal assemblies by ducts and air transfer openings shall comply with Section 716.~~

~~713.4.1.4~~ 714.4.1.4 Disimilar materials. *(No change to text)*

~~713.4.2~~ 714.4.2 Nonfire-resistance-rated assemblies. Penetrations of nonfire-resistance rated floor or floor/ceiling assemblies or the ceiling membrane of a nonfire-resistance rated roof/ceiling assembly shall meet the requirements of Section 708 or shall comply with Section ~~713.4.2.1~~ 714.4.2.1 or ~~713.4.2.2~~. 714.4.2.2

~~713.4.2.1~~ 714.4.2.1 Noncombustible penetrating items. Noncombustible penetrating items that connect not more than ~~three~~ five stories are permitted, provided that the annular space is filled to resist the free passage of flame and the products of combustion with an approved noncombustible material or with a fill, void or cavity material that is tested and classified for use in through-penetration firestop systems.

~~713.4.2.2~~ 714.4.2.2 Penetrating items. Penetrating items that connect not more than two stories are permitted, provided that the annular space is filled with an approved material to resist the free passage of flame and the products of combustion.

~~713.5~~ 714.5 Penetrations in smoke barriers. Through-penetration firestop systems in *smoke barriers* shall be tested in accordance with the requirements of UL 1479 for air leakage. The ~~air leakage rate~~ L rating of the system measured at 0.30 inch (7.47 Pa) of water in both the ambient temperature and elevated temperature tests, shall not exceed:
5.0 cfm per square foot (0.025m^3/ s m^2) of penetration opening for each *through-penetration firestop system*; or
A total cumulative leakage of 50 cfm (0.024m^3/s) for any 100 square feet (9.3 m^2) of wall area, or floor area.

Section ~~714~~ 715
FIRE RESISTANT JOINT SYSTEMS

~~714.6~~ 715.6 Fire-resistant joint systems in smoke barriers. Fire-resistant joint systems in smoke barriers, and joints at the intersection of a horizontal *smoke barrier* and an exterior curtainwall, shall be tested in accordance with the requirements of UL 2079 for air leakage. The ~~air leakage rate~~ L rating of the joint system shall not exceed 5 cfm per lineal foot (0.00775 m^3/s m) of joint at 0.30 inch (7.47 Pa) of water for both the ambient temperature and elevated temperature test.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html <http://www.iccsafe.org/cs/cc/ctc/index.html> . Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of vertical openings through the Vertical Opening Study Group, which is part of the area of study, entitled "Balanced Fire Protection." The scope of the activity is noted as:

"To investigate what constitutes an acceptable balance between active fire protection and passive fire protection measures with respect to meeting the fire and life safety objectives of the IBC."

The ICC Vertical Opening Study Group re-grouped after the last ICC code development cycle and again looked at the problems and inconsistencies with Chapter 7 of the 2009 IBC. This statement provides a comprehensive explanation of the code proposals drafted and supported by the study group.

Rather than scrap the affected sections and re-write new text, the study group approached this task using mainly surgical fixes. After careful review we felt that the current content in Chapter 7 is fundamentally sound and familiar to all. We believe the inconsistencies that have developed in Chapter 7are mainly due to the initial drafting of the IBC, where language from each of the three legacy code was used, as is. As concepts in the IBC changed, some of these sections became in conflict with one another, obsolete or created "do loops" where the user never finds the correct requirement.

Most of the changes proposed by the study group are editorial in nature and will not change how the code is applied or used. However, as you will see, the study group has also proposed changes separately that are technical in nature. During the review, we felt there are areas in code that, based on fire statistics, should be improved. The study group was very focused on getting a basic proposal in front of the committee and membership that fixes the code editorially. Our main proposal includes only amendments that this group feels are editorial or very minor changes. In addition to the main proposal, we are also proposing technical changes. The study group is in support of both of these; however we did not want to jeopardize the entire effort because of the technical change debate.

Several of the definitions in Section 702 containing specific terms used in Chapter 7 were modified. Mainly the group wanted to emphasize the difference between openings, penetrations and membrane penetrations, although they are all defined globally as vertical openings. The definitions include the term breach to describe the entry into an assembly. This term was currently used in one of the existing definitions and we expanded its use. Our focus was to properly define the terms so that they can be dealt with in a prescriptive manner regarding vertical openings. In addition, the definition of joints was expanded to include linear openings in both rated or non-rated horizontal assemblies. This amendment was needed to be able to guide the code user to what is needed for non-rated assemblies. Other terms were discussed but the term "joint" was already defined in a way that familiar to all. The term L rating was also defined in a manner consistent with the existing standards and listings.

Section 711.4.1 was added to provide the user with guidance for non-rated assemblies in terms of what to do with open joints between the floor assemblies that allow for independent movement of the building in any plane caused by thermal, seismic, wind or any other loading. Basically, if the joint is not concealed within a cavity of a wall or not covered by a floor topping, then it must be sealed or treated with an approved material. Typically, they are covered by a decorative metal or something similar. This proposal will still allow for that method plus many other methods of sealing the vertical opening that this creates.

Section 711.5 was amended to clarify it applies to concealed and unconcealed penetrations. The study group felt that all penetrations needed to be sealed in some fashion, to reduce accelerated structural damage due to a breach in the assembly. Vertical openings should be protected in some way, whether the assembly is rated or non-rated. The added exception provides for joints that meet the exceptions in 715.1 and do not required additional measures.

Section 708 was changed to Section 712 to come after Horizontal Assemblies. The 2009 currently states that all vertical openings require a shaft and then give 17 exceptions to providing that shaft. Realizing that in today's built environment a shaft enclosure is only one of many ways to deal with a vertical opening, we re-named Section 712 (previously Section 708) to Vertical Openings and re-wrote the exceptions to become available options for dealing with the multitude of various vertical openings encountered within a building. Additionally, we felt that the code should be specific on where to go to find the requirements for each application. And finally we felt users should not be able to use sections that are out of context, such as the example of using current Exception 7 for penetrations.

Section 712.1.8 was further modified to clarify the meaning "required means of egress" and to remind the user that smoke and fire barriers cannot be penetrated with an unprotected vertical opening. Additionally "limited to the same smoke compartment" was removed because the charging statement eliminates I-2 and I-3 occupancies from consideration.

A new sections were added under Section 712.1.17 that provides guidance for joints in non-rated assemblies, previously discussed.
The term "vertical" was added where the current 2009 Code section 708 used just the term "opening". We felt this clarification is consistent with our overall goal to emphasize the difference between vertical openings used for convenience and those vertical openings which are used as penetrations, joint and other applications where the vertical opening is breached by an object and intended to be sealed.

An exception was added to Section 714.4.1.2 Membrane Penetrations that exempts membrane penetrations by non-combustible items in concrete floors. Membrane penetration requirements were not intended to address embedded or cast non-combustible items within concrete floors. This condition has never been shown to be a problem. Reports from fires show that this application performs very well in real fire conditions without compromising the integrity of the structure or allowing fire spread.

The study group believes that these amendments, explained so far are all very minor or editorial in nature and do reflect any new technical requirements.

Definitions: Reason for change

These terms were either added or modified based on previous and current VO study group work.

711.4.1: Reason for change

This section was proposed to address holes in unrated floor ceiling assemblies. After a conference call on 3/31, it was determined that the term "linear opening" needed a definition or change the term.
Further work to address the term is needed. To be completed by the CTC meeting.

712:Reason for changes

Section 708 was identified as being a problem.

This proposal removes the exceptions to providing a shaft a makes them options for vertical openings. No technical changes occurred.
Alternate code change 708.1.8 is a technical change that is being proposed for discussion.

714: Reason for change.

Indentified as a problem at the Balt. MD CTC meeting.

No guidance was given as to how the measurement is to be taken.
This proposal mandates the full height of the wall as one dimension when calculating the 100 sq. ft. This was determined to be the area most affected

A 10 ft. x 10 ft. square was chosen as an easy visual reference for inspectors in the field. This was determined to be area most affected.
An exception was added to stipulate that penetrations (membrane) in solid concrete floors was not considered a membrane penetration.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HEILSTEDT-FS1-702.1

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee agreed that the proposal was a good reorganization of the requirements for vertical openings. The committee did recognize that there were also some minor technical changes and felt that these were appropriate and reasonable.

Note: The following modification was considered editorial:

712.1.4 Penetrations. Penetrations by pipe, tube, conduit, wire, cable and vents shall be protected in accordance with Section 714 ~~712.4~~.

(Portions of the proposal not shown remain unchanged)

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gregory R. Keith, Professional heuristic Development, representing the Boeing Company, requests Approval as Modified by Public Comment.

Modify the proposal as follows:

~~**711.4.1 Nonfire-resistance-rated assemblies.** Joints in or between floors assemblies without a required fire-resistance rating shall comply with one of the following:~~

1. ~~The linear opening shall be concealed within the cavity of a wall.~~
2. ~~The linear opening shall be located above a ceiling.~~
3. ~~The linear opening shall be sealed, treated or covered with an approved material or system to resist the free passage of flame and the products of combustion.~~

~~**Exception:** Joints meeting one of the joint exceptions listed in 715.1~~

711.5 Penetrations. Penetrations of horizontal assemblies~~, whether concealed or unconcealed,~~ shall comply with Section 714.

~~**712.1.17 Nonfire-resistance-rated joints.** Joints in or between floors without a required fire-resistance rating shall be permitted in accordance with section 711.4.1.~~

(portions of the proposal not shown remain unchanged)

Commenter's Reason: In its published reason statement, the proponent of FS56-09/10 stated, "Most of the changes proposed by the study group are editorial in nature and will not change how the code is applied or used. However, as you will see, the study group has also proposed changes separately that are technical in nature. During the review, we felt there are areas in code that, based on fire statistics, should be improved. The study group was very focused on getting a basic proposal in front of the committee and membership that fixes the code editorially. Our main proposal includes only amendments that this group feels are editorial or very minor changes. In addition to the main proposal, we are also proposing technical changes. The study group is in support of both of these; however we did not want to jeopardize the entire effort because of the technical change debate."

It is acknowledged that much of FS56-09/10 reorganizes existing Chapter 7 provisions. Although the proponent suggests that the proposal "includes only amendments that this group feels are editorial or very minor changes," certain more stringent technical requirements have been introduced that have not been debated in the code development process to this point. Specifically, the proposal creates requirements for the protection of joints in nonfire-resistance rated floor assemblies. Additionally, it expands the scope of penetration requirements in horizontal assemblies to include those concealed within the assembly. Although the proponent states that these changes are based on fire statistics, no such statistics or other technical substantiation was offered for the inclusion of either one of these more stringent requirements in the IBC.

Section 711 (current Section 712) applies to "horizontal assemblies." The definition of horizontal assembly in Section 702.1 states, "A fire-resistance rated floor or roof assembly of materials designed to restrict the spread of fire in which continuity is maintained." 2009 Section 712.1 states, "Floor and roof assemblies required to have a fire-resistance rating shall comply with this section." Additionally, it states, "Nonfire-resistance-rated floor and roof assemblies shall comply with Section 713.4.2." Section 713.4.2 prescribes penetration protection in nonfire-resistance rated floor and roof assemblies under certain conditions. Although additional requirements have been created for non-fire resistance rated assemblies, they are not referenced in the section charging language (Section 711.1). As previously stated, there has been absolutely no technical justification or fire statistics that would demonstrate the need for additional joint protection in nonfire-resistance rated floor or roof assemblies. Additionally, the proposed requirements are more stringent in scope than the current penetration protection requirements for nonfire-resistance rated floor and roof assemblies based on the number of interconnected stories.

Also, Section 717 currently provides requirements for the protection of concealed spaces. Increasing the scope of Section 711.5 to include concealed spaces, is without precedence, without technical substantiation, without loss history and is entirely inappropriate.

These two provisions intended to increase protection requirements in nonfire-resistance rated construction are significant technical changes that deserve proper technical debate. To disguise these requirements as "editorial or very minor" is an insult to the objective code development process. The proponent indicated that technical changes were separately submitted. These questioned provisions that increase opening protection requirements for nonrated floor and roof assemblies should have been individually considered by the ICC Fire Safety Code Committee and the ICC membership. If the format provided by FS56-09/10 is preferred over current provisions, then it is recommended that the item be approved as modified by deleting the noted significant technical changes that were not even addressed during discussion of the proposal in Baltimore.

Public Comment 2:

Sarah A. Rice, CBO, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 711
HORIZONTAL ASSEMBLIES

711.4 Continuity. Assemblies shall be continuous without openings, penetrations or joints except as permitted by this section ~~and Sections 712.1, 714.4, 715 and 1022.1.~~ Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof construction is maintained. Unprotected skylights shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 704.10. The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.

Exception: In buildings of Type IIB, IIIB or VB construction, the construction supporting the *horizontal assembly* is not required to be fire-resistance-rated at the following:

1. Horizontal assemblies at the separations of incidental uses as specified by Table 508.2.5, provided the required *fire-resistance rating* does not exceed 1 hour.
2. Horizontal assemblies at the separations of *dwelling units* and *sleeping units* as required by Section 420.3.
3. Horizontal assemblies at *smoke barriers* constructed in accordance with Section 709.

711.8 Vertical openings. Vertical openings in horizontal assemblies shall be enclosed in a shaft constructed in accordance with Section 713 or comply with Section 712.

711.9 Means of egress stairs and ramps. Vertical openings in horizontal assemblies containing stairs or ramps required to comply with Chapter 10 shall comply with Section 1022.1.

(Renumber subsequent sections)

(Portions of proposal not shown remain unchanged)

Commenter's Reason:
711.4 – The modification eliminates the laundry list of section numbers as with the incorporation of new section 711.8, each is already referenced within the body of Section 711. Section 712 are addressed through references in new Sections 711.8 and 711.9, Section 714.4 is referenced in current 2009 IBC Section 712.6, Section 715 is referenced in current 2009 IBC 712.5

711.8 & 711.9 – The addition of these 2 sections brings consistency into the section. Currently all types of "holes" are addressed except for those that qualify as "vertical openings" and those that contain stairs or ramps required by Chapter 10. With the changes made through FS56-09/10 we now have a section on "vertical openings." The revisions add references to that new section and current 2009 IBC Section 1022.

Public Comment 3:

Sarah A. Rice, CBO, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 712
VERTICAL OPENINGS

712.1 General. <u>In accordance with Section 711.4, vertical openings through floor and roof assemblies shall comply with the provision of this section or be enclosed in a shaft constructed in accordance with Section 713</u> ~~The provisions of this section shall apply to the vertical opening applications listed in Sections 712.1.1 through 712.1.18.~~

<u>Exception:</u> <u>Vertical openings that comply with Section 714.4, 715 or 1022.1.</u>

712.1.1 Smoke compartments. Vertical openings contained entirely within a <u>smoke compartment</u> ~~shaft enclosure~~ complying with Section <u>407 or 408</u> ~~709~~ shall be permitted.

(Portions of proposal not shown remain unchanged)

Commenter's Reason:

712.1 - The charging section has been revised to make it clear that there are two paths that the designer may choose for protecting a vertical opening – enclose it in a shaft (Section 713) or meet one of the parameters found in new Section 712.

712.1.1 - In Section 712.1.1, the language has been modified to clarify the original intent – vertical openings in smoke compartments (only found in hospitals & penal facilities) are allowed within the parameters outlined in Sections 407 and 408.

Public Comment 4:

Sarah A. Rice, CBO, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

712.1.8 Two story openings. In other than Groups I-2 and I-3, a floor opening that is not used as one of the applications listed in this section shall be permitted if it complies with all the items below:

1. Does not connect more than two stories.
2. Does not contain a<u>n exit</u> stairway or ramp required by Chapter 10.
3. Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.
4. Is not concealed within the construction of a wall or a floor/ceiling assembly.
5. Is not open to a corridor in Group I and R occupancies.
6. Is not open to a corridor on nonsprinklered floors.
7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

712.1.10 Mezzanine. Vertical floor openings between a mezzanine<u> or mezzanines,</u> complying with Section 505 and the floor below shall be permitted.

712.1.11 <u>Fire-resistance rated</u> Joints. Joints shall be permitted where complying with Section 715.

(Portions of proposal not shown remain unchanged)

Commenter's Reason:

712.1.8 - The modification is needed to make it clear that the stair or ramp limitation in new Section 712.1.8, Item 3 is only for "exit" stairs. Given the revisions proposed for Chapter 10 in code change E5-09/10 (which was Approved as Submitted by the MOE Code Development Committee) some may interpret the limitation to apply to any stair or ramp covered by Chapter 10 – which is ALL stairs and ramps but this provision is only applicable to those that are "exits." Should E5-09/10 not be successful the proposed modification is still appropriate as it then emphasizes which stairs and ramps are being limited. Stairs and ramps that provide only intercommunication and are not required for the means of egress system would acceptable.

712.1.10 – The modification is needed to recognized that there may be more than one mezzanine in a story.

712.1.11 – The modification is needed so as to distinguish clearly this section from the provisions in new section 712.1.17 "nonfire-resistance rated joints."

Public Comment 5:

Gregory R. Keith, Professional heuristic Development, representing the Boeing Company, requests Disapproval

Commenter's Reason: The ICC Code Technology Committee (CTC) appointed a Vertical Openings Study Group on December 13, 2006. The CTC recognized that there were technical inconsistencies in IBC Chapter 7 requirements for the protection of openings in horizontal assemblies intended to restrict the vertical movement of fire. There were also concerns that opening and penetration requirements for horizontal assemblies were difficult for users to properly determine. It was suggested that there needs to be a vertical migration strategy and that technical requirements should support that strategy in concert, as opposed to being a collection of abstract requirements that perhaps achieve no practical end. Specifically, there were concerns that certain provisions required the protection of openings or penetrations in a given horizontal assembly while exceptions permitted unprotected openings in the same assembly.

FS56-09/10 was the second Vertical Opening Study Group attempt to achieve the CTC's stated goals. Upon close analysis, FS56 does very little to improve Chapter 7 provisions. The proponent's published reason statement explains, "Most of the changes proposed by the study group are editorial in nature and will not change how the code is applied or used. However, as you will see, the study group has also proposed changes separately that are technical in nature. During the review, we felt there are areas in code that, based on fire statistics, should be improved. The study group was very focused on getting a basic proposal in front of the committee and membership that fixes the code editorially. Our main proposal includes only amendments that this group feels are editorial or very minor changes. In addition to the main proposal, we are also proposing technical changes. The study group is in support of both of these; however we did not want to jeopardize the entire effort because of the technical change debate."

To gain a sense as to how FS56-09/10 actually impacts Chapter 7, the ICC staff has posted a document on the ICC website that shows how the proposal will overlay current Chapter 7 requirements. It can be found as follows: codes, standards and guidelines > Technical Committees > Other Code Committees > Code Technology Committee > Balanced Fire Protection > Study Groups: Vertical Openings > Impact of FS56-09/10. FS 56 provisions appear in red.

• Six definitions were either modified or created.

• Beginning with Section 708, several sections have been renumbered with no technical changes whatsoever.

• Sections 711.4.1 and 711.5 contain significant technical changes, contrary to the proponent's claims. Section 711 (current Section 712) applies to "horizontal assemblies." The definition of horizontal assembly in Section 702.1 states, "A fire-resistance rated floor or roof assembly of materials designed to restrict the spread of fire in which continuity is maintained." 2009 Section 712.1 states, "Floor and roof assemblies required to have a fire-resistance rating shall comply with this section." Additionally, it states, "Nonfire-resistance-rated floor and roof assemblies shall comply with Section 713.4.2." Section 713.4.2 prescribes penetration protection in nonfire-resistance rated floor and roof assemblies under certain conditions. Although additional joint protection requirements have been created for non-fire resistance rated assemblies, they are not referenced in the section charging language (Section 711.1). As previously stated, there has been absolutely no technical justification or fire statistics that would demonstrate the need for additional joint protection in nonfire-resistance rated floor or roof assemblies. Additionally, the proposed requirements are more stringent in scope than the current penetration protection requirements for nonfire-resistance rated floor and roof assemblies based on the number of interconnected stories. Currently, Section 717 provides requirements for the protection of concealed spaces. Increasing the scope of Section 711.5 to include concealed spaces, is without precedence, without technical substantiation, without loss history and is entirely inappropriate.

• A new Section 712 (Vertical Openings) has been created. It essentially represents a laundry list of potential opening protection requirements that potentially apply to floor and roof construction. The new section restates many provisions contained elsewhere in the Chapter 7. For instance, Sections 711.6 and 712.1.11 state essentially the same thing. The various opening protection requirements should be placed in the context of the assembly that they protect.

• Section 713 shaft enclosure provisions have been reformatted. What were formally exceptions are now stated as positive requirements. The requirements themselves, are virtually unchanged.

FS56-09/10 does little to improve continuity or understandability of Chapter 7 vertical opening protection requirements. It resolves none of the technical conflicts that currently exist and were the reason that the CTC appointed the Vertical Openings Study Group in the first place. In fact, through the inclusion of new technical requirements applicable to nonfire-resistance rated floor and roof construction, more technical and philosophical inconsistencies have been created. The technical ramifications or fire loss justification of these significant changes were never discussed at any point during the committee hearings. The proposal contains change for change's sake and accomplishes very little except for creating unreasonable, more stringent requirements for nonrated construction and concealed openings within horizontal assemblies. The result of approval of FS56-09/10 will be to only further confuse fundamental provisions that are in need of repair. FS56 should be disapproved and the CTC Vertical Openings Study Group should be instructed to produce a proposal that responds to the CTC's original concerns and actually improves the IBC.

Final Action: AS AM AMPC____ D

FS63-09/10

711.5, 711.6, 711.7

Proposed Change as Submitted

Proponent: Sarah A. Rice, CBO, representing self

Add new text as follows:

711.5 Openings. Openings in smoke partitions shall comply with Sections 711.5.1 and 711.5.2.

711.5.1 Windows. Windows in smoke partitions shall be sealed to resist the free passage of smoke or be automatic-closing upon detection of smoke. ~~Doors in smoke partitions shall comply with this section.~~

711.5.2 Doors. Doors in smoke partitions shall comply with Sections 711.5.2.1 through 711.5.2.3.

711.5.2.1 ~~**711.5.1**~~ **Louvers.** Doors in smoke partitions shall not include louvers.

711.5.2.2 ~~**711.5.2**~~ **Smoke and draft control doors.** Where required elsewhere in the code, doors in smoke partitions shall meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.015424m3/(s m2)) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature test and the elevated temperature exposure test. Installation of smoke doors shall be in accordance with NFPA 105.

711.5.2.3 ~~**711.5.3**~~ **Self- or automatic-closing doors.** Where required elsewhere in the code, doors in smoke partitions shall be self- or automatic-closing by smoke detection in accordance with Section 715.4.8.3.

711.6 Penetrations ~~**and joints**~~**.** The space around penetrating items ~~and in joints~~ shall be filled with an *approved* material to limit the free passage of smoke.

711.7 Joints. Joints shall be filled with an *approved* material to limit the free passage of smoke.

~~711.7~~ 711.8 Ducts and air transfer openings. *(No change to text)*

Reason: The proposed changes create uniformity with how openings, joints, penetrations and air-transfer and duct openings are addressed in other sections.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-FS1F-711

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that this was a good reorganization of the opening requirements for smoke partitions. The committee did recognize the technical change in Section 711.7 and indicated that it was appropriate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, CBO, The Preview Group, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

711.5.1 Windows. Where required elsewhere in the code, windows in smoke partitions shall be sealed to resist the free passage of smoke or be automatic-closing upon detection of smoke.

711.5.2 Doors. Where required elsewhere in the code, doors in smoke partitions shall comply with Sections 711.5.2.1 through 711.5.2.3.

711.7 Joints. Where required elsewhere in the code, joints shall be filled with an *approved* material to limit the free passage of smoke.

(portions of proposal not shown, remain unchanged)

Commenter's Reason: The proposal is intended to clarify when the opening protective provisions in Section 711 have to be installed in a smoke partition. Without the proposed language the intended application of the smoke partition section starts to become unclear.

Let's not forget that the smoke partition section, when originally put into the code, was an orphan – we had a classification of a wall, i.e., smoke partition, but no requirements for there ever to be smoke partitions. It was also put for when "smoke partitions" were introduced that should there ever become a requirement for a smoke partition that each installation would need to be examined to see what function the smoke partition might play and therefore that when it came to "opening protectives" each requirement for a smoke partition would need to assess how openings should be addressed. Not all smoke partitions would need to provide the same level of protection to its openings, thus the concept that was agreed to was to have the section in the code call out what types and level of opening protectives would be needed. The language being added, just reaffirms that the opening protective provisions contained in Section 711 don't kick in unless they are "required elsewhere in the code.

Final Action: AS AM AMPC____ D

FS64–09/10

712 (New)

Proposed Change as Submitted

Proponent: Sarah A. Rice, CBO, representing self

Add new text as follows:

Section 712
NONFIRE-RESISTANCE RATED INTERIOR PARTITIONS AND BARRIERS

<u>**712.1 General.** Nonfire-resistance rated interior partitions shall comply with this section.</u>

<u>**712.2 Materials.** The walls shall be of materials permitted by the building type of construction.</u>

<u>**712.3 Openings.** Unless serving as a smoke partition or required by other sections of this code, openings in nonfire-resistance rated interior partitions shall be not be required to be protected.</u>

<u>**712.4 Penetrations.** Unless serving as a smoke partition or required by other sections of this code, penetrations into or through a nonfire-resistance rated interior partitions shall be not be required to be protected.</u>
<u>**712.5 Joints.** Unless serving as a smoke partition or required by other sections of this code, joints between nonfire-resistance rated interior partitions shall be not be required to be protected.</u>

<u>**712.6 Ducts and air transfer openings.** Unless serving as a smoke partition or required by other sections of this code, ducts and air-transfer openings in nonfire-resistance rated interior partitions shall be not be required to be protected.</u>

(Renumber subsequent sections)

Reason: This proposal introduces a new section on nonfire-resistance rated interior partitions. Often questions regarding construction and levels of protection arise when the wall of a corridor is allowed to not be fire rated because the building is spinklered. When the wall is fire rated it is considered to be a fire partition and has to be constructed as such, but how are the walls that are not fire rated to be constructed? And when an exit stairway is allowed to unenclosed, such as in an open parking garage, but the designer chooses to enclose the stair (maybe for weather purposes) what now are the requirements for the walls around that stair?

This proposal seeks to provide the answer to these questions.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE FS1e NEW 712

<u>Public Hearing Results</u>

Committee Action: Disapproved

Committee Reason: The proposed wording is confusing in that most of the proposal tells the code user what is not required. The code is typically written to indicate what is required.

Assembly Action: None

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, CBO, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Section 712

NONFIRE-RESISTANCE RATED INTERIOR PARTITIONS AND BARRIERS

712.1 General. Nonfire-resistance rated interior partitions<u>, both loadbearing and non-loadbearing,</u> shall comply with this section.

<u>**Exception:** Smoke barriers shall comply with Section 711.</u>

712.2 Materials. The walls shall be of materials permitted by the building type of construction.

712.3 Openings. Unless serving as a smoke partition or required by other sections of this code, openings in nonfireresistance rated interior partitions shall ~~be~~ not be required to be protected.

712.4 Penetrations. Unless ~~serving as a smoke partition or~~ required <u>elsewhere in the</u> ~~by other sections of this~~ code, penetrations into or through a nonfire-resistance rated interior partitions shall ~~be~~ not be required to be protected.

712.5 Joints. Unless ~~serving as a smoke partition or~~ required <u>elsewhere in the</u> ~~by other sections of this~~ code, joints between nonfireresistance rated interior partitions shall ~~be~~ not be required to be protected.

712.6 Ducts and air transfer openings. Unless ~~serving as a smoke partition or~~ required elsewhere in the ~~by other sections of this~~ code, ducts and air-transfer openings in nonfire-resistance rated interior partitions shall ~~be~~ not be required to be protected.

(Renumber subsequent sections)

Commenter's Reason: While I agree in concept with the Committees reason for disapproving this proposal, the overwhelming history of interpretations on this topic drives the need for this section. The Committee stated that "The proposed wording is confusing in that most of the proposal tells the code user what is not required. The code is typically written to indicate what is required."

But ask a Code Official or one of ICC staff how oftern they get asked if doors in non-fireresistance-rated walls have to be fire doors, if closers are required on doors in non-fireresistance-rated walls or if duct openings need dampers. The questions go on and on. And for this topic the need for a section that tells the code user how to address openings in non-fireresistance-rated walls outweighs the negatives.

The references to "Smoke Partiions" have been removed within the body of the section and replaced with a general exception sending the code user to the appropriate section.

Final Action: AS AM AMPC____ D

FS65-09/10
712.3

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise as follows:

SECTION 712
FIRE-RESISTANCE RATED HORIZONTAL ASSEMBLIES

712.1 General. Floor and roof assemblies required to have a fire-resistance rating shall comply with this section. Nonfire-resistance-rated floor and roof assemblies shall comply with Section 713.4.2

712.2 Materials. The floor and roof assemblies shall be of materials permitted by the building type of construction.

712.3 Fire-resistive rating. The fire-resistance rating of floor and roof assemblies shall be a minimum of 1-hour fire-resistance rated construction but not be less than that required by the building type of construction. Where the floor assembly separates mixed occupancies, the assembly shall have a fire-resistance rating of not less than that required by Section 508.3.3 based on the occupancies being separated. Where the floor assembly separates a single occupancy into different fire areas, the assembly shall have a fire-resistance rating of not less than that required by Section 707.3.9. ~~Horizontal assemblies separating dwelling units in the same building and horizontal assemblies separating sleeping units in the same building shall be a minimum of 1-hour fire-resistance-rated construction.~~

> **Exception:** Dwelling unit and sleeping unit separations in buildings of Type IIB, IIIB and VB construction shall have fire-resistance ratings of not less than ½ hour in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

Reason: Adding "Fire Resistance Rated" to the title clarifies that this section only applies to rated horizontal assemblies. The changes in 712.3 are needed to provide coordination with Section 420.3. Currently, Section 420.3 refers to Section 712 for horizontal assemblies but Section 712 does not include scoping for "floor assemblies separating dwelling or sleeping units from other occupancies contiguous to them in the same building" but does include the scoping for "horizontal assemblies separating dwelling units in the same building and horizontal assemblies separating sleeping units in the same building". Deleting the scoping text from 712.3 eliminates the redundancy with Section 420.3. Adding the minimum 1-hour fire-resistance rated construction to Section 712.3 provides clarity similar to that provided in Section 709.3 for Fire Partitions which is also referenced in Section 420.2.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KRANZ-FS1-712.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposed change would conflict with Section 712.1 where you would need to go to Table 601 to determine the requirements for fireresistance. Further, Section 102.1 of the code differentiates between general and specific requirements sufficiently so coordination with 420 is not required and in fact might cause confusion instead of clarity.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lee Kranz representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 712
FIRE-RESISTANCE RATED HORIZONTAL ASSEMBLIES

712.1 General. Floor and roof assemblies required to have a fire-resistance rating shall comply with this section. Nonfire-resistance-rated floor and roof assemblies shall comply with Section 713.4.2

712.2 Materials. The floor and roof assemblies shall be of materials permitted by the building type of construction.

712.3 Fire-resistive rating. The fire-resistance rating of floor and roof assemblies shall ~~be a minimum of 1-hour fire-resistance rated construction but~~ not be less than that required by the building type of construction. Where the floor assembly separates mixed occupancies, the assembly shall have a fire-resistance rating of not less than that required by Section 508.3.3 based on the occupancies being separated. Where the floor assembly separates a single occupancy into different fire areas, the assembly shall have a fire-resistance rating of not less than that required by Section 707.3.9. <u>Horizontal assemblies separating dwelling units or sleeping units from other dwelling units or sleeping units or from other occupancies contiguous to them in accordance with Section 420 shall have a minimum fire-resistance rating of 1-hour.</u>

> **Exception:** Dwelling unit and sleeping unit separations in buildings of Type IIB, IIIB and VB construction shall have fire-resistance ratings of not less than ½ hour in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

Commenter's Reason: As advised by the Fire Safety Committee in Baltimore, the language for this proposal has been modified to resolve potential conflicts with Table 601 for type of construction. The language has also been revised to clarify that horizontal assemblies must be not less than 1-hour rated when separating dwelling or sleeping units from other dwelling or sleeping units <u>or from other occupancies contiguous to them</u>. This modification is needed to provide coordination with Section 420.3. Currently, Section 420.3 refers to Section 712 for horizontal assemblies but Section 712 does not specify an hourly rating for floor assemblies separating dwelling or sleeping units from other occupancies contiguous to them in the same building.

Final Action: AS AM AMPC____ D

FS70-09/10
713.3.1.1, 713.4.1.1.2, 716.3.1 (IMC 607.3.1)

Proposed Change as Submitted

Proponent: Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing In-O-Vate Technologies, Inc.

Revise as follows:

713.3.1.2 Through-penetration firestop system. Through penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water and shall have an F <u>and T</u> rating of not less than the required fire-resistance rating of the wall penetrated.

713.4.1.1.2 Through-penetration firestop system. Through penetrations shall be protected by an approved through-penetration firestop system installed and tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (2.49 Pa). The system shall have an F-rating and a T-rating of not less than 1 hour but not less than the required rating of the floor penetrated.

~~Exception:~~ ~~Floor penetrations contained and located within the cavity of a wall do not require a T- rating.~~

716.3.1 (IMC 607.3.1) Damper testing. Dampers shall be listed and bear the label of an approved testing agency indicating compliance with the standards in this section. Fire dampers shall comply with the requirements ofUL555. <u>In addition, fire dampers shall be tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (2.49 Pa). The system shall have a T-rating of not less than rating of the penetrating assembly</u>. Only fire dampers labeled for use in dynamic systems shall be installed in heating, ventilation and air-conditioning systems designed to operate with fans on during a fire. Smoke dampers shall comply with the requirements of UL 555S. Combination fire/smoke dampers shall comply with the requirements of both UL 555 and UL 555S. Ceiling radiation dampers shall comply with the requirements of UL 555C.

Reason: During the last code change cycle, I attempted to remove the requirement for a "T rating" on a horizontal penetration of a membrane by a box. The opposition provided a compelling argument supporting the inclusion of a "T rating" that the membership supported.

While I did not agree with the testimony supporting a "T rating," I do support consistency in the code. If the arguments for "T ratings" are compelling for a box membrane penetration, then the same argument would support a "T rating" for a full horizontal penetration and a duct penetration.

If a duct penetrated a membrane, there is currently no requirement for a "T rating." How can this be allowed in the code when a smaller box penetration of a membrane must have a "T rating?" This does not make sense. Both membrane penetrations present the same hazard.

The same can be said for any full penetration. How can we ignore the "T rating?" Clearly, without a "T rating" the penetration is not equivalent to an ASTM E119 assembly. Again, this was the argument used during the last code change cycle.

There needs to be consistency in the Building Code. I have an alternative change to Section 713.3.2 that removes the "T rating" for horizontal penetration of a membrane by a box. Either this change or that change must be accepted for the code to be consistent.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: BALLANCO-FS1-713.3.1.2

<u>Public Hearing Results</u>

Committee Action: Disapproved

Committee Reason: The committee felt that there was no technical justification for the T-rating requirement to be added for all through penetration firestop systems. The committee also felt that the exception to 713.4.1.1.2 has been well established and should not be removed.

Assembly Action: None

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

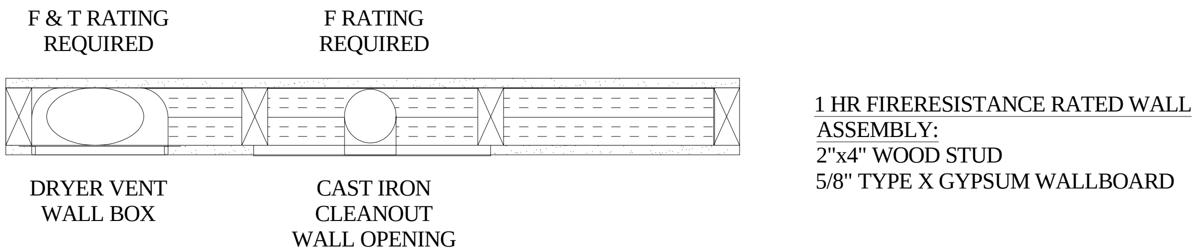
Public Comment:

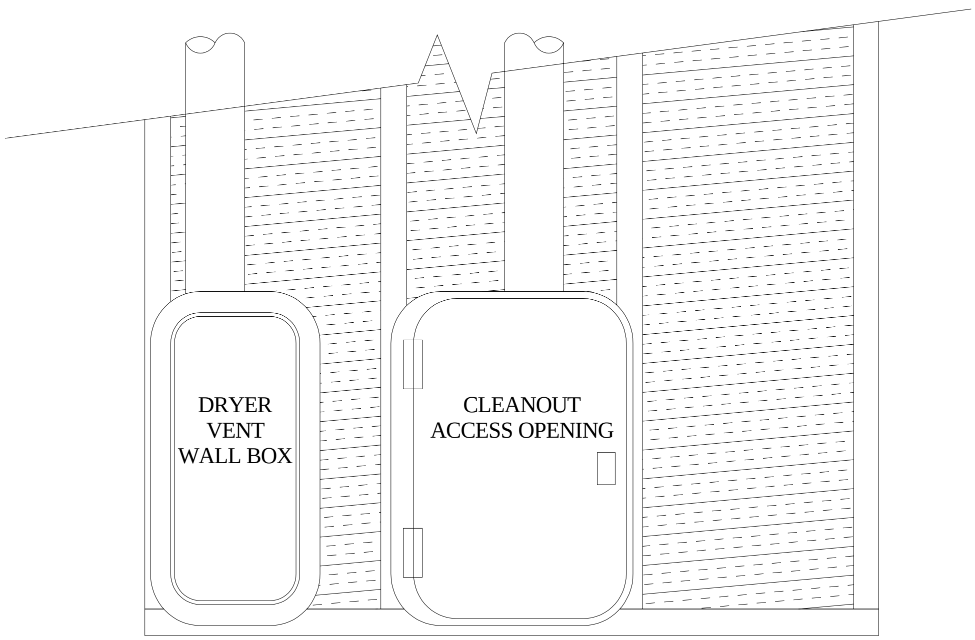
Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing In-O Vate Technologies, requests Approval as Submitted.

Commenter's Reason: The Committee failed to address the single concern that I raised with Code Change F70-09/10. That concern is, "Why does the code require a "T" rating for a box penetrating a wall while not requiring a "T" rating for any other wall penetration?

Either a "T" rating is appropriate or it is not. I have included a drawing of the absurdity of the current code requirement. If a dryer vent box is located in a 1 hour wall, the box penetration must have an F and T rating. Right alongside the dryer vent box, a cleanout wall opening to a cast iron pipe is shown. That opening only requires an F rating. Yet, the hazard is the same for both openings. Anything you say about the one opening, you can say about the other opening. This is true for so many other wall penetrations that are not boxes.

So, the real question is, do we need a T rating (in addition to an F rating) for wall penetrations? I do not believe we do. That is why I would encourage the membership to vote to approve Code Change F71-09/10. If the membership believes a T rating is necessary, then I have provided that opportunity with Code Change F70-09/10.





Commenter's Reason:

Final Action: AS AM AMPC____ D

FS71-09/10
713.3.2

Proposed Change as Submitted

Proponent: Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing In-O-Vate Technologies, Inc.

Revise as follows:

713.3.2 Membrane penetrations. Membrane penetrations shall comply with Section 713.3.1. Where walls or partitions are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire-resistance will not be reduced.

Exceptions:

(Exceptions not shown remain unchanged)

4. Membrane penetrations by boxes, other than electrical boxes, provided such penetrating items and the annular space between the wall membrane and the box, are protected by an approved membrane penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water, and shall have an F ~~and T~~ rating of not less than the required fire-resistance rating of the wall penetrated and be installed in accordance with their listing.

Reason: I submitted this change to the last cycle when the “T rating” was added to the membrane box penetration. This was not a requirement in the 2006 edition of the IBC. Traditionally, the IBC has never required a “T rating” for horizontal penetrations. This is the first requirement for such a rating.

It is my opinion that the code should be consistent. I have submitted another change that adds the “T rating” for all horizontal penetrations. Either all horizontal penetrations or no horizontal penetrations should be required to have a “T rating.” The code cannot be inconsistent.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BALLANCO-FS2-713.3.2.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the T-rating for the items described in item 4 of 713.3.2 was appropriate and was cost effective to achieve during the testing of the boxes and therefore should remain as a requirement.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

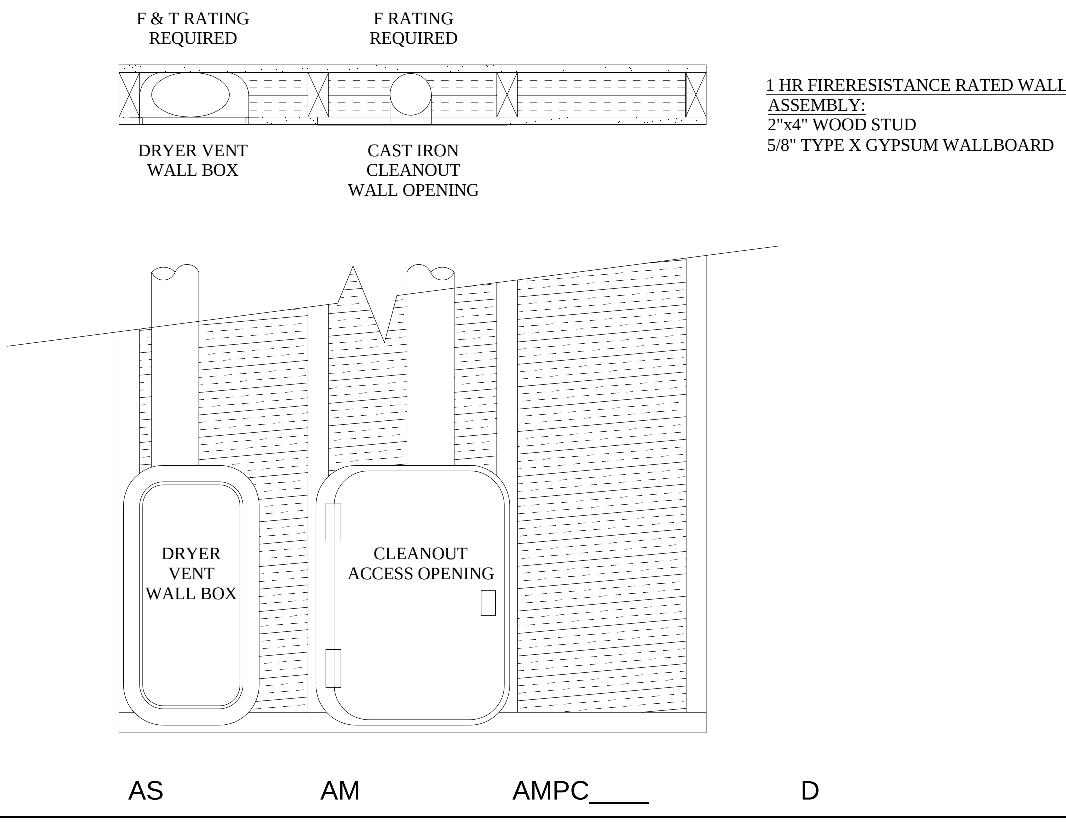
Public Comment:

Julius Balance, PE, JB Engineering and Code Consulting, PC, representing In-O-Vate Technologies, requests Approval as Submitted.

Commenter's Reason: The Committee failed to address the single concern that I raised with Code Change F71-09/10. That concern is, “Why does the code require a “T” rating for a box penetrating a wall while not requiring a “T” rating for any other wall penetration?

Either a “T” rating is appropriate or it is not. I have included a drawing of the absurdity of the current code requirement. If a dryer vent box is located in a 1 hour wall, the box penetration must have an F and T rating. Right alongside the dryer vent box, a cleanout wall opening to a cast iron pipe is shown. That opening only requires an F rating. Yet, the hazard is the same for both openings. Anything you say about the one opening, you can say about the other opening. This is true for so many other wall penetrations that are not boxes.

So, the real question is, do we need a T rating (in addition to an F rating) for wall penetrations? I do not believe we do. That is why I would encourage the membership to vote to approve Code Change F71-09/10. If the membership believes a T rating is necessary, then I have provided that opportunity with Code Change F70-09/10.



Final Action: AS AM AMPC____ D

FS72-09/10
713.2 (New)

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc, representing Firestop Contractors International Association

Add new text as follows:

713.2 Contractor Qualifications. In buildings having occupied floors located more than 75 feet (22860 mm) above the lowest level of fire department vehicle access, through-penetration firestop systems shall be installed by contractors that are approved or qualified for such installations under programs administered by approved agencies, such as FM Approvals or Underwriters Laboratories.
(Renumber subsequent sections)

Reason: Proper Design, Installation, Inspection and Maintenance of Firestop Systems is critical to fire and life safety in buildings because firestopping is used in everything from egress corridors to separation of spaces. Firestopping is a highly technical industry, requiring specialized knowledge at the firestop contracting firm in the office and field to analyze conditions on construction documents and / or on-site, select the appropriate firestop system(s) from UL, FM, Intertek and other directories, then match the systems to penetrating items and annular spaces as they exist in the field, with no variances from the systems allowed. If the system is not installed to the parameters in the design, the 'system' may or may not work when called upon by fire. This code change proposal addresses installation of through penetration and membrane firestop systems to zero-tolerance parameters of the classified and listed firestop design. The concept has been proposed in the past and some felt the scope was too broad. Therefore, the scope of the proposed requirement has been limited to high-rise buildings.

There are approval or qualification programs administered by approved agencies such as FM Approvals and Underwriters Laboratories for contractors who install materials that become firestop systems. Any contractor (trade or specialty firestop contractor) installing firestop systems can be approved or qualified to the programs administered by these agencies. The programs are similar to ISO 9000 that is used for the manufacturing environment, but adjusted for the construction environment. Successful completion means that the company has policies and procedures in place sufficient to control operations resulting in installations conforming to the listed firestop system.

Any firm is eligible to obtain FM Approval and or UL Qualification. With costs ranging from $6000 to $10000 for the initial audit and about $3000 annually for ongoing audits by UL & FM, the cost is less than many contractors would spend on advertising in the "Blue Book" or in entertainment. Experience shows that the cost can be recovered through the benefits of improved processes and reduced errors on firestopping projects.

Firestopping by a contractor firm who has been approved or qualified means that the firm has the processes in place in the company culture to handle the zero tolerance installation program needed for firestop systems for fire and life safety. The audits by FM & UL test the company's ability to install fire and life safety through penetration firestop systems to these requirements, through extensive review of the company procedures.

Below is a summary of what it takes for a contractor company to become FM 4991 Approved and / or UL Qualified:

-Designated Responsible Individual (DRI) – Each firm employs a DRI who has passed an industry exam based on the Firestop Contractors International Association's Firestop Industry Manual of Practice, FM Standard FM 4991, Standard for the Approval of Firestop Contractors, and - or the UL Qualified Firestop Contractor Program requirements, as well as selection of firestop systems from directories matched to field conditions.

-Quality Audits – FM & UL then audit the firestop processes of the company:

--Initial Audit - The process to install firestopping is very technical, and needs attention to detail. The specialty firestop contractor firm or trade contractor firm has their company quality manual audited and approved or qualified by an auditor from either FM Approvals or Underwriters Laboratories to be recognized by the approved agency as a 'certified contractor'. This is a very robust, truly independent inspection of the contractors' firestop systems selection, submittal, and installation and inspection processes by FM & UL Auditors. Auditors also visit a project site to verify that the procedures are actually in place throughout the company. Audits of the company include every discipline from training of employees, systems selection and communications to – from the field.

--Annual Audit – FM and or UL visit the firm to review the company's procedures annually to verify continued compliance to the FM 4991 Standard or UL Qualified Firestop Contractor Program. These visits are key to continued success of the firm's quality management system.

Firestopping is a vital part of effective compartmentation. When installation is not performed correctly, it can cause delays of certificate of occupancy, reducing building owners' revenue streams and create a fire and life safety risk. FM Approved and UL Qualified Firestop Contractors can lower the risk of non compliant firestopping through a company culture that has embraced the quality management system approach through their company culture.

Firestopping installation is a process that is knowledge sensitive, and requires a company (not just a worker) that has the quality management systems culture ingrained in it's operations and, more importantly, it's people. Plus, the production of the quality assurance manual at the company helps them gather important insight into company operations through self assessment followed up by a full audit by a credible, independent organization, FM & UL

There are many contractor firms who have been approved or qualified, that cover most of the US, Dubai, with many more in process of becoming approved or qualified throughout the world. Since firestopping is lightweight, and knowledge travels, so too can FM Approved and UL Qualified Firestop Contractor Firms travel to serve local needs competitively, throughout North America. Contractors have even exported the process know how to the Middle East including the United Arab Emirates, and beyond. For more information, visit http://www.fcia.org to view Specialty Firestop Contractor Firms who have become FM 4991 Approved or UL Qualified, and see the approval and qualification documents to understand how the contractor company can get involved in the programs.

Cost Impact: The code change proposal will not increase the costs of construction.

ICCFILENAME: KOFFELL-FS5-713.2 NEW

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was a concern over the availability of approved contractors to provide these installations nation-wide. Further, the term "approved agency" puts the responsibility on the code official to approve these agencies, which in many cases they are not qualified to do.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

William E. Koffel, PE, Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

<u>**713.2 Contractor Qualifications.** In buildings having a building height of 420 feet (128 m) or more, through-penetration firestop systems shall be installed by contractors qualified by an approved agency.</u>

<u>Exception: Where the work is of a minor nature as approved by the building official.</u>

Commenter's Reason: The language of the proposed Public Comment addresses the issues and concerns of the Code Development Committee

1. Availability of contractors – The application of the section has been restricted to special high-rise buildings and the Code has already established special requirements for such buildings. As such, there is a higher probability of access to multiple "qualified contractors." Even if a "qualified contractor" is not immediately available in close proximity to the project, such large projects typically involve special construction teams that draw from a larger geographic area.
2. References to specific qualification programs – The proposed language in the Public Comment eliminates the references to UL and FM and instead used the phrase "approved agency" as defined in Chapter 17 of the Code.
3. Small projects – Just as Chapter 17 allows for special inspections, the proposed exception permits the Building Official to exempt small projects and minor work from the requirement.

Proper design, installation, inspection, and maintenance of Firestop Systems is critical to fire and life safety in buildings because firestopping is used in everything from egress corridors to separation of spaces. Firestopping is a highly technical industry, requiring specialized knowledge at the firestop contracting firm in the office and field to analyze conditions on construction documents and/or on-site, select the appropriate firestop system(s) from UL, FM, Intertek and other directories, then match the systems to penetrating items and annular spaces as they exist in the field, with no variances from the systems allowed. If the system is not installed to the parameters in the design, the 'system' may or may not work when called upon by fire. This Public Comment addresses installation of through penetration and membrane firestop systems to zero-tolerance parameters of the classified and listed firestop design. The concept has been proposed in the past and some felt the scope was too broad. Therefore, the scope of the proposed requirement has been limited to certain high-rise buildings.

There are approval or qualification programs administered by approved agencies such as FM Approvals and Underwriters Laboratories for contractors who install materials that become firestop systems. Any contractor (trade or specialty firestop contractor) installing firestop systems can be approved or qualified to the programs administered by these agencies. The programs are similar to ISO 9000 that is used for the manufacturing environment, but adjusted for the construction environment. Successful completion means that the company has policies and procedures in place sufficient to control operations resulting in installations conforming to the listed firestop system.

Any firm is eligible to obtain FM Approval and or UL Qualification. With costs ranging from $6000 to $10000 for the initial audit and about $3000 annually for ongoing audits by UL & FM, the cost is less than many contractors would spend on advertising in the "Blue Book" or in entertainment. Experience shows that the cost can be recovered through the benefits of improved processes and reduced errors on firestopping projects.

Firestopping by a contractor firm who has been approved or qualified means that the firm has the processes in place in the company culture to handle the zero tolerance installation program needed for firestop systems for fire and life safety. The audits by FM & UL test the company's ability to install fire and life safety through penetration firestop systems to these requirements, through extensive review of the company procedures.

Final Action: AS AM AMPC____ D

FS74-09/10
713.2.1 (New)

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc, representing Firestop Contractors International Association

Add new text as follows:

713.2 Installation details. Where sleeves are used, they shall be securely fastened to the assembly penetrated. The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section. Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

713.2.1 Alternative Methods. Where the configuration of a penetrating item or group of items is such that listed penetration firestop system tested in accordance with ASTM E 814 or UL 1479 is determined to be non-existent and reconfiguration of the penetrations or fire resistance rated assembly is determined to be impractical or impossible, alternative methods for maintaining the integrity of the required fire–resistance rating of the assembly shall be permitted to be established by any of the following methods or procedures.

1. Designs documented in approved sources but not in public directories.
2. Calculations performed in an approved manner.
3. Engineering analysis based on a comparison of approved penetration firestop systems tested in accordance with ASTM E 814 or UL 1479 that extrapolate specific similar features from these systems and combine them to formulate an equivalent fire resistant rated assembly as specifically designated by the manufacturer's technical representative of the systems specified within the referenced approved penetration firestop system.
4. Alternative protection methods as allowed by Section 104.11

Reason: The purpose of this code change proposal is to clarify a part of the code that is confusing in the field to enforce. Although there are over 8000 classified systems in the Underwriters Laboratories Fire Resistance Directory and thousands more in Intertek, FM Approvals and other laboratories listings, there are still configurations that appear at project sites that have no qualified system listed in a directory. This is when our firestop contracting industry searches for advice from the manufacturers headquarters technical personnel to seek a determination that a combination of systems that closely resembles the situation be suggested for approval from the manufacturer, that is documented by the manufacturer for submittal.

This service is performed by manufacturer's qualified technical personnel who understand the fire performance of these products in systems, and use characteristics found in similar systems to make a determination about suitability for use of the products in the specific application. These suggestions are submitted by firestop manufacturer's technical staff through the contractor for approval. Using knowledge from those who fire test the products frequently and understand their limitations, these manufacturer's technical personnel reference the closest possible tested system(s) to determine an appropriate method that provides a system closest to the field condition.

This code language is needed to set minimum requirements for how these determinations, (also known as Engineering Judgments, or Equivalent Fire Resistance Rated Assemblies) are created, and who at the company should be responsible for writing these determinations of suitability for use in specific applications.

Companies are structured different ways, with many titles for field sales people. Those with the most experience with fire testing products at companies, and the most removed from the sales process seems to be the manufacturer's technical personnel at headquarters locations. This code language is needed to provide the building official transparency in the process when presented engineering judgments from the industry…only if a listed system cannot be found in the directories from any manufacturer…even if it means switching manufacturers for a few applications.

Cost Impact: The code change proposal will not increase the costs of construction.

Analysis: Standards ASTM E814 and UL 1479 are currently referenced in the I-codes.

ICCFILENAME: KOFFELL-FS2-713.2.1 NEW

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt some of the terms, such as "impractical" and "impossible" were too subjective and difficult to determine. Further, the phrase "calculations performed in an approve manner" is difficult to determine and perhaps unenforceable. Lastly, Section 104.11 already allows for alternative methods.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

William E. Koffel, PE, Koffel Associates, Inc., representing Firestop Contractors International Association (FICA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

713.2 Installation details. Where sleeves are used, they shall be securely fastened to the assembly penetrated. The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section. Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

713.2.1 Alternative Methods. Where the configuration of a penetrating item or group of items is such that listed penetration firestop system tested in accordance with ASTM E 814 or UL 1479 is determined to be non-existent and reconfiguration of the penetrations or fire resistance rated assembly is determined to be impractical or impossible, alternative methods for maintaining the integrity of the required fire–resistance rating of the assembly shall be permitted to be established ~~by any of the following methods or procedures.~~ using an engineering analysis based on a comparison of listed penetration firestop systems and prepared by a manufacturer's technical representative of the systems specified or prepared by the laboratory that conducted the original test.

1. ~~Designs documented in approved sources but not in public directories.~~
2. ~~Calculations performed in an approved manner.~~
3. ~~Engineering analysis based on a comparison of approved penetration firestop systems tested in accordance with ASTM E 814 or UL 1479 that extrapolate specific similar features from these systems and combine them to formulate an equivalent fire resistant rated assembly as specifically designated by the manufacturer's technical representative of the systems specified within the referenced approved penetration firestop system.~~
4. ~~Alternative protection methods as allowed by Section 104.11~~

Commenter's Reason: The purpose of this Public Comment is to clarify a part of the Code that is confusing in the field to enforce. Although there are over 8000 classified systems in the Underwriters Laboratories Fire Resistance Directory and thousands more in Intertek, FM Approvals and other laboratories listings, there are still configurations that appear at project sites that have no qualified system listed in a directory. This is when the firestop contracting industry searches for advice from the manufacturer's headquarters technical personnel to seek a determination that a combination of systems that closely resembles the situation be suggested for approval from the manufacturer.

This service is to be performed by manufacturer's qualified technical personnel who understand the fire performance of these products in systems or a representative of the testing laboratory, and use characteristics found in similar systems to make a determination about suitability for use of the products in the specific application. These suggestions are submitted by firestop manufacturer's technical staff through the contractor for approval. Using knowledge from those who fire test the products frequently and understand their limitations, the manufacturer's technical personnel reference the closest possible tested system(s) to determine an appropriate method that provides a system closest to the field condition.

This Code language is needed to set minimum requirements for when these determinations are permitted to be used, how these determinations (also known as Engineering Judgments, or Equivalent Fire Resistance Rated Assemblies) are created, and who should be responsible for writing these determinations of suitability for use in specific applications.

Companies are structured different ways, with many titles for field sales people. Those with the most experience with fire testing products at companies, and the most removed from the sales process seems to be the manufacturer's technical personnel at headquarters locations. This Code language is needed to provide the building official transparency in the process when presented engineering judgments from the industry…only if a listed system cannot be found in the directories from any manufacturer…even if it means switching manufacturers for a few applications.

During the Public Hearings various comments were raised ranging from this is desperately needed in the field to such language will encourage the further use of engineering judgments. By restricting the application to instances for which a listed system does not exist and who may prepare the engineering judgment we do not believe that the further use of engineering judgments will be encouraged. Although the Code will now specifically permit engineering judgments, something permitted today by the Code as an alternative method, most manufacturers will continue to test applications that are commonly used in the field since there is still a cost involved in preparing engineering judgments and the use of engineering judgments has the potential to increase the construction time due to the specific approval required for an engineering judgment.

In summary, the Public Comment simplifies the verbiage that was originally proposed in the Public Proposal. Furthermore, the verbiage of the Public Comment restricts the use of engineering judgments to those instances for which a listed system does not exist by any manufacturer. Lastly, the Public Comment retains the original concept that the engineering judgment must be prepared by someone who is familiar with the testing that has been performed.

Final Action: AS AM AMPC____ D

FS75-09/10
713.4.1.2

Proposed Change as Submitted

Proponent: Tim Pate, City and County of Broomfield, representing the Colorado Chapter ICC Code Change Committee

Revise as follows:

713.4.1.2 Membrane penetrations. Penetrations of membranes that are part of a horizontal assembly shall comply with Sections 713.4.1.1.1 or 713.4.1.1.2. Where floor/ceiling assemblies are required to have a fire resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

Exceptions:

(Exceptions 1-5 remain unchanged)

6. The ceiling membrane of 1 and 2 hour fire resistance rated horizontal assemblies is permitted to be interrupted with the double wood top plate of a fire resistance wall assembly provided that all penetrating items through the double top plates are protected in accordance with Section 713.4.1.1.1 or 713.4.1.1.2.

Reason: This code change will add a new exception to section 712.4.1.2 which will allow the ceiling membrane of a 1 or 2 hour fire rated floor/ceiling or roof/ceiling assembly to be interrupted by a double wood top plate of a fire rated wall. All penetrations of the top plates would have to be protected by approved through penetration firestop systems. This would codify the typical construction that we see with Type VA construction where the wood framed walls extend up and attach directly to the underside of wood floor joists/trusses or roof joists/trusses for structural requirements. Non fire rated wall top plates would not be allowed to interrupt the drywall membrane of the floor/ceiling or roof/ceiling.
Section 711.4 would technically require this ceiling membrane to be continuous in these areas but it would be impossible to install this drywall on top of load bearing walls since the drywall would end up being crushed when building is fully loaded. This code change would get the IBC in line with the UL testing criteria and general notes. This code change would allow what we already see on every Type VA building.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: PATE-FS1-713.4.1.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the ceiling membrane should be continuous and uninterrupted; however if this proposal were to be considered it should be limited to nonfireresistance rated partitions or fire partitions.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

George Kellogg, Rocklin, CA, representing Sacramento Valley Association of Building Officials, requests Approval as Submitted.

Commenter's Reason: The proposed code change would codify the practical application of the code by clarifying that ceiling membrane of 1 and 2 hour fire-rated ceilings may be interrupted by the double top-plate of a supporting wall so long as penetrations are treated with appropriate fire stop assemblies. This proposal would allow for continuity of structural systems with the proper application of Section 713.4.1.1.1 or 713.4.1.1.2.

Public Comment 2:

Tim Pate representing the Colorado Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

713.4.1.2 Membrane penetrations. Penetrations of membranes that are part of a horizontal assembly shall comply with Sections 713.4.1.1.1 or 713.4.1.1.2. Where floor/ceiling assemblies are required to have a fire resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

Exceptions:

(Exceptions 1-5 remain unchanged)

6. The ceiling membrane of 1 and 2 hour fire resistance rated horizontal assemblies is permitted to be interrupted with the double wood top plate of a fire resistance wall assembly, provided that all penetrating items through the double top plates are protected in accordance with Section 713.4.1.1.1 or 713.4.1.1.2. <u>The fire resistance rating of the wall shall not be less than the rating of the horizontal assembly.</u>

Commenter's Reason: There was testimony in opposition to the original code change that this new exception could potentially allow a fire barrier to not be continuous through the fire resistance rated horizontal assembly. We respectfully disagree since Section 707.5 Continuity of Fire Barriers specifically requires these assemblies to be continuous to the under side of the floor or roof sheathing, slab or deck above. This would super cede this new exception since it is the more restrictive requirement.

Section 709.4 Continuity of Fire Partitions has same language but allows them to stop at bottom membrane of horizontal assembly as long as there is adequate fire blocking or draftstopping above and within the interstitial space.

As described in the original reason statement this code change will allow the two top plates to become equivalent to the ceiling membranes of either the one or two hour rated assembly. I have added language to clarify that the rating of the wall would need to match the rating of the horizontal – one hour wall for one hour assembly and two hour wall for two hour assembly. This exception would then only deal with the fire partitions and interior bearing walls based on the Table 601 requirements.

Public Comment 3:

Bruce Dimmig and Tom Hedges, Mesa, AZ, representing the Arizona Building Officials, requests Approved as Modified by this public comment.

Modify the proposal as follows:

713.4.1.2 Membrane penetrations. Penetrations of membranes that are part of a horizontal assembly shall comply with Section~~s~~ 713.4.1.1.1 or 713.4.1.1.2. Where floor/ceiling assemblies are required to have a fire resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

Exceptions:

(Exceptions 1-5 remain unchanged)

6. The ceiling membrane of ~~1 and~~ <u>maximum</u> 2-hour ~~fire resistance rated~~ horizontal assemblies is permitted to be interrupted with the ~~double wood~~ top plate of a fire resistance <u>rated</u> wall assembly<u>, having an equal or greater fire resistance rating than the horizontal assembly,</u> provided that all penetrating items through the ~~double~~ top plates are protected in accordance with Section 713.4.1.1.1 or 713.4.1.1.2.

Commenter's Reason: The committee reason that the ceiling membrane should be continuous and uninterrupted is not practical or possible as the existing exceptions demonstrate. Section 711.4 would technically require this ceiling membrane to be continuous in these areas but it would be impossible to install this drywall on top of load bearing walls or shear walls since the drywall would end up being crushed when building is fully loaded. A fire resistance rated wall could be of wood, masonry or steel. By stipulating a rating for the walls that can penetrate the ceiling membrane, a safe level of fire resistance will be provided.

If the ceiling membrane is not permitted to be interrupted by walls, the following Fig. 1 and 2 examples of typical construction would no longer be permitted.

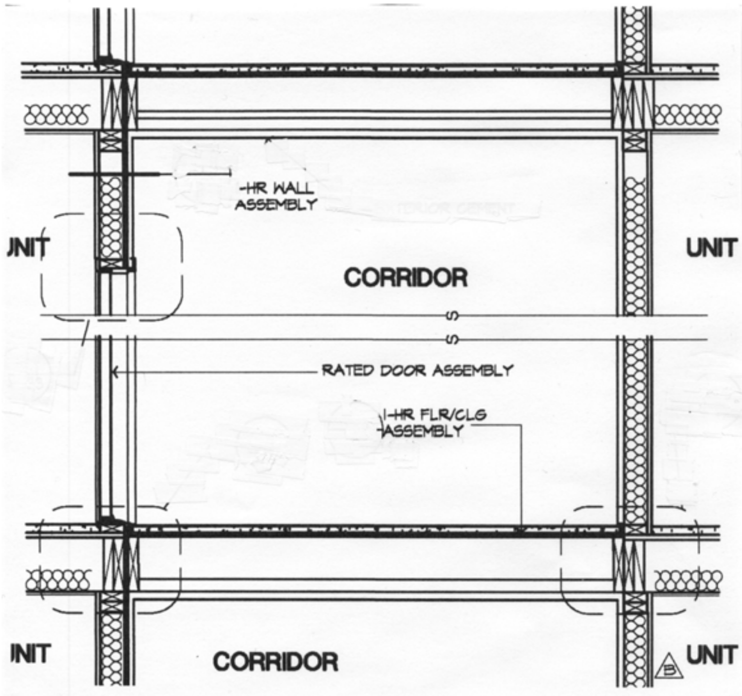


FIG. 1

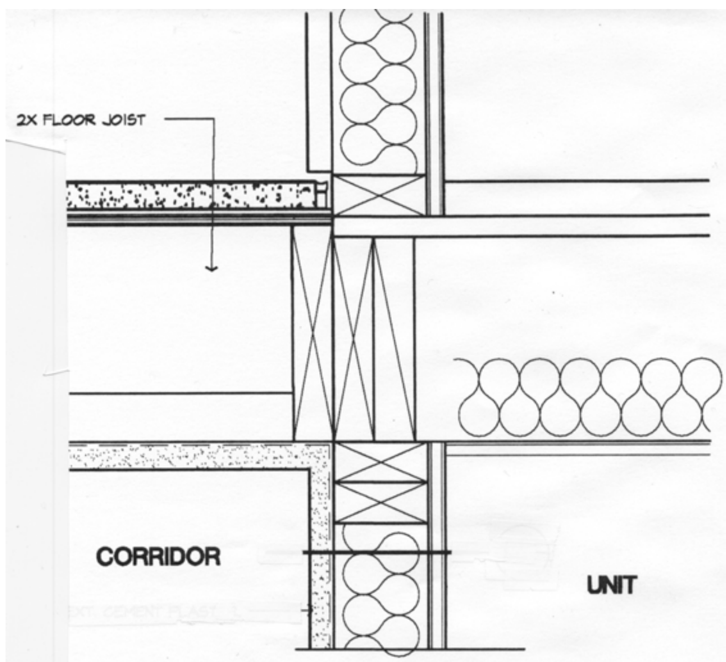


FIG. 2

Final Action: AS AM AMPC____ D

FS76-09/10
713.4.2.3 (New)

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc, representing Firestop Contractors International Association

1. Revise as follows:

713.4.2 Nonfire-resistance-rated assemblies. Penetrations of nonfire-resistance-rated floor or floor/ceiling assemblies or the ceiling membrane of a nonfire-resistance-rated roof/ceiling assembly shall meet the requirements of Section 708 or shall comply with Section 713.4.2.1 ~~or~~ , 713.4.2.2., or 713.4.2.3.

713.4.2.1 Noncombustible penetrating items. Noncombustible penetrating items that connect not more than three *stories* are permitted, provided that the *annular space* is filled to resist the free passage of flame and the products of combustion with an *approved* noncombustible material or with a fill, void or cavity material that is tested and classified for use in through-penetration firestop systems.

712.4.2.2 Penetrating items. Penetrating items that connect not more than two stories are permitted, provided that the annular space is filled with an approved material to resist the free passage of flame and the products of combustion.

2. Add new text as follows:

713.4.2.3 Unlimited stories. Penetrating items shall be permitted provided the annular space is filled with a fill, void, cavity material, or device that is tested and classified for use in through-penetration firestop systems.

Reason: Currently the Code limits the number of stories connected without a shaft when the floor is not required to have a fire resistance rating. The Code currently permits the use of approved materials. While fill, void, or cavity materials and devices tested for use in through penetration firestop systems would likely be approved materials, the proposed language clearly states that such materials shall be permitted without specific approval. The proposed language will also allow such materials without a height restriction. However, Table 503 limits most buildings with non-rated floor assemblies to heights less than three stories unless an automatic sprinkler system is provided.

A void or cavity material that is tested and classified for use in through penetration firestop systems is an effective method for preventing the passage of fire and toxic gas. Very often this limitation in the code relating to the number of stories of penetrating items is overlooked because the floor is not required to be fire resistant and as a result penetrations are left inadequately protected.

To require a shaft enclosure for what could be a very limited quantify of penetrations of a non-rated floor assembly is excessive when other acceptable means to protect the penetrations are available.

Cost Impact: Much more cost effective methodology.

ICCFILENAME: KOFFELL-FS8-713.4.2 NEW

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval was requested by the proponent based on the committee's action on FS56-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

William E. Koffel, PE, Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

713.4.2 Nonfire-resistance-rated assemblies. Penetrations of nonfire-resistance-rated floor or floor/ceiling assemblies or the ceiling membrane of a nonfire-resistancerated roof/ceiling assembly shall meet the requirements of Section 708 or shall comply with Section 713.4.2.1 or 713.4.2.2, or 713.4.2.3.

713.4.2.1 Noncombustible penetrating items. Noncombustible penetrating items that connect not more than ~~three~~ five stories are permitted, provided that the annular space is filled to resist the free passage of flame and the products of combustion with an approved noncombustible material or with a fill, void, or cavity material, or device that is tested and classified for use in through-penetration firestop systems.

713.4.2.2 Penetrating items. Penetrating items that connect not more than two stories are permitted, provided that the annular space is filled with an approved material to resist the free passage of flame and the products of combustion.

713.4.2.3 ~~Unlimited stories~~ Combustible penetrating items. Combustible penetrating items that connect not more than five stories shall be permitted, provided the annular space is filled with a fill, void, or cavity material, or device that is tested and classified for use in through-penetration firestop systems.

Commenter's Reason: With the action taken on FS56-09/10, noncombustible penetrating items are permitted to connect up to five stories without a shaft enclosure when the horizontal assembly is not required to have a fire resistance rating. Combustible and noncombustible penetrations are permitted to connect two stories and only be protected by an approved material to fill the annual space. The Code makes no reference to the use of a fill, void, or cavity material or a device for combustible penetrations other than to presume they would be an "approved material" as required in 713.4.2.2.

The FCIA submitted proposal FS76-09/10 that would also allow the use of a fill, void, or cavity material or device for combustible penetrations. FS76-09/10 was recommended for Disapproval based upon the action taken on FS56-09/10. However, FS56-09/10 did not address combustible penetrations connecting more than two stories. The purpose of this Public Comment is to extend the permitted use of fill, void, or cavity materials materials or devices to protect non-rated floors for both combustible and noncombustible penetrations.

A fill, void or cavity material or a device that is tested and classified for use in through penetration firestop systems is an effective method for preventing the passage of fire and toxic gas. Very often this limitation in the code relating to the number of stories of combustible penetrating items is overlooked because the floor is not required to be fire resistant and as a result penetrations are left inadequately protected.

To require a shaft enclosure for what could be a very limited quantity of penetrations of a non-rated floor assembly is excessive when other acceptable means to protect the penetrations are available.

The change from three stories to five stories in 713.4.2.1 is consistent with the action taken on FS56-09/10. Although we would agree that the three paragraphs could be sequenced better, the language in the Public Comment has been formatted so that it can be incorporated into the action on FS56-09/10 by only changing the section numbers from 713.4.2 to 714.4.2.

Final Action: AS AM AMPC____ D

FS81–09/10
714.1

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing Metal Building Manufacturers Association

Revise as follows:

714.1 General. Joints installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an *approved fire-resistant joint system* designed to resist the passage of fire for a time period not less than the required *fire-resistance rating* of the wall, floor or roof in or between which it is installed. *Fire-resistant joint systems* shall be tested in accordance with Section 714.3. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be protected in accordance with Section 714.4.

Exceptions:

1. *Fire-resistant joint systems* shall not be required for joints in all of the following locations:
   1.1. Floors within a single *dwelling unit*.
   1.2. Floors where the joint is protected by a shaft enclosure in accordance with Section 708.
   1.3. Floors within atriums where the space adjacent to the atrium is included in the volume of the atrium for smoke control purposes.
   1.4. Floors within malls.
   1.5. Floors and ramps within open and enclosed parking garages or structures constructed in accordance with Sections 406.3 and 406.4, respectively.
   1.6. *Mezzanine* floors.
   1.7. Walls that are permitted to have unprotected openings.
   1.8. Roofs where openings are permitted.
   1.9. Control joints not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in accordance with ASTM E 119 or UL 263.
2. The voids created at the intersection of a fire-resistance-rated wall assembly and a non-fire-resistance-rated roof assembly shall be filled, but are not required to comply with the requirements of this section. The material or system used to fill the void shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.

Reason: The IBC defines joints as being an opening that occurs between two fire-resistance rated assemblies. However, in many instances there are openings/void spaces that occur between a fire-resistance rated assembly and a non-fire resistance rated assembly. One very common type of this situation occurs when a fire-resistance rated wall assembly terminates at the underside of a non-fire-resistance rated roof assembly in a low-rise metal building. This code change proposal has been submitted so as to clarify the requirements for these types of situations.

The Metal Building Manufacturers Association requested a formal interpretation on this matter. Interpretation 34-08 dated February 20, 2009 states that Section 713.1 (2006 edition) did not apply to these intersections. Thus, this Code proposal is just adding new language to address the findings of the Code interpretation and therefore enhance the code.

It is understood that this new Exception does not remove the continuity requirements for these types of assemblies as specified in the appropriate Sections of the Code.

Also, the industry has specifically inserted the requirements for installation so as to address the proper installation of the materials and systems used in this application.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BEITEL-FS3-714.1.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the exception was in the wrong place and would be better located in the continuity provisions. Also, the committee felt there should be some referenced to an acceptable material to used to fill the void in question.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jesse J. Beitel, Hughes Associates, Inc., representing Metal Building Manufacturers Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

707.5 Continuity. Fire barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed space, such as the space above a suspended ceiling. Joints and voids at intersections shall comply with Section 707.8 and 707.9.

707.8 Joints. Joints made in or between fire barriers and joints at the intersection of fire barriers with the underside of a fire-resistance-rated ~~the~~ floor or roof sheathing, slab or deck above, shall comply with Section 714.

707.9 Voids At Intersections. The voids created at the intersection of a fire barrier and a non-fire-resistance-rated roof assembly shall be filled. An approved material or system shall be used to fill the void, shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.

(Renumber subsequent section)

Commenter's Reason: This modified language addresses comments made by the Committee and others at the CDH. The basic language from our Proposal remains but the modification to the proposal addresses the concern of the appropriate location for this provision that addresses voids at the intersection of fire barriers and non-fire-resistance-rated roofs. The new Section 707.9 will provide the requirements. The additional language in Section 707.5 provides a pointer to the new Section and the new language in section 707.8 provides clarification.
Additionally, the proposal requires that the material or system be approved. Thus, documentation to show that material or system will meet the performance requirements to retard the passage of fire and hot gases must be provided. The Metal Building Manufacturers Association (MBMA) has performed this type of testing and the information including UL's test reports can be found at MBMA.com and follow the links to Technical Library, Fire Resistance, Head of Wall.

Note to Staff: If FS56-09/10 is approved, wording of "voids at intersections" could be changed to 'joints".

Final Action: AS AM AMPC____ D

FS83-09/10
714.1.1 (New)

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc, representing Firestop Contractors International Association

Add new text as follows:

714.1 General. Joints installed in or between fire-resistance- rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an *approved fire-resistant joint system* designed to resist the passage of fire for a time period not less than the required *fire-resistance rating* of the wall, floor or roof in or between which it is installed. *Fire-resistant joint systems* shall be tested in accordance with Section 714.3. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be protected in accordance with Section 714.4.

Exception: *Fire-resistant joint systems* shall not be required for joints in all of the following locations:

1. Floors within a single *dwelling unit*.
2. Floors where the joint is protected by a shaft enclosure in accordance with Section 708.
3. Floors within atriums where the space adjacent to the atrium is included in the volume of the atrium for smoke control purposes.
4. Floors within malls.
5. Floors and ramps within open and enclosed parking garages or structures constructed in accordance with Sections 406.3 and 406.4, respectively.
6. *Mezzanine* floors.
7. Walls that are permitted to have unprotected openings.
8. Roofs where openings are permitted.
9. Control joints not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in accordance with ASTM E 119 or UL 263.

714.1.1 Alternative Methods. Where the configuration of a joint is such that a listed joint firestop system or perimeter fire containment system tested in accordance with ASTM E 1966 or UL 2079 or ASTM E 2307, is determined to be non-existent alternative methods for maintaining the integrity of the required fire–resistance rating of the assembly shall be permitted to be established by any of the following methods or procedures.

1. Designs documented in approved sources but not in public directories.
2. Calculations performed in an approved manner.
3. Engineering analysis based on a comparison of approved penetration firestop systems tested in accordance with ASTM E 1966 or UL 2079 and or ASTM E 2307 that extrapolate specific similar features from these systems and combine them to formulate an equivalent fire resistant rated assembly as specifically designated by the manufacturer's technical representative of the systems specified within a referenced approved penetration firestop system
4. Alternative protection methods as allowed by Section 104.11

Reason: The purpose of this code change proposal is to clarify a part of the code that is confusing in the field to enforce. Although there are over 8000 classified systems in the Underwriters Laboratories Fire Resistance Directory and thousands more in Intertek, FM Approvals and other laboratories listings, there are still configurations that appear at project sites that have no qualified system listed in a directory. This is when the firestop contracting industry searches for advice from the manufacturer's technical personnel to seek a determination that a combination of systems that closely resembles the situation be suggested for approval based upon documentation from the manufacturer.

This service is performed by manufacturer's qualified technical personnel who understand the fire performance of these products in systems, and use characteristics found in similar systems to make a determination about suitability for use of the products in the specific application. These suggestions are submitted by firestop manufacturer's technical staff through the contractor for approval. Using knowledge from those who fire test the products frequently and understand their limitations, these manufacturers technical personnel reference the closest possible tested system(s) to determine an appropriate method that provides a system closest to the field condition.

This code language is needed to set minimum requirements for how these determinations, (also known as Engineering Judgments, or Equivalent Fire Resistance Rated Assemblies) are created, and who at the company should be responsible for writing these determinations of suitability for use in specific applications.

Companies are structured different ways, with many titles for field sales people. Those with the most experience with fire testing products at companies, and the most removed from the sales process seem to be the manufacturers technical personnel often located at headquarter locations. This code language is needed to provide the building official transparency in the process when presented engineering judgments from the industry…only if a listed system cannot be found in the directories from any manufacturer…even if it means switching manufacturers for a few applications.

Cost Impact: The code change proposal will not increase the costs of construction.

ICCFILENAME: KOFFELL-FS3-714.1.1 NEW

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt the phrase "calculations performed in an approve manner" is difficult to determine and perhaps unenforceable. Further, Section 104.11 already allows for alternative methods.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

William E. Koffel, PE, Koffel Associates, representing Firestop Contractors International Association (FCIA), requests Approved as Modified by this Public Comment.

Modify the proposal as follows:

714.1.1 Alternative Methods: Where the configuration of a joint is such that a listed joint firestop system or perimeter fire containment system tested in accordance with ASTM E 1966 or UL 2079 or ASTM E 2307 is determined to be non-existent, alternative methods for maintaining the integrity of the required fire–resistance rating of the assembly shall be permitted to be established ~~by any of the following methods or procedures~~ using an engineering analysis based on a comparison of listed systems that is prepared by a manufacturer's technical representative of the systems specified or prepared by the laboratory that conducted the original test.

1. ~~Designs documented in approved sources but not in public directories.~~
2. ~~Calculations performed in an approved manner.~~
3. ~~Engineering analysis based on a comparison of approved penetration firestop systems tested in accordance with ASTM E 1966 or UL 2079 and or ASTM E 2307 that extrapolate specific similar features from these systems and combine them to formulate an equivalent fire resistant rated assembly as specifically designated by the manufacturer's technical representative of the systems specified within a referenced approved penetration firestop system~~
4. ~~Alternative protection methods as allowed by Section 104.11~~

Commenter's Reason: The purpose of this Public Comment is to clarify a part of the Code that is confusing in the field to enforce. Although there are over 8000 classified systems in the Underwriters Laboratories Fire Resistance Directory and thousands more in Intertek, FM Approvals and other laboratories listings, there are still configurations that appear at project sites that have no qualified system listed in a directory. This is when the firestop contracting industry searches for advice from the manufacturer's headquarters technical personnel to seek a determination that a combination of systems that closely resembles the situation be suggested for approval from the manufacturer.

This service is to be performed by manufacturer's qualified technical personnel who understand the fire performance of these products in systems or a representative of the testing laboratory, and use characteristics found in similar systems to make a determination about suitability for use of the products in the specific application. These suggestions are submitted by firestop manufacturer's technical staff through the contractor for approval. Using knowledge from those who fire test the products frequently and understand their limitations, the manufacturer's technical personnel reference the closest possible tested system(s) to determine an appropriate method that provides a system closest to the field condition.

This Code language is needed to set minimum requirements for when these determinations are permitted to be used, how these determinations (also known as Engineering Judgments, or Equivalent Fire Resistance Rated Assemblies) are created, and who should be responsible for writing these determinations of suitability for use in specific applications.

Companies are structured different ways, with many titles for field sales people. Those with the most experience with fire testing products at companies, and the most removed from the sales process seems to be the manufacturer's technical personnel at headquarters locations. This Code language is needed to provide the building official transparency in the process when presented engineering judgments from the industry…only if a listed system cannot be found in the directories from any manufacturer…even if it means switching manufacturers for a few applications.

During the Public Hearings various comments were raised ranging from this is desperately needed in the field to such language will encourage the further use of engineering judgments. By restricting the application to instances for which a listed system does not exist and who may prepare the engineering judgment we do not believe that the further use of engineering judgments will be encouraged. Although the Code will now specifically permit engineering judgments, something permitted today by the Code as an alternative method, most manufacturers will continue to test applications that are commonly used in the field since there is still a cost involved in preparing engineering judgments and the use of engineering judgments has the potential to increase the construction time due to the specific approval required for an engineering judgment.

In summary, the Public Comment simplifies the verbiage that was originally proposed in the Public Proposal. Furthermore, the verbiage of the Public Comment restricts the use of engineering judgments to those instances for which a listed system does not exist by any manufacturer. Lastly, the Public Comment retains the original concept that the engineering judgment must be prepared by someone who is familiar with the testing that has been performed.

Final Action: AS AM AMPC____ D

FS86-09/10
714.2.1 (New)

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc., representing Firestop Contractors International Association

Add new text as follows:

714.2 Installation. *Fire-resistant joint systems* shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

<u>**714.2.1 Installation details, field installation.** In buildings having occupied floors located more than 75 feet (22860 mm) above the lowest level of fire department vehicle access, fire-resistant joint systems shall be installed by contractors that are approved or qualified for such installations under programs administered by approved agencies, such as FM Approvals or Underwriters Laboratories.</u>

Reason: Proper Design, Installation, Inspection and Maintenance of Joint Systems is critical to fire and life safety in building. This is a highly technical industry, requiring specialized knowledge at the firestop contracting firm in the office and field to analyze conditions on construction documents and / or on-site, select the appropriate firestop system(s) from UL, FM, Intertek and other directories, then match the systems to penetrating items and annular spaces as they exist in the field, with no variances from the systems allowed. If the system is not installed to the parameters in the design, the 'system' may or may not work when called upon by fire. This code change proposal addresses installation of joint systems to zero-tolerance parameters of the classified and listed design. And, *fire-resistant joint systems* are very complicated systems, where the contractor firm installing must have special qualifications to accomplish the goal of limiting fire and smoke spread from the compartment of origin. The concept has been proposed in the past and some felt the scope was too broad. Therefore, the scope of the proposed requirement has been limited to high-rise buildings.

There are approval or qualification programs administered by approved agencies such as FM Approvals and Underwriters Laboratories for contractors who install materials that become firestop systems. Any contractor (trade or specialty firestop contractor) installing firestop systems can be approved or qualified to the programs administered by these agencies. The programs are similar to ISO 9000 that is used for the manufacturing environment, but adjusted for the construction environment. Successful completion means that the company has policies and procedures in place sufficient to control operations resulting in installations conforming to the listed firestop system.

Any firm is eligible to obtain FM Approval and or UL Qualification. With costs ranging from $6000 to $10000 for the initial audit and about $3000 annually for ongoing audits by UL & FM, the cost is less than many contractors would spend on advertising in the "Blue Book" or in entertainment. Experience shows that the cost can be recovered through the benefits of improved processes and reduced errors on firestopping projects.

Firestopping by a contractor firm who has been approved or qualified means that the firm has the processes in place in the company culture to handle the zero tolerance installation program needed for firestop systems for fire and life safety. The audits by FM & UL test the company's ability to install fire and life safety through penetration firestop systems to these requirements, through extensive review of the company procedures.

Below is a summary of what it takes for a contractor company to become FM 4991 Approved and / or UL Qualified:

-Designated Responsible Individual (DRI) – Each firm employs a DRI who has passed an industry exam based on the Firestop Contractors International Association's Firestop Industry Manual of Practice, FM Standard FM 4991, Standard for the Approval of Firestop Contractors, and - or the UL Qualified Firestop Contractor Program requirements, as well as selection of firestop systems from directories matched to field conditions.

-Quality Audits – FM & UL then audit the firestop processes of the company:

--Initial Audit - The process to install firestopping is very technical, and needs attention to detail.The specialty firestop contractor firm or trade contractor firm has their company quality manual audited and approved or qualified by an auditor from either FM Approvals or Underwriters Laboratories to be recognized by the approved agency as a 'certified contractor'. This is a very robust, truly independent inspection of the contractors' firestop systems selection, submittal, and installation and inspection processes by FM & UL Auditors. Auditors also visit a project site to verify that the procedures are actually in place throughout the company. Audits of the company include every discipline from training of employees, systems selection and communications to – from the field.

--Annual Audit – FM and or UL visit the firm to review the company's procedures annually to verify continued compliance to the FM 4991 Standard or UL Qualified Firestop Contractor Program These visits are key to continued success of the firm's quality management system.

Firestopping is a vital part of effective compartmentation. When installation is not performed correctly, it can cause delays of certificate of occupancy, reducing building owners' revenue streams and create a fire and life safety risk. FM Approved and UL Qualified Firestop Contractors can lower the risk of non compliant firestopping through a company culture that has embraced the quality management system approach through their company culture.

Firestopping installation is a process that is knowledge sensitive, and requires a company (not just a worker) that has the quality management systems culture ingrained in it's operations and, more importantly, it's people. Plus, the production of the quality assurance manual at the company helps them gather important insight into company operations through self assessment followed up by a full audit by a credible, independent organization, FM & UL

There are many contractor firms who have been approved or qualified, that cover most of the US, Dubai, with many more in process of becoming approved or qualified throughout the world. Since firestopping is lightweight, and knowledge travels, so too can FM Approved and UL Qualified Firestop Contractor Firms travel to serve local needs competitively, throughout North America. Contractors have even exported the process know how to the Middle East including the United Arab Emirates, and beyond. For more information, visit http://www.fcia.org to view Specialty Firestop Contractor Firms who have become FM 4991 Approved or UL Qualified, and see the approval and qualification documents to understand how the contractor company can get involved in the programs.

Cost Impact: There is no cost impact to this code change proposal. Approved or qualified firms assign the correct value to firestopping systems installed to the listed system.

ICCFILENAME: KOFFELL-FS9-714.1

Public Hearing Results

Committee Action: Disapproved

Committee Reason: As with FS85-09/10, the committee felt there was a concern over the availability of approved contractors to provide these installations nation-wide. Further, the term "approved agency" puts the responsibility on the code official to approve these agencies, which in many cases they are not qualified to do.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

William E. Koffel, PE, Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

<u>**714.2 Contractor Qualifications.** In buildings having a building height of 420 feet (128 m) or more, fire resistant joint systems shall be installed by contractors qualified by an approved agency.</u>

<u>Exception: Where the work is of a minor nature as approved by the building official.</u>

Commenter's Reason: The language of the proposed Public Comment addresses the issues and concerns of the Code Development Committee

1. Availability of contractors – The application of the section has been restricted to special high-rise buildings and the Code has already established special requirements for such buildings. As such, there is a higher probability of access to multiple "qualified contractors." Even if a "qualified contractor" is not immediately available in close proximity to the project, such large projects typically involve special construction teams that draw from a larger geographic area.
2. References to specific qualification programs – The proposed language in the Public Comment eliminates the references to UL and FM and instead used the phrase "approved agency" as defined in Chapter 17 of the Code.
3. Small projects – Just as Chapter 17 allows for special inspections, the proposed exception permits the Building Official to exempt small projects and minor work from the requirement.

Proper design, installation, inspection and maintenance of joint systems is critical to fire and life safety in building. This is a highly technical industry, requiring specialized knowledge at the firestop contracting firm in the office and field to analyze conditions on construction documents and / or on-site, select the appropriate fire resistant joint system(s) from UL, FM, Intertek and other directories, then match the systems to conditions as they exist in the field, with no variances from the systems allowed. If the system is not installed to the parameters in the design, the 'system' may or may not work when called upon by fire. This Public Comment addresses installation of joint systems to zero-tolerance parameters of the classified and listed design. And, *fire-resistant joint systems* are very complicated systems, where the contractor firm installing must have special qualifications to accomplish the goal of limiting fire and smoke spread from the compartment of origin. The concept has been proposed in the past and some felt the scope was too broad. Therefore, the scope of the proposed requirement has been limited to high-rise buildings.

There are approval or qualification programs administered by approved agencies such as FM Approvals and Underwriters Laboratories for contractors who install materials that become fire resistant joing systems. Any contractor (trade or specialty firestop contractor) installing fire resistant joing systems can be approved or qualified to the programs administered by these agencies. The programs are similar to ISO 9000 that is used for the manufacturing environment, but adjusted for the construction environment. Successful completion means that the company has policies and procedures in place sufficient to control operations resulting in installations conforming to the listed fire resistant joint system.

Any firm is eligible to obtain FM Approval and or UL Qualification. With costs ranging from $6000 to $10000 for the initial audit and about $3000 annually for ongoing audits by UL & FM, the cost is less than many contractors would spend on advertising in the "Blue Book" or in entertainment. Experience shows that the cost can be recovered through the benefits of improved processes and reduced errors on projects.

Installation by a contractor firm who has been approved or qualified means that the firm has the processes in place in the company culture to handle the zero tolerance installation program needed for fire resistant joint systems for fire and life safety. The audits by FM & UL test the company's ability to install fire and life safety fire resistant joint systems to these requirements, through extensive review of the company procedures.

Final Action: AS AM AMPC____ D

FS87-09/10
714.4

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing self

Revise as follows:

714.4 Exterior curtain wall/floor intersection. Where fire resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be sealed with an *approved* system to prevent the interior spread of fire. Such systems shall be securely installed and tested in accordance with ASTM E 2307 to provide an F rating ~~prevent the passage of flame~~ for ~~the~~ a time period at least equal to the *fire-resistance rating* of the floor assembly ~~and prevent the passage of heat and hot gases sufficient to ignite cotton waste~~. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

Reason: This Code change provides a better clarification of the requirements for the materials. The "F" rating as determined in ASTM E 2307 evaluates the material or assembly for passage of flame and passage of heat and hot gases sufficient to ignite cotton waste.

This change just clarifies that the requirements are only for an "F" rating and a "T" rating is not required.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BEITEL-FS2-714.4.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that since the criteria for F rating includes passage of heat and hot gasses that this change was editorial and ultimately easier to enforce.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc., representing North American Insulation Manufacturers Association (NAIMA), requests Disapproval.

Commenter's Reason: The proposed change makes enforcement of 714.4 more difficult in that it gives the false impression of removing a long-standing IBC performance requirement, thereby reducing the level of performance of perimeter fire barrier joints from what has traditionally been required. The language in Section of 714.4 has been in the IBC prior to inclusion of ASTM E2307. The IBC has always established the desired level of performance of exterior curtain wall and floor intersections as being both preventing the passage of flame and "… prevent the passage of heat and hot gases sufficient to ignite cotton waste." The inclusion of ASTM E2307 led to a clear requirement that the F-Rating determined by ASTM E2307 was to prevent the passage of flame for the time period at least equal to the *fire-resistance rating* of the floor assembly. The additional text clearly stated that the installed system also needed to prevent the passage of heat and hot gases sufficient to ignite cotton waste. This is very similar to the definition of "F"-Rating in ASTM E2307, which states that the rating of the perimeter fire barrier shall be determined as the time at which either fire penetrates through the perimeter joint protection or around its boundaries, or the passage of flames or hot gases are sufficient to ignite the cotton waste. The existing IBC text in 714.4 accurately identifies and separates these 2 requirements within 714.4. The proposed change has the effect of burying the second component of the requirement in the test standard.

While the committee felt that, since the criteria for F rating includes passage of heat and hot gasses, this change was editorial and ultimately easier to enforce. Our concern is that, without sufficient knowledge of the test method, the component of the performance requirement that limits the rate of passage of heat through the system is less apparent to Code users.

What ASTM E2307 measures is the performance of the perimeter joint system and its ability to maintain a barrier to prevent fire spread during the deflection and deformation of the exterior wall assembly and floor assembly during the fire test, while resisting fire exposure from an interior compartment fire as well as from the flame plume emitted from the window burner below.

Final Action: AS AM AMPC____ D

FS88-09/10
714.4

Proposed Change as Submitted

Proponent: James P. Stahl Jr., representing Specified Technologies, Inc.

Revise as follows:

714.4 Exterior curtain wall/floor intersection. Where fire resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be sealed with an *approved* system to prevent the interior spread of fire. Such systems shall be securely installed and tested in accordance with ASTME 2307 to prevent the passage of flame for the time period at least equal to the *fire-resistance rating* of the floor assembly and prevent the passage of heat and hot gases sufficient to ignite cotton waste. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

> **Exception**: Voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies where the vision glass extends down to the finished floor level shall be permitted to be sealed with an approved material to prevent the interior spread of fire. Such material shall be securely installed and cable of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (0.254 mm) of water column (2.5 Pa) for the time period at least equal to the fire-resistance rating of the floor assembly.

Reason: The purpose of the proposed change is to reinstate the allowance for testing at least some curtain wall assemblies, specifically those which incorporate full height vision glass, based on fire exposure to an ASTM E119 time-temperature curve.

Justification: The proposed language in the exception existed in the Code until the 2009 edition of the IBC. While ASTM E2307 was specifically developed to test perimeter fire barrier systems, there is a problem for certain types of assemblies in terms of being able to meet the new performance criteria. The proposed exception would permit the continued use of full height vision glass curtain wall assemblies based on compliance with the traditional ASTM E119 testing.

Cost Impact: This code change will not increase the cost of construction.

ICCFILENAME: STAHL-FS1-714.4

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

714.4 Exterior curtain wall/floor intersection. Where fire resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be sealed with an *approved* system to prevent the interior spread of fire. Such systems shall be securely installed and tested in accordance with ASTME 2307 to prevent the passage of flame for the time period at least equal to the *fire-resistance rating* of the floor assembly and prevent the passage of heat and hot gases sufficient to ignite cotton waste. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

> **Exception**: Voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies where the vision glass extends ~~down~~ to the finished floor level shall be permitted to be sealed with an approved material to prevent the interior spread of fire. Such material shall be securely installed and capable ~~cable~~ of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (0.254 mm) of water column (2.5 Pa) for the time period at least equal to the fire-resistance rating of the floor assembly.

Committee Reason: The committee agreed that this proposal appropriately allows for assemblies that are commonly used in current building practice to be approved based on ASTM E119 time-temperature exposure conditions. The modification recognizes that the glass could extend up or down. Changing cable to capable was considered editorial.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, representing the City of Seattle Department of Planning & Development, requests Disapproval.

Commenter's Reason: The reason given for introducing the exception is "there is a problem for certain types of assemblies in terms of being able to meet the new performance criteria". In other words, the assembly shouldn't be required to be tested because it can't pass the test. Testing according to ASTM E 2307 is required because there is a danger of fire lapping from floor to floor on the interior side of curtain walls. That danger is no less when glass extends to the floor. This code change proposal should be disapproved because no technical justification was provided to show why this construction should not be required to comply with the ASTM standard.

In the 2009 IBC the requirements for exterior curtain wall/floor intersections were revised to recognize the newly-developed ASTM E 2307 standard. ASTM E 2307 was developed specifically to determine the fire resistance of perimeter fire barrier systems when subjected to standard fire exposure conditions using the intermediate scale, multistory test apparatus. The scope of ASTM E 2307 does not suggest that the test standard should not apply to situations where the vision glass extends to the finished floor level, and the risk of fire compromising these intersections is the same whether the curtain wall has vision glass that extend to the finished floor or not. In addition, since the proposed exception only references the time-temperature fire conditions from ASTM E 119, there is nothing which defines the minimum test sample size, the sample configuration and the acceptance criteria for how the assembly needs to perform during and after the fire exposure.

Final Action: AS AM AMPC____ D

FS90-09/10
714.4, 714.4.1, 714.4.2 (New)

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Rick Thornberry, Hughes Associates, Inc., The Code Consortium, representing Centria, Trespa North America, Inc., Alcan Composites USA, Inc.

Revise as follows:

714.4 Exterior curtain wall/floor intersections. The intersections of exterior curtain wall assemblies and floor or floor/ceiling assemblies shall be protected against interior fire spread in accordance with Sections 714.4.1 through 714.4.3 as applicable. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

714.4.1 Fire-resistance-rated exterior curtain wall/fire-resistance-rated floor intersections. Where fire resistance-rated floor or floor/ceiling assemblies are required, ~~voids created at~~ the intersection of ~~the~~ fire-resistance-rated exterior curtain wall assemblies and such floor assemblies shall be sealed with an approved system. ~~to prevent the interior spread of fire.~~ Such systems shall be securely installed and tested in accordance with ASTM E 2307 to ~~prevent the passage of flame~~ provide an "F" rating and a "T" rating for ~~the~~ a time period at least equal to the fire-resistance rating of the floor assembly. ~~and prevent the passage of heat and hot gases sufficient to ignite cotton waste. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.~~

714.4.2 Nonfire-resistance-rated exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of nonfire-resistance-rated exterior curtain wall assemblies and fire-resistance-rated floor assemblies shall be sealed with an approved system. Such systems shall be securely installed and tested in accordance with ASTM E2307 to provide an "F" rating when tested with the nonfire-resistance-rated exterior curtain wall assembly. The "F" rating shall be the greater of 30 minutes or the time at which one of the following occurs .

1. The "F" rating is determined in the ASTM E2307 test, or
2. A through-crack, hole or other opening is observed in the exterior exposed face of the curtain wall assembly at a location above the upper surface of the floor assembly during the ASTM E2307 test.

714.4.~~1~~ 3 Exterior curtain wall/nonfire-resistance-rated floor assembly intersections. Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an approved material or system to retard the interior spread of fire and hot gases between stories.

Reason: This code change is a revision to Section 714.4. This revision addresses several issues with respect to the existing wording and provides in some cases, new requirements. The proposed reorganization of Section of 714.4 now provides requirements based on the fire-resistance ratings of the types of wall assemblies and floors or floor/ceiling assemblies that intersect. This reorganization greatly simplifies the use of this section of the Code.

One new item is the requirement for the seal when a fire-resistance-rated wall meets a fire-resistance-rated floor or floor/ceiling assembly. In this case, the seal must exhibit an "F" rating and a "T" rating equivalent to the fire-resistance rating of the floor or floor ceiling assembly. This change is appropriate for this application and incorporates the reported results of ASTM E2307 ('F" and "T" ratings) and thus clarifies the requirements.

Another change is the addition of a section to address the intersection of a nonfire-resistance-rated wall assembly and a fire-resistance-rated floor or floor/ceiling assembly. This is a very common type of intersection when curtain walls are used. In this case, the wall assembly does not have a fire-resistance rating and when tested in the ASTM E2307, the wall may not remain intact for the fire-resistance-rating period of the floor or floor/ceiling assembly. This new section recognizes this fact but still requires ASTM E2307 testing with the nonfire-resistance-rated wall assembly and requires a minimum fire-resistance rating for the seal material. The time period of 30 minutes was selected as providing a significant but yet realistic fire performance criteria for this condition.

The current 714.4.1 which addresses the issue of nonfire-resistance-rated floors is unchanged.

This reorganization provides significant clarity to this section of the Code and provides appropriate requirements based on the fire-resistance ratings of the intersecting walls and floors or floor ceiling assemblies.

Cost Impact: This code change will not increase the cost of construction.

Analysis: Code change proposals FS90 and FS91 address fire-resistance rated curtain wall/floor intersection requirements. The committee needs to make its intent clear with respect to these provisions.

ICCFILENAME: BEITEL-FS13-714.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that these changes should be done in the development of the referenced standard rather than in the code. Further, the limit of 30 minutes in Section 714.4.2 may not be appropriate for situations where the floor fireresistance rating is greater than this.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE, The Code Consortium and Jesse Beitel, Hughes Associates, Inc., representing Alcan Composites USA, Inc./Centria/Trespa North American, Ltd, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

714.4 Exterior curtain wall/floor intersections. The intersections of exterior curtain wall assemblies and floor or floor/ceiling assemblies shall be protected against interior fire spread in accordance with Sections 714.4.1 through 714.4.3 as applicable. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

714.4.1 Fire-resistance-rated exterior curtain wall/fire-resistance-rated floor intersections. Where fire-resistance-rated floor or floor/ceiling assemblies are required, the intersection of fire-resistance-rated exterior curtain wall assemblies and such floor assemblies shall be sealed with an approved system. Such systems shall be securely installed and tested in accordance with ASTM E 2307 to provide an "F" rating and a "T" rating for a time period at least equal to the <u>required</u> fire-resistance rating of the floor assembly.

714.4.2 Nonfire-resistance-rated exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of nonfire-resistance-rated exterior curtain wall assemblies and fire-resistance-rated floor assemblies shall be sealed with an approved system. Such systems shall be securely installed and tested in accordance with ASTM E2307 to provide an "F" rating when tested with the nonfire-resistance-rated exterior curtain wall assembly. <u>A "T" rating shall not be required.</u> The "F" rating shall be ~~the greater of 30 minutes or the time at which one of the following occurs:~~ <u>for a time period at least equal to the required fire-resistance rating of the floor assembly.</u>

~~1. The "F" rating is determined in the ASTM E2307 test, or~~

<u>Exception: Where the time at which</u> ~~2.~~a through-crack, hole or other opening is observed in the exterior exposed face of the curtain wall assembly at a location above the upper surface of thefloor assembly during the ASTM E2307 test <u>is less than the required "F" rating but not less than 30 minutes, the system shall not be required to have an "F" rating at least equal to the required fire-resistance rating of the floor assembly, provided the void created at the intersection of the exterior curtain wall assembly and the floor assembly is sealed with an approved material to prevent the interior spread of fire. Such material shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (0.254 mm) of water column (2.5 Pa) for the time period at least equal to the required fire-resistance rating of the floor assembly</u>.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: The Committee Reason Statement for disapproval of this Code Change focused mainly on Section 714.4.2 Nonfire-Resistance-Rated Exterior Curtain Wall/Fire-Resistance-Rated Floor Intersections since the Committee felt it contained criteria that more appropriately belonged within the referenced standard ASTM E 2307 rather than the code. However, this code change proposal actually consists of a reformatting of Section 714.4 Exterior Curtain Wall/Floor Intersections to break it down into logical subsections that address the different configurations and fire-resistance ratings of the building elements that make up the intersection that occurs at the exterior curtain wall and the floor in multistory buildings. We believe that the reformatting will definitely make this section more user friendly and enforceable. The Committee also expressed concerns about the minimum F rating only being required to be 30 minutes in Section 714.4.2 since the fire-resistance rating of the floor assembly will most likely be either 1-hour or 2-hours.

The revisions we have incorporated into our original code change submittal, we believe, help to further clarify the intent of the code change while also making it consistent with actions taken on other code changes during this cycle that impact this section such as FS87-09/10 and FS88-09/10. In fact, Section 714.4.2 has been revised in this Public Comment to eliminate the minimum F rating of 30 minutes and instead allow for the use of a new Exception to current Section 714.4 that was approved as modified by the Committee in Code Change FS88-09/10. The Committee agreed that the Exception was necessary to accommodate exterior curtain wall assemblies containing vision glass that extends to the finished floor level. That is because such assemblies cannot be effectively tested in accordance with ASTM E 2307 as the glass will break out early in the fire test. We believe that the Exception is also appropriate for other exterior curtain wall assemblies that will also not remain fully intact during the duration of the ASTM E 2307 fire test. Such exterior curtain wall assemblies are generally constructed of aluminum or are supported by aluminum extrusions and brackets used as attachments to the structural subframe that supports the curtain wall system away from the edge of the floor slab. Such systems cannot resist direct fire exposure for significant periods of time and thus do not remain intact in place during the full fire exposure for the ASTM E 2307 fire test for cases where there are 1-hour or 2-hour fire-resistance rated floors.

The Exception is invoked when a through-crack, hole, or other opening is observed in the exterior exposed face of the exterior curtain wall assembly at a location above the upper surface of the floor assembly during the ASTM E 2307 fire test. This would represent the loss of integrity of the curtain wall assembly similar to the breaking of visions glass. But the Exception is also conditional on the fact that such a failure of the exterior curtain wall assembly must not occur prior to 30 minutes of exposure during the ASTM E 2307 fire test. Thus, the curtain wall design must have some minimum substantial integrity for the first 30 minutes of fire exposure. Obviously, this limitation is more restrictive than for vision glass which breaks out of the curtain wall assembly generally within the first 15 minutes of the fire test. If those conditions are met, then the Exception approved by FS88-09/10 for vision glass can be applied. This Exception will still require the void at the intersection of the exterior curtain wall assembly and the fire-resistance rated floor assembly to be filled with a material that will resist the passage of flames and hot gases for a period of not less than that required by the fire-resistance rating of the floor assembly when tested to ASTM E 119 time-temperature conditions under a minimum positive pressure differential of 0.01 inches of water column. It should be noted that until the 2009 International Building Code (IBC), this method of testing the perimeter fire barrier protection at that void was either required or allowed as an alternative to the ASTM E 2307 fire test.

We believe that this Public Comment adequately responds to the Committee's concerns regarding our original code change proposal while meeting the intent of our original code change proposal for providing reasonable means for achieving the protection of the void created at the intersection of the exterior curtain wall assembly and the floor in multistory buildings, while not causing undue hardship on the installation of curtain wall assemblies that have traditionally been successfully used in multistory buildings for many years prior to the development of the ASTM E 2307 fire test method.

Therefore, we respectfully request that the Class A voting members support our Public Comment by overturning the Committee's recommendation for disapproval and voting for approval as modified in accordance with this Public Comment.

Analysis: Public comments to FS90 and FS91 address fire-resistance rated curtain wall/floor intersection requirements. The membership needs to make their preference clear with respect to these provisions.

Final Action: AS AM AMPC____ D

FS91-09/10

702, 714.4, 714.4.1, 714.4.1.1 (New), 714.4.3 (New)

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing Alcan Composites USA, Inc.

1. Add new text as follows:

702 DEFINITIONS

<u>**PERIMETER FIRE BARRIER.** The perimeter joint protection installed between the exterior curtain wall assembly and the floor assembly to resist the passage of fire and hot gases between stories within the building at the voids created at the intersection of the exterior curtain wall assembly and the floor assembly.</u>

2. Revise as follows:

714.4 Exterior curtain wall/floor intersection. <u>Exterior curtain wall/floor intersections shall comply with Sections 714.4.1 and 714.4.2 as applicable.</u>

<u>**714.4.1 Exterior curtain wall/fire-resistance rated floor assembly intersections.**</u> Where fire-resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be <u>protected by</u> ~~sealed with~~ an *approved* <u>perimeter fire barrier designed to resist</u> ~~system to~~

~~prevent~~ the interior spread of fire and hot gases between stories. ~~Such systems~~ The perimeter fire barrier shall be ~~securely installed and~~ tested in accordance with ASTM E 2307 ~~to prevent the passage of flame~~ for the time period at least equal to the *fire-resistance rating* of the floor assembly ~~and prevent the passage of heat and hot gases sufficient to ignite cotton waste. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5~~.

714.4.1.1 Installation. The perimeter fire barrier shall be securely installed so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

714.4.~~1~~2 Exterior curtain wall/nonfire-resistance-rated floor assembly intersections. Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an *approved* material or system to retard the interior spread of fire and hot gases between *stories*.

714.4.3 Curtain wall spandrels. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

Reason: This section was revised during the last code cycle to eliminate the alternate method of testing which was utilized prior to the development of ASTM E 2307. So now the protection of the voids created at the intersection of exterior curtain wall assemblies and floor assemblies is required to be tested in accordance with ASTM E 2307. We believe it is appropriate to further revise this section to clarify that fact. Therefore, we have deleted some of the unnecessary terminology since that is already covered within the test method itself or within the new definition for "Perimeter Fire Barrier" which we are also including as a part of this code change proposal.

The definition for "Perimeter Fire Barrier" being proposed is similar to that contained in ASTM E 2307 and is the term contained in the title of the standard which is "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus." So we have incorporated the term "Perimeter Fire Barrier" within this code change to make it very clear what protection the section prescribes based on tests conducted in accordance with ASTM E 2307. Some of the other terminology we have substituted parallels that in Section 714.1 General for fire-resistant joint systems so that they are consistent since Section 714.4 is a subsection of Section 714 Fire-Resistant Joint Systems.

We have also reformatted Section 714.4 and subdivided it into two additional subsections. Subsection 714.4.1 specifically deals with the installation of the perimeter fire barrier where the floor assembly is required to have a fire-resistance rating and utilizes terminology based on Section 714.2 Installation for fire-resistant joint systems for consistency. Subsection 714.4.3 is simply the last sentence of Section 714.4 relocated. Current Subsection 714.4.1 has been renumbered as 714.4.2 to fit into this reformatting. We believe that this will provide for better clarity, interpretation, and enforcement of these provisions for exterior curtain wall/floor intersection protection utilizing perimeter fire barriers.

In summary, no technical changes have been made to this section. It has simply been editorially revised to be consistent with the referenced test method ASTM E 2307 and similar requirements in Section 714 for fire-resistant joint systems of which this Section 714.4 is a subsection.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Code change proposals FS90 and FS91 address fire-resistance rated curtain wall/floor intersection requirements. The committee needs to make its intent clear with respect to these provisions.

ICCFILENAME: THORNBERRY-FS7-714.4.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the term "perimeter fire barrier" was not needed and could cause confusion rather than clarity.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE, The Code Consortium, Inc., representing Alcan Composites USA, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

702 DEFINITIONS

F RATING. The time period that the through-penetration firestop system limits the spread of fire through the penetration when tested in accordance with ASTM E 814 or UL 1479; the time period that the perimeter fire barrier limits the spread of flames or hot gases through the intersection of the exterior curtain wall assembly and the fire-resistance-rated floor or floor/ceiling assembly when tested in accordance with ASTM E 2307.

PERIMETER FIRE BARRIER. The perimeter joint protection installed between the exterior curtain wall assembly and the floor assembly to resist the passage of fire and hot gases between stories within the building at the voids created at the intersection of the exterior curtain wall assembly and the floor assembly.

T RATING. The time period that the penetration firestop system, including the penetrating item, limits the maximum temperature rise to 325°F (163°C) above its initial temperature through the penetration on the nonfire side when tested in accordance with ASTM E814 or UL 1479; the time period that the perimeter fire barrier limits the maximum temperature rise to 325°F (181°C) above its initial temperature on the nonfire side when tested in accordance with ASTM E 2307.

714.4 Exterior curtain wall/floor intersection. Exterior curtain wall/floor intersections shall comply with Sections 714.4.1 and 714.4.2 as applicable.

714.4.1 Exterior curtain wall/fire-resistance rated floor assembly intersections. Where fire-resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be protected by an approved perimeter fire barrier designed to resist the interior spread of fire and hot gases between stories. The perimeter fire barrier shall be tested in accordance with ASTM E2307 to provide an "F" rating for ~~the~~ a time period at least equal to the required fire-resistance rating of the floor assembly. A "T" rating shall not be required.

714.4.1.1 Installation. The perimeter fire barrier shall be securely installed so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

714.4.2 Exterior curtain wall/nonfire-resistance-rated floor assembly intersections. Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an approved material or system to retard the interior spread of fire and hot gases between stories.

714.4.3 Curtain wall spandrels. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

Commenter's Reason: The main reason the Committee voted to disapprove this Code Change was that they felt the proposed new definition for "Perimeter Fire Barrier" could cause confusion with the currently defined term "Fire Barrier." We respectfully disagree with the Committee's reason since defined terms are shown in italics in the code text, so any user of the code would be able to determine that the phrase "perimeter fire barrier" is different than the term "fire barrier." Furthermore, the term "perimeter fire barrier" as noted in the Reason Statement to the original Code Change is the identical terminology used in the referenced test method ASTM E 2307. It concisely defines the protection that is required to be installed between the exterior curtain wall assembly and the floor assembly in order to resist the passage of fire and hot gases between stories. By providing this defined term, it will no longer be necessary to have a long descriptive phrase to identify the perimeter joint protection required by the code. We have also revised Section 714.4.1 to reflect changes made to Section 714.4 by Code Change FS87-09/10 which was recommended for approval by the Committee.

And one final important point, we have added second definitions to the current definitions for "F Rating" and "T Rating" to recognize the F rating and T rating determined in accordance with ASTM E 2307 so as not to confuse them with the currently defined terms for those ratings based on ASTM E 814/UL 1479 for through-penetration firestop systems.

With the revisions proposed in this Public Comment, we believe that Section 714.4 will be more user friendly and enforceable, as well as more closely correlated with the ASTM E 2307 fire test required by this section. Therefore, we respectfully request that the Class A voting members in attendance at the hearings to overturn the Committee recommendation for disapproval and vote for approval as modified for Code Change FS91-09/10 based on this Public Comment.

Analysis: Public comments to FS90 and FS91 address fire-resistance rated curtain wall/floor intersection requirements. The membership needs to make their preference clear with respect to these provisions.

Final Action: AS AM AMPC____ D

FS96-09/10
715.4.3.1

Proposed Change as Submitted

Proponent: Bill Ziegert, representing Smoke Guard, Inc.

Revise as follows:

715.4.3.1 Smoke and draft control. *Fire door* assemblies including elevator hoistway doors opening into fire-resistance rated corridors shall also meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot ($0.01524\ m^3/s \cdot m^2$) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature and elevated temperature tests. Louvers shall be prohibited. Installation of smoke doors shall be in accordance with NFPA 105.

Reason: Just as it is important that room to corridor doors in fire rated corridors meet not only the fire-resistance rating requirements, but also the requirements for smoke and draft control, it is equally if not more important that the elevator hoistway doors which are fire- resistance rated meet the same smoke leakage requirements when they open into fire resistance rated corridors. Fires on one floor can potentially overcome the corridor doors, filling the corridor with smoke and then enter the elevator shaft where the stack effect would force the smoke out onto non affected floors. If the hoistway doors resist the passage of smoke, occupants on other floors would not be as likely to be exposed to the smoke hazard.

Cost Impact: Moderate cost increase that would apply only to occupancies without elevator lobbies.

ICCFILENAME: ZIEGERT-FS2-715.4.3.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that these provisions were not necessary to enforce the code. Elevator manufacturers have indicated that they cannot achieve smoke and draft control requirements, therefore the option is to provide an enclosed elevator lobby, which are clearly provided for in the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas Meyers, City of Central City, Colorado, representing Colorado Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

715.4.3.1 Smoke and draft control. *Fire door* assemblies including elevator hoistway doors opening directly into fire-resistance rate corridors shall also meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.01524 m3/s · m2) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature and elevated temperature tests. Louvers shall be prohibited. Installation of smoke doors shall be in accordance with NFPA 105.

Commenter's Reason: The modification adds the word "directly" within the original proponent's change to include elevator hoistway doors as being required to provide for smoke protection in accordance with the testing procedure contained in UL 1784. This is intended to clarify the committee's concerns that the hoistway doors would be required to be protected in circumstances where a smoke protected elevator lobby is already provided with smoke and draft control door assemblies. Using the term "directly" indicates that the hoistway door is in direct communication with a corridor and not isolated via lobby or additional (3002.6) swinging doors.

The change is needed to address inconsistency in enforcement of smoke and draft door provisions in fire resistance rated corridor applications penetrated with leaky elevator hoistway openings. Currently, some enforcing agencies require any elevator hoistway door to have smoke and draft control capacity whenever the corridor is rated, consistent with the requirement for other door assemblies in the corridor fire partition. Other jurisdictions interpret the 708.14 elevator lobby provisions as providing the draft and smoke control provisions specific to the elevator hoistway opening for all circumstances, including corridor applications referencing 715.4.3.1. Approval as modified would provide clear resolution to this inconsistency.

Elevators are known for their ability to convey smoke from level to level in a building. If the code insists on smoke and draft control at normal door openings, it is only logical to require it at the elevator hoistway opening.

Final Action: AS AM AMPC____ D

FS97–09/10
715.4.3.2, Table 715.4

Proposed Change as Submitted

Proponent: William F. O'Keeffe, representing SAFTIFirst

1. Revise as follows:

715.4.3.2 Glazing in door assemblies. Where Table 715.4 identifies 1-hour rated corridor walls or 1-hour rated smoke barriers, ~~I~~in a 20-minute fire door assembly, the glazing material in the door itself shall have a minimum fire-protection rating of 20 minutes and shall be exempt from the hose stream test. Glazing material in any other part of the door assembly including transom lites and sidelites, shall be tested for 45-minutes in accordance with NFPA ~~257~~ 252 or UL ~~9~~ 10C, including the hose stream test~~, in accordance with Section 715.5~~.Where Table 715.4 identifies 0.5-hour rated corridor walls or other fire partitions, in a 20-minute fire door assembly, the glazing material in the door vision panel, sidelights and transoms shall have a minimum fire-protection rating of 20 minutes when tested to NFPA 252 or UL 10C, and shall be exempt from the hose stream test.

2. Revise as follows:

TABLE 715.4
FIRE DOOR AND FIRE SHUTTER FIRE PROTECTION RATINGS

TYPE OF ASSEMBLY	REQUIRED ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4	3
	3	3[a]
	2	$1\frac{1}{2}$
	$1\frac{1}{2}$	$1\frac{1}{2}$
Fire barriers having a required fire-resistance rating of 1 hour:		
Shaft, exit enclosure and exit passageway walls	1	1
Other fire barriers	1	$\frac{3}{4}$
Fire partitions:		
Corridor walls	1	$\frac{1}{3}$ [b]
	0.5	$\frac{1}{3}$ ~~b~~
Other fire partitions	1	$\frac{3}{4}$
	0.5	$\frac{1}{3}$
Exterior walls	3	$1\frac{1}{2}$
	2	$1\frac{1}{2}$
	1	$\frac{3}{4}$
Smoke barriers	1	$\frac{1}{3}$ [b]

a. Two doors, each with a fire protection rating of 11/2 hours, installed on opposite sides of the same opening in a firewall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.
b. For testing requirements, see Section 715.4.3.

Reason: This code change provides for testing of a 20-minute door assembly, including the sidelight and transom panels, to NFPA 252 without hose stream, when the assembly is in a half-hour rated corridor or fire partition. Since a half hour wall tested to ASTM E119 is not required to be hose stream tested, there is no fire safety reason to require the door assembly component in that wall to meet a hose stream test.

In past code cycle testimony it has been suggested that there is a reason to treat sidelights and transoms differently than the glazing in the vision panel of the door, because combustibles can be stacked next to a sidelight (of course, that argument doesn't apply to the transom, because it is above the door). It has also been suggested that 20-minute tempered products are subject to "disintegration."

The first point is not a hose stream issue, but a radiant heat issue, and applying a hose stream test to products does not assure that they will block radiant heat from passing through the glazing and spreading the fire. Indeed, as seen by the test data in the supporting fire test video, http://www.safti.com/video/resist/resistive.html, one type of fire protection material, ceramic, transmits enough radiant heat in the first 20-minutes of fire exposure to cause spontaneous combustion. Wired glass, another fire protection product that can pass the hose stream test, likewise transmits dangerous levels of radiant heat during the early stages of a fire.

The second point simply isn't true, and was not substantiated by any test data showing alleged "disintegration." Specialty tempered products have undergone rigorous fire testing, and have proven to be effective fire protection materials by fire case history. Millions of square feet of these products have been used worldwide without any reports of the alleged "disintegration" alleged by opponents to this code change. Significantly, opponents of this code change have never come forward with any reported instances of failure.
The fact is, products not tested to the hose stream protect against fire equally as well as those that are tested.

This change also changes the test standard for sidelights and transoms back to NFPA 252 and UL 10C, which is the standard historically applied to door assemblies that include sidelights and transoms, and is consistent with the test protocol specified in NFPA 80. The application of NFPA 257 under the existing provision has caused confusion and impractical test methods for testing one door assembly to two different test standards.

In 20-minute window applications in half hour walls, there is no legitimate fire safety reason for requiring one element of the fire resistive construction to pass the hose stream test, where the half hour wall assembly and 20-minute door components do not pass that same test.

Cost Impact: The code change proposal will reduce the cost of construction.

ICCFILENAME: OKEEFFE-FS6-715.4.3.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposed wording was confusing with respect to door requirements and door vision panel requirements. Further, NFPA 257 is the appropriate standard and should not be eliminated.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jeff Inks, Window and Door Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

715.4.3.2 Glazing in door assemblies. ~~Where Table 715.4 identifies 1-hour rated corridor walls or 1-hour rated smoke barriers,~~ In a 20-minute fire door assembly, the glazing material in the door itself shall have a minimum fire-protection rating of 20 minutes and shall be exempt from the hose stream test. Glazing material in any other part of the door assembly including transom lites and sidelites, shall be tested ~~for 45-minutes~~ in accordance with NFPA 252 or UL 10C, including the hose stream test, in accordance with Section 715.5.~~Where Table 715.4 identifies 0.5-hour rated corridor walls or other fire partitions, in a 20-minute fire door assembly, the glazing material in the door vision panel, sidelights and transoms shall have a minimum fire-protection rating of 20 minutes when tested to NFPA 252 or UL 10C, and shall be exempt from the hose stream test.~~

TABLE 715.4
FIRE DOOR AND FIRE SHUTTER FIRE PROTECTION RATINGS

TYPE OF ASSEMBLY	REQUIRED ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4	3
	3	3[a]
	2	$1\frac{1}{2}$
	$1\frac{1}{2}$	$1\frac{1}{2}$
Fire barriers having a required fire-resistance rating of 1 hour:		
Shaft, exit enclosure and exit passageway walls	1	1
Other fire barriers	1	$\frac{3}{4}$
Fire partitions:		
Corridor walls	1	$\frac{1}{3}$ [b]
	0.5	$\frac{1}{3}$ [b]
Other fire partitions	1	$\frac{3}{4}$
	0.5	$\frac{1}{3}$
Exterior walls	3	$1\frac{1}{2}$
	2	$1\frac{1}{2}$
	1	$\frac{3}{4}$
Smoke barriers	1	$\frac{1}{3}$ [b]

a. Two doors, each with a fire protection rating of 11/2 hours, installed on opposite sides of the same opening in a firewall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.
b. For testing requirements, see Section 715.4.3.

Commenter's Reason: WDMA concurs with the intent of the initial proposal and with the proponent's supporting statements regarding the appropriate test standards transom lights and sidelights in 20-minute fire door assemblies which is the bases for this comment. We do not believe the testimony in opposition to this proposal or the Fire Safety Committee provided an adequate reason for rejecting it. .

Both NFPA 252 – *Standard Methods of Fire Tests of Door Assemblies*, and UL 10 *Standard for Positive Pressure Fire Tests of Door Assemblies*, expressly include glazing as an integral part of the entire door assembly to be tested, while the NFPA 257 *Standard on Fire Test for Window and Glass Block Assemblies,* and UL 9 *Fire Tests of Window Assemblies* are limited only to glazing in window assemblies and do not include glazing in door assemblies. Requiring glazing in fire door assemblies to be tested to NFPA 257 or UL 9C therefore results in a very significant conflict in section 715.4.3 that is further exacerbated by requiring the hose stream for glazing in 20-minute rated fire door assemblies. This creates an impractical and unreasonable testing protocol by requiring different components in the same assembly to be tested to two different standards.

Section 715.4.3. requires fire door assemblies, including side and transom lights and glazing in the door to have minimum fire rating of 20-minutes, tested to NFPA 252 or UL 10 without the hose stream test which is then followed by Section 715.4.3.2, that requires the same sidelight and transom light glazing to be tested to NFPA 257 or UL 9, including the hose stream test, for the same rating. In effect, this means taking glazing that was tested separately from the assembly, per NFPA 257, including the hose stream test, and installing it in a door assembly that was tested without the hose stream test per NFPA 252. This cannot be reasonably accomplished in a lab and makes little sense. This is also inconsistent with the protocols specified by NFPA 80, which together with the conflict in 715.4.3 is causing unnecessary confusion and as noted, an impractical and unreasonable testing protocol for testing requirements that have never been adequately justified in the first place. This public comment eliminates the fire testing conflicts currently created by the section.

Public Comment 2:

Jeff Inks, Window and Door Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

715.4.3.2 Glazing in door assemblies. ~~Where Table 715.4 identifies 1-hour rated corridor walls or 1-hour rated smoke barriers,~~ In a 20-minute fire door assembly, the glazing material in the door itself shall have a minimum fire-protection rating of 20 minutes and shall be exempt from the hose stream test. Glazing material in any other part of the door assembly including transom lites and sidelites, shall be tested ~~for 45-minutes~~ in accordance with NFPA 257 ~~252~~ or UL 9 ~~10C~~, including the hose stream test, in accordance with Section 715.5. ~~Where Table 715.4 identifies 0.5-hour rated corridor walls or other fire partitions, in a 20-minute fire door assembly, the glazing material in the door vision panel, sidelights and transoms shall have a minimum fire-protection rating of 20 minutes when tested to NFPA 252 or UL 10C, and shall be exempt from the hose stream test.~~

> **Exception:** Glazing material in any other part of the door assembly including transom lights and sidelights, in fire partitions required to be 1/2 hour rated by Table 715.4, shall be exempt from the hose stream test.

TABLE 715.4
FIRE DOOR AND FIRE SHUTTER FIRE PROTECTION RATINGS

TYPE OF ASSEMBLY	REQUIRED ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4 3 2 1 1/2	3 3[a] 1 1/2 1 1/2
Fire barriers having a required fire-resistance rating of 1 hour: Shaft, exit enclosure and exit passageway walls Other fire barriers	 1 1	 1 3/4
Fire partitions: Corridor walls Other fire partitions	 1 0.5 1 0.5	 1/3[b] 1/3[b] 3/4 1/3
Exterior walls	3 2 1	1 1/2 1 1/2 3/4
Smoke barriers	1	1/3[b]

a. Two doors, each with a fire protection rating of 11/2 hours, installed on opposite sides of the same opening in a firewall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.
b. For testing requirements, see Section 715.4.3.

Commenter's Reason: WDMA concurs with the intent of the initial proposal and with the proponent's supporting statements regarding application of the hose stream test requirement on transom lights and sidelights in 20-minute fire door assemblies which is the bases for this comment. The proposal as amended by this comment addresses the Committee's reason for disapproval by removing the proposed language the Committee felt was confusing, and clarifying it by adding a limited exception to accomplish the same objective.

WDMA believes that the exception as proposed is wholly justified because of the continued lack of data, actual incidents of failure, or any other justification for requiring a hose stream test for the sidelight and transom light glazing in a 20-minute door assembly, especially when there is no hose stream test requirement for any other component of the assembly or partition because such a test is not necessary to assure the required performance. Having no requirement for a hose stream test in 20-minute assemblies is also consistent with the requirements in NFPA 101.

The only bases for maintaining a requirement for the hose stream test for sidelight and transom light glazing in 20-minute door assemblies in the IBC continues to be unsubstantiated assertions by opponents to removing the requirement that fuel loads can be stacked by sidelight glazing, and tempered glass can fail when experiencing a significant temperature delta. Those assertions are not disputed in and of themselves. However, as noted, they have not been substantiated by data, actual incidents or any other sound technical information to establish that they are in fact the risk they are asserted to be in order to justify the need for the hose stream test for glazing in these assemblies.

The argument that the potential for fuel loads to be stacked in front of a sidelight and that that potential poses a significant risk to these assemblies is subjective and unsupported. The other argument that glazing in these assemblies is vulnerable to failure due to thermal shock caused by water from an activated sprinkler is equally unsupported by data or documented failures under those circumstances. There is no record of reported incidents of failure due to thermal shock from fire sprinklers in the U.S. or anywhere in the world indicating a fire safety problem. In fact, specialty tempered products have undergone rigorous fire testing, and have proven to be effective fire protection materials by fire case history. Millions of square feet of these products have been used worldwide without any reports of the failures opponents have asserted that there is a too great a risk of.

Final Action: AS AM AMPC____ D

FS100-09/10
715.4.4.1

<u>Proposed Change as Submitted</u>

Proponent: William F. O'Keeffe, representing SAFTIFirst

Revise as follows:

715.4.4 Doors in exit enclosures and exit passageways. Fire door assemblies in exit enclosures and exit passageways shall have a maximum transmitted temperature end point of not more than 450° F (250° C) above ambient at the end of 30 minutes of standard fire test exposure.

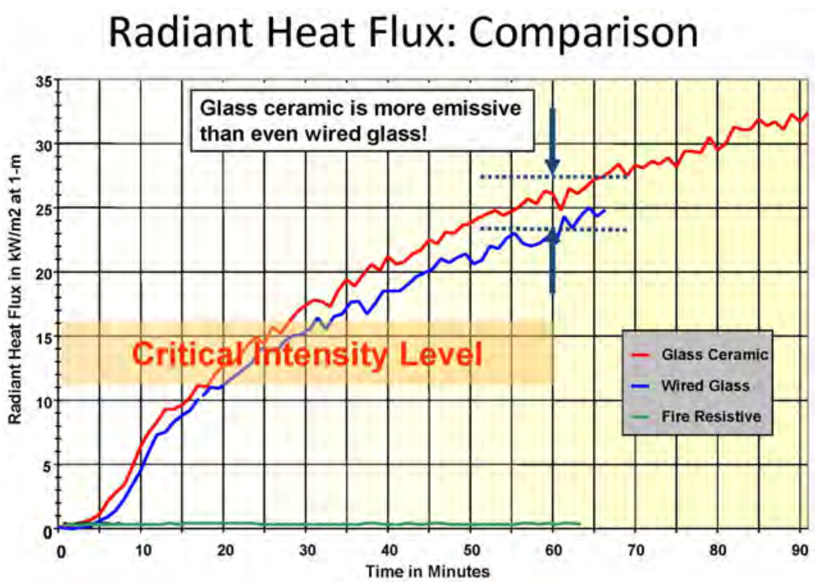
> **Exception:** The maximum transmitted temperature rise is not required in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.1.2.

715.4.4.1 Glazing in doors. Fire-protection-rated glazing in excess of 100 sq inches (0.065 m^2) <u>is not permitted.</u> <u>Fire-resistance rated</u> glazing <u>in excess of 100 sq inches (0.065 m^2)</u> shall be permitted in fire door assemblies when tested as components of the door assemblies, and not as glass lights, and shall have a maximum transmitted temperature rise of 450° F (250° C) in accordance with 715.4.4.

> ~~**Exception:** The maximum transmitted temperature end rise is not required in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Reason: This code change will make the size limits fire protection glazing in 60-and 90-minute doors in exit enclosures and passageways consistent with size limits for 60-and 90-minute doors elsewhere in the code. The presence of sprinklers in the building does not eliminate the life safety and fire spread hazard posed by unrestricted transmission of radiant heat flux through large sizes of fire protection rated glazing panels in 60-and-90-minute doors, especially when those doors are protecting exit enclosures and exit passageways deemed essential for occupant life safety.

Fire test data show that at 45-minutes, fire protection rated products such as ceramics and wired glass transmit in excess of 20 kW/m^2. At 20 minutes of fire exposure, these materials transmit in excess of 10 kW/m^2, and at 10 minutes of fire exposure, transmit 5 kW/m^2. See http://www.safti.com/video/resist/resistive.html See Chart Cumulative Radiant Heat Energy Data Chart below, prepared by the test sponsor, Vetrotech SaintGobain. The Society of Fire Protection Engineers Fire Protection Engineering Handbook identifies a fairly obvious tolerance limit for exposure to radiant heat of 2.5 kW/m^2 due to unbearable pain. (See SFPE Handbook of Fire Protection Engineering, 2nd edition, page 2-114)



Included as further support of this code change are two test reports from the Coast Guard testing of (1) Ceramic (FireLite) in steel bulkheads and (2) wired glass in steel bulkheads. Temperature rise and radiant heat flux measurements were recorded. The tests were intended to measure radiant heat flux and surface temperature performance at 60 minutes. The tests can be summarized as follows:

Wired Glass Test

The test of the wired glass panels resulted in glazing failure prior to 60-minutes, so radiant heat and temperature rise were only recorded up to the time of the wired glass failure.

Test 1

Heat flux at end of test (41:24 minutes) - 71 kW/m sq.
Surface temperature - wired glass temperature - 730 degrees C; steel frame - 540 degrees C

Test 2

Heat flux at end of test (37:46 minutes) - 48 kW/m sq.
Surface temperature - wired glass temperature - 730 degrees C; steel frame - 550 degrees C

Test 3

Heat flux at end of test (48:30 minutes) - 57 kW/m sq.
Surface temperature - wired glass temperature - 760 degrees C; steel frame - 585 degrees C

Conclusion on page 8 - As the window panes began to reach their melting point and flow out of the test frame, the recorded heat flux levels showed obvious increases. In all three tests, the recoded heat flux increased approximately 5-7 kW/m sq. until the wire glass fell out of the test frame and the test was terminated.

Ceramic (FireLite) Test

Test 1

Heat flux at end of test (60:00 minutes) - 75 kW/m sq.
Surface temperature - ceramic glass temperature - 800 degrees C; steel frame - 600 degrees C

Test 2

Heat flux at end of test (60:00 minutes) - 69 kW/m sq.
Surface temperature -ceramic glass temperature - 800 degrees C; steel frame - 600 degrees C

Test 3

Heat flux at end of test (60:00 minutes) - 73 kW/m sq.
Surface temperature -ceramic glass temperature - 800 degrees C; steel frame - 600 degrees C

According to these test reports, the surface temperature is significantly higher on the glazing than it is on the steel frame. Also, the report notes that the radiant heat measurements taken that included the "cooler steel frame" were several percentages lower than the view that included just the glazing. (see Ceramic test report, page 6.)

As further support, the following is a published listing of the ceramic product that was tested in the weblink video provided above, which shows a maximum tested area of 3627 sq. inches.

Product Designation: Keralite FR-F, Keralite FR-R, Keralite FR-L, Keralite
Thickness: 3/16 in. or 5/16 in. (5 or 8 mm)
Glazing Compound: closed cell PVC tape for 3/4 hr and 1 hr ratings. Kerafix ceramic tape for 1-1/2 hr ratings.
Furnace Pressure: Neutral and Positive

Rating	**Application**	**Max Exposed Area of Glass (Sq In.)**	**Max Width of Exposed Glass (In.)**	**Max Height of Exposed Glass (In.)**	**Min Depth of Groove (In.)**	**Groove Width (In.)**	**Building Code Marking**
1 hr.	Door	3627	46-1/2	78	5/8	5/16, 7/16	D-H-NT-60
1 hr.	Window, Transom, Sidelight	3627	46-1/2	78	5/8	5/16, 7/16	D-H-NT-60, OH-60

The use of this much glazing in a fire door protecting an exit enclosure or passageway is a threat to life safety, and should not be permitted.

Finally, the current provision, which appears to allow fire protection rated glazing to exceed 100 sq. inches when the building is sprinklered, was never intended by the proponent of the code change to the 2000 IBC that allowed fire resistance rated glazing that limited temperature rise to 450 F degrees to exceed 100 sq. inches. In the Draft 2000 IBC, there was one exception in the section specifying the requirements for temperature rise doors in exit enclosures and passageways, which applied to allow a non-temperature rise door when the building is sprinklered. The proposal submitted in 1998 that amended that section to allow fire resistance rated glazing to exceed 100 sq. inches when tested to limit temperature rise to 450- degrees F did not propose a second exception that would allow fire protection glazing to exceed 100 sq. inches when the building was sprinklered. However, when the monograph was published, a duplicate exception was printed, though never intended or proposed by the proponent of that code change.

The proponent of the 1998 code change intended this section to limit fire protection rated glazing to 100 sq. inches, consistent with the size limits provided by the legacy codes, and currently applicable in Section Section 715.4.7.1—regardless of whether the building is sprinklered. The same reasons for limiting fire protection glazing in 90-minute fire doors certainly apply in 60-minute exit enclosure and passageway fire doors.

As stated in NFPA 80 (2007), Annex I:

Traditional glazing materials have been prohibited from being used in fire windows in exit stair enclosures because of the concern for radiant heat transfer. Recently, the model building codes also incorporated requirements for limiting the temperature rise on the unexposed face of fire doors opening into exit stair enclosures in order to address the problem of heat transfer (both conducted and reradiated) that could expose evacuating occupants passing doors at each landing. Therefore, caution should be exercised when considering glazing materials with fire protection ratings of 60-minutes or more in such applications, since they can transmit excessive radiant heat into the exit stair enclosure. However, glazing materials with fire resistance ratings are suitable for such situations, since they have been tested to limit radiant heat transfer.

In sum, there is good reason to clarify that fire protection rated glazing is limited to 100 sq. inches in 1-hour exit enclosures and passageways, without an exception when automatic sprinklers are installed in accordance with Chapter 9 provisions. These exit enclosures and passageways are integral to life safety, and there is no justification for not providing for passive fire protection, protecting occupants from dangerous radiant heat levels from fully glazed exit enclosure doors, especially since the cost of fire resistance rated glazing is comparable to the cost of laminated safety-rated ceramics.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Code change proposals FS100 and FS107 propose similar revisions to Section 715.4.4.1. The committee needs to make its intent clear with respect to these provisions.

ICCFILENAME: OKeeffe-FS1-715.4.4.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that the presence of sprinklers in the building should not eliminate the life safety and fire spread hazard posed by unrestricted transmission of radiant heat flux through large sizes of fire protection rated glazing panels especially when those doors are protecting exit enclosures or passageways.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene, representing Underwriters Laboratories, Inc., requests Disapproval.

Commenter's Reason: The Committee action of Approval as Submitted manages to create confusion regarding doors in exit enclosures and exit passageways. Based on 715.4.4, in a NFPA 13 or 13R protected building, the opaque door panel is *not limited* to 450ºF temperature rise above ambient, but with the change to 715.4.4.1, the glazing within that same door panel would be *limited* to 450ºF temperature rise. This creates an inconsistency between 715.4.4 and 715.4.4.1 without technical justification.

It would also necessitate revising the marking scheme to add a designation for a fire-resistance-rated glazing that doesn't meet the ASTM E119 temperature requirements when in door applications, but does meet 450ºF temperature rise.

The revised text adds confusion and will foster further misunderstanding on product use and application not only within the Code and Architectural Community but also with manufacturers and suppliers of doors and frames.

Final Action: AS AM AMPC____ D

FS101-09/10-PART II
1703.5.4 (New)

NOTE: PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART I IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART II.

Proposed Change as Submitted

Proponent: William F. O'Keeffe, representing SAFTIFirst

PART II- IBC STRUCTURAL

Add new text as follows:

1703.5.4 Method of labeling. Information required to be permanently identified on the product shall be acid etched, sand blasted, ceramic fired, laser etched, embossed or of a type that, once applied, cannot be removed without being destroyed.

Reason: This code change provides for a method of permanently identifying information required by the code on the label. The language for permanent identification is taken from Section 2403.1, which applies to the permanent identification of information on glazing required by Chapter 24. This clarifies that the same method of permanent identification applies to other labeling required in the code, and specifically, Chapter 7.

This change also makes an editorial correction to Section 715.4.7.3 by correcting the reference to 715.4.7.3.1, instead of the incorrect reference to 715.5.9.1.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: OKeeffe-FS5-703.5

Public Hearing Results

PART II- IBC STRUCTURAL

Committee Action: **Approved as Submitted**

Committee Reason: To be consistent with the committee's action on FS101-09/10 Part I.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee (GICC), Committee of the Glass Association of North America (GANA), requests Disapproval.

Commenter's Reason: FS101 Part II should be disapproved. In support of Part II of FS101, the Proponent says that: "[t]he language for permanent identification is taken from Section 2403.1, which applies to the permanent identification of information on glazing required by Chapter 24." What the Proponent did not tell the Committee is that the language found in this proposal is taken from the second paragraph of Section 2403.1 and that paragraph only applies to tempered glass. Further, the Proponent failed to tell the Committee that, even where these same marking techniques (namely acid etching, sand blasting etc.) are found in connection with the designation of safety glazing in Section 2406.3, exceptions from compliance with these marking techniques exist for all types of glazings "other than tempered glass." The reason that these methods of labeling are mandated only for tempered glass is because tempered glass must be manufactured to size and cannot be cut in the field. It is, therefore, easy to apply acid etchings, laser etchings or sand blasted labels to each specially manufactured light of tempered glass. However, it is, simply, impracticable to require these methods of labeling for all other types of glazings that can be cut in the field.

The mandatory inclusion of these labeling techniques for all products is, simply, overbroad and impracticable and Final Action Agenda voters are urged to vote against the standing motion to approve FS101 Part II "As Submitted" in order to vote in favor of a motion to disapprove FS101 Part II.

Final Action: AS AM AMPC____ D

NOTE: PART I REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

FS101-09/10, PART I- IBC FIRE SAFETY

Revise as follows:

703.5 Fire-resistance-rated glazing. Fire-resistance-rated glazing, when tested in accordance with ASTM E 119 or UL 263 and complying with the requirements of Section 707, shall be permitted. Fire-resistance-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and the identifier "W-XXX," where the "XXX" is the fire-resistance rating in minutes. Such label or identification shall be issued by an agency and shall be permanently ~~affixed to~~ identified on the glazing.

715. 4.7.3 Labeling. Fire-protection-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and information required in Section ~~715.5.9.1~~ 715.4.7.3.1 that shall be issued by an approved agency and shall be permanently ~~affixed to~~ identified on the glazing.

715. 5.9 Labeling. Fire-protection-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and information required in Section 715.5.9.1 that shall be issued by an approved agency and shall be permanently ~~affixed to~~ identified on the glazing.

Reason: This code change provides for a method of permanently identifying information required by the code on the label. The language for permanent identification is taken from Section 2403.1, which applies to the permanent identification of information on glazing required by Chapter 24. This clarifies that the same method of permanent identification applies to other labeling required in the code, and specifically, Chapter 7.

This change also makes an editorial correction to Section 715.4.7.3 by correcting the reference to 715.4.7.3.1, instead of the incorrect reference to 715.5.9.1.

Cost Impact: The code change proposal will not increase the cost of construction.

PART I- IBC FIRE SAFETY
Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that the proposed glazing marking is appropriate and consistent with Section 2403.1.

Assembly Action: **None**

FS102-09/10
715.5

Proposed Change as Submitted

Proponent: William F. O'Keeffe, representing SAFTIFirst

715.5 Fire-protection-rated glazing. Glazing in fire window assemblies shall be fire-protection rated in accordance with this section and Table 715.5. Glazing in fire door assemblies shall comply with Section 715.4.7. Fire-protection-rated glazing in fire window assemblies shall be tested in accordance with and shall meet the acceptance criteria of NFPA 257 or UL 9. Fire-protection-rated glazing shall also comply with NFPA 80. Openings in nonfire-resistance-rated exterior wall assemblies that require protection in accordance with Section 705.3, 705.8, 705.8.5 or 705.8.6 shall have a fire protection rating of not less than 3/4 hour.

Exceptions:

1. Wired glass in accordance with Section 715.5.4
2. Fire-protection-rated glazing in 0.5-hour fire-resistance-rated partitions is permitted to have an 0.33-hour fire-protection rating.

715.5.8 Interior fire window assemblies. Fire-protection-rated glazing used in fire window assemblies located in fire partitions and fire barriers shall be limited to use in assemblies with a maximum fire-resistance rating of 1 hour in accordance with this section.

715.5.8.1 Where 3/4–hour fire protection window assemblies permitted. Fire-protection-rated glazing requiring 45-minute opening protection in accordance with Table 715.5 shall be limited to fire partitions designed in accordance with Section 709 and fire barriers utilized in the applications set forth in Sections 707.3.6 and 707.3.8 where the fire-resistance rating does not exceed 1 hour.

715.5.8.2 Area limitations. The total area of fire-protection rated window~~s~~ assemblies shall not exceed 25 percent of the area of a common wall with any room.

Reason: This code change is a clarification that fire protection-rated window assemblies are subject to area limits. Since there are some window assemblies that are fire resistance rated to ASTM E119, this code change aids the user in clarifying that fire protection rated window assemblies are subject to these limits.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: OKeeffe-FS10-715.5-2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The term "assemblies" appropriately includes the frame, which makes the requirements more conservative. Further, this is consistent with the committee's actions on FS107-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee (GICC), a Committee of the Glass Association of North America (GANA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

715.5.8.2 Area limitations. The total area of <u>the glazing in</u> fire-protection rated window assemblies shall not exceed 25% of the area of a common wall with any room.

(portions of proposal not shown, remain unchanged)

Commenter's Reason: In recommending approval of this proposal, it is believed that the Committee intended to make references to fire windows uniform throughout Chapter 7 by referring to them as "fire window assemblies" rather than merely as "windows" or "fire windows" since the testing and rating of fire windows includes their assemblies. However, adopting this proposal as submitted will alter how the 25% area limitation established in 715.5.8.2 is calculated. As written, the proposal would add the framing and other opaque assembly materials to the calculation of the 25% limitation. Since no evidence was submitted justifying a need to change the method of calculating the 25% limitation, the modification proposed by this Public Comment would 1- retain the proposed changes needed to make references to "fire window assemblies" uniform, but retain the current method of calculating the 25% area limitation. In that regard, it would include only the total area of the glazing, not the opaque materials used in the fire window assembly.

Final Action Agenda voters are urged to vote against the standing motion to approve FS102 as submitted in order to vote in favor of a motion to adopt the proposal "As Modified" by this Public Comment.

Final Action: AS AM AMPC____ D

FS107-09/10

702, 703.5, 715.2, 715.3, 715.3.1, Table 715.3 (New), 715.4, 715.4.1, 715.4.2, 715.4.3, 715.4.3.1, 715.4.3.2, 715.5.4, 715.4.4, 715.4.4.1, 715.4.5, 715.4.6, 715.4.6.1, 715.4.6.1.1, 715.4.7, 715.4.7.1, 715.5.8.1.1, 715.5.8.1.2, 715.5.8.1.2.1, 715.5.8.1.2.2, 715.4.7.2, 715.4.7.3, 715.5, 715.4.7.3.1, 715.4.7.4, 715.5.8, 715.5.8.1, 715.5.8.2, 715.6.8.3, Table 715.5, 715.5.9, 715.5.9.1, TABLE 715.4,

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC); William F. O'Keeffe, representing SAFTIFirst

1. Add new text:

SECTION 702 DEFINITIONS

<u>**Fire-rated glazing.** Glazing with either a fire protection rating or a fire resistance rating.</u>

2. Revise as follows:

SECTION 703 FIRE RESISTANCE RATINGS AND FIRE TESTS

703.5 Fire-resistance-rated glazing. Fire-resistance-rated glazing, when tested in accordance with ASTM E 119 or UL 263 and complying with the requirements of Section 707, shall be permitted. Fire-resistance-rated glazing shall bear a label ~~or other identification showing the name of the manufacturer, the test standard and the identifier "W-XXX," where the "XXX" is the fire-resistance rating in minutes. Such label or identification shall be~~ marked in accordance with Table 715.3 issued by an approved agency and shall be permanently affixed to the glazing.

SECTION 715 OPENING PROTECTIVES

715.1 General. (*No change to current text)*

715.2 Fire-resistance-rated glazing. Fire-resistance-rated glazing tested as part of a fire-resistance-rated wall assembly in accordance with ASTM E 119 or UL 263 and labeled in accordance with Section 703.5, shall be permitted in fire doors and fire window assemblies where tested and installed in accordance with their listings and shall not otherwise be required to comply with this section.

3. Add new text as follows:

715.3 Marking Fire-Rated Glazing Assemblies Fire-rated glazing assemblies shall be marked in accordance with Tables 715.3, 715.5, and 715.6.

715.3.1 Fire-rated glazing that exceeds the code requirements. Fire-rated glazing assemblies marked as complying with hose stream requirements (H) shall be permitted in applications that do not require compliance with hose stream requirements. Fire-rated glazing assemblies marked as complying with temperature rise requirements (T) shall be permitted in applications that do not require compliance with temperature rise requirements. Fire-rated glazing assemblies marked with ratings (XXX) that exceed the ratings required by this code shall be permitted.

Table 715.3
Marking Fire-Rated Glazing Assemblies

Fire Test Standard	Marking	Definition of Marking
ASTM E119 or UL 263	W	Meets wall assembly criteria.
NFPA 257 or UL 9	OH	Meets fire window assembly criteria including the hose stream test.
NFPA 252 or UL 10B or UL 10C	D H T	Meets fire door assembly criteria. Meets fire door assembly "Hose Stream" test. Meets to 450º F temperature rise criteria for 30 minutes
	XXX	The time in minutes of the fire resistance or fire protection rating of the glazing assembly

~~715.3~~ 715.4 Alternate methods for determining fire-protection. *(No change to current text)*

~~715.4~~ 715.5 Fire door and shutter assemblies. *(No change to current text)*

Exceptions:

(Exceptions to remain unchanged)

~~715.4.1~~ 715.5.1 Side hinged or pivoted swinging doors. *(No change to current text)*

~~715.4.2~~ 715.5.2 Other types of assemblies. *(No change to current text)*

~~715.4.3~~ 715.5.3 Door assemblies in corridors and smoke barriers. Fire door assemblies required to have a minimum fire protection rating of 20 minutes where located in corridor walls or smoke barrier walls having a fire-resistance rating in accordance with Table ~~715.4~~ 715.5 shall be tested in accordance with NFPA 252, UL 10B or UL 10C without the hose stream test.

Exceptions:

(Exceptions to remain unchanged)

~~715.4.3.1~~ 715.5.3.1 Smoke and draft control. *(No change to current text)*

~~715.4.3.2~~ 715.5.3.2 Glazing in door assemblies. In a 20-minute fire door assembly, the glazing material in the door itself shall have a minimum fire-protection rating of 20-minutes and shall be exempt from the hose stream test. Glazing material in any other part of the door assembly, including transom lites and sidelites, shall be tested in accordance with NFPA 257 or UL 9, including hose stream test, in accordance with Section 715.5.

715.5.4 Door assemblies in other fire partitions. Fire door assemblies required to have a minimum fire-protection rating of 20-minutes where located in other fire partitions having a fire resistance rating of 0.5-hour in accordance with Table 715.4 shall be tested in accordance with NFPA 252, UL 10B or UL 10C with the hose stream test.

(Renumber subsequent sections)

~~715.4.4~~ 715.5.5 Doors in exit enclosures and exit passageways. Fire door assemblies in exit enclosures and exit passageways shall have a maximum transmitted temperature ~~end point~~ rise of not more than 450F degrees (250C degrees) above ambient at the end of 30 minutes of standard fire test exposure.

Exception: The maximum transmitted temperature rise is not required ~~limited~~ in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

~~715.4.4.1~~ 715.5.5.1 Glazing in doors. Fire protection rated glazing shall be limited to 100-sq. inches (0.065 m^2). ~~Fire protection-rated glazing in excess of 100 sq.inches (0.065 m^2) shall be permitted in fire door assemblies when~~ unless the glazing has been tested as components of the door assemblies and not as glass lights, and ~~shall have~~ has a maximum transmitted temperature rise of 450F degrees (250C degrees) in accordance with Section ~~715.4.4~~ 715.5.5.

Exception: The maximum temperature rise is not ~~required~~ limited in buildings equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

~~715.4.5~~ 715.5.6 Fire door frames with transom lights and sidelights. Door frames with transom lights, sidelights, or both shall be permitted where a ¾-hour fire protection rating or less is required in accordance with Table 715.4. ~~Where a fire protection rating exceeding ¾ hour is required in accordance with Table 715.4,~~ Fire door frames with transom lights, sidelights, or both, ~~shall be permitted where~~ installed with fire-resistance rated glazing tested as an assembly in accordance with ASTM E119 or UL 263 shall be permitted where a fire-protection rating exceeding ¾-hour is required in accordance with Table 715.4.

~~715.4.6~~ 715.5.7 Labeled protective assemblies. *(No change to current text)*

~~715.4.6.1~~ 715.5.7.1 Fire door labeling requirements. Fire doors shall be labeled showing the name of the manufacturer or other identification readily traceable back to the manufacturer, the name or trademark of the third-party inspection agency, the fire protection rating and, where required for fire doors in exit enclosures and exit passageways by Section ~~715.4.4~~ 715.5.5, the maximum transmitted temperature point. Smoke and draft control doors complying with UL 1784 and shall be labeled as such and shall also comply with Section ~~715.4.6.3~~ 715.5.7.3. Labels shall be approved and permanently affixed. The label shall be applied at the factory or location where fabrication and assembly are performed.

~~715.4.6.1.1~~ 715.5.7.1.1 Light kits, louvers and components. Listed light kits and louvers and their required preparations shall be considered as part of the labeled door where such installations are done under the listing program of the third-party agency. Where tested for such use, fire doors and door assemblies shall be permitted to consist of components, including glazing, vision light kits and hardware that are labeled, listed or classified by different third party agencies.

~~715.4.6.2~~ 715.5.7.2 Oversized doors. *(No change to current text)*

~~715.4.6.3~~ 715.5.7.3 Smoke and draft control door labeling requirements. *(No change to current text)*

~~715.4.7~~ 715.5.8 Glazing material. *(No change to current text)*

~~715.4.7.1~~ 715.5.8.1 Size limitations. Fire-protection-rated glazing ~~used in fire doors~~ shall comply with the size limitations of NFPA 80, and as provided in sections 715.5.8.1.1 and 715.8.1.2.

~~Exceptions:~~

715.5.8.1.1 Fire-resistance-rated glazing in door assemblies in fire walls and fire barriers rated greater than 1-hour. Fire-resistance-rated glazing tested to ASTM E119 or UL 263 and NFPA 252, UL10B or UL 10C shall be permitted in fire door assemblies located in fire walls and in fire barriers in accordance with Table 715.4 to the maximum size tested and in accordance with their listings.

715.5.8.1.2 Fire-protection-rated glazing in door assemblies in fire walls and fire barriers rated greater than 1-hour. Fire-protection-rated glazing shall be prohibited in fire walls and fire barriers except as provided in 715.5.8.1.2.1 and 715.5.8.1.2.2

715.5.8.1.2.1 Horizontal exits. ~~1. Fire protection rated glaing in fire doors located in fire walls shall be prohibited except where serving a fire door in a horizontal exit, a self closing swinging door shall be permitted to have a vision panel of not more than 100 square inches without a dimension exceeding 10 inches.~~ Fire-protection-rated glazing shall be permitted as vision panels in self-closing swinging fire door assemblies serving as horizontal exits in fire walls where limited to 100 square inches with no dimension exceeding 10 inches.

715.5.8.1.2.2 Fire barriers. ~~2.~~ Fire-protection-rated glazing ~~shall not be installed in fire doors~~ shall be permitted in fire doors having a 1-1/2-hour fire protection rating intended for installation in fire barriers, where limited to 100 square inches. ~~unless the glazing is not more than 100 square inches in area.~~

~~715.4.7.2~~ 715.5.8.2 Exit and elevator protectives. *(No change to current text)*

~~715.4.7.3~~ 715.5.8.3 Labeling. *(No change to current text)*

~~715.4.7.3.1~~ 715.5.8.3.1 Identification. *(No change to current text)*

~~715.4.7.4~~ 715.5.8.4 Safety glazing. *(No change to current text)*

(Renumber subsequent sections)

~~715.5.8~~ 715.6.8 Interior fire window assemblies. Fire-protection-rated glazing used in fire window assemblies located in fire partitions and fire barriers shall be limited to use in assemblies with a maximum fire-resistance rating of 1-hour in accordance with this section.

~~715.5.8.1~~ 715.6.8.1 Where ¾-hour fire-protection window assemblies permitted. Fire-protection-rated glazing requiring 45 minute opening protection in accordance with Table ~~715.5~~ 715.6 shall be limited to fire partitions designed in accordance with Section 709 and fire barriers utilized in the applications set forth in Sections 707.3.6 and 707.3.8 where the fire resistance rating does not exceed 1 hour. Fire-resistance-rated glazing assemblies tested in accordance with ASTM E119 or UL 263 shall not be subject to the limitations of this section.

~~715.5.8.2~~ 715.6.8.2 Area limitations. The total area of windows shall not exceed 25 percent of the area of a common wall with any room.

715.6.8.3. Where 1/3- hour fire-protection window assemblies permitted. Fire-protection-rated glazing shall be permitted in window assemblies tested to NFPA 257 or UL 9 in smoke barriers and fire partitions requiring 1/3-hour opening protection in accordance with Table 715.6

TABLE ~~715.5~~ 715.6
FIRE WINDOW ASSEMBLY FIRE-PROTECTION RATINGS

TYPE OF WALL ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE WINDOW ASSEMBLY RATING (hours)	FIRE RATED GLAZING MARKING
Interior walls			
Fire walls	All	NP[a]	W-xxx[b]
Fire barriers	>1	NP[a]	W-xxx[b]
	1	NP[a]	W-xxx[b]
Incidental use areas (707.3.6), Mixed occupancy separations(707.3.8)	1	¾	OH-45 or W-60
Fire partitions	1	¾	OH-45 or W-60
	0.5	1/3	OH-20 or W-30
Smoke barriers	1	¾	OH-45 or W-60
Exterior walls	>1	1-1/2	OH-90 or W-XXX[B]
	1	¾	OH-45 or W-60
	0.5	1/3	OH-20 or W-30
Party wall	All	NP	Not Applicable

NP – Not Permitted

a. Not permitted except fire resistance rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 715.2

b. xxx = The fire rating duration period in minutes, which shall be equal to the fire resistance rating required for the wall assembly.

~~715.5.9~~ 715.6.9 Labeling. Fire-protection-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and information required ~~Section 715.5.9.1~~ Table 715.6 that shall be issued by an approved agency and shall be permanently affixed to the glazing.

~~**715.5.9.1 Identification.** For fire protection-rated glazing, the label shall bear the following two-part identifiers: "OH – XXX." "OH" shall indicate that the glazing has been tested to and meets both the fire protection and the hose-stream requirements of NFPA 257 or UL 9. "XXX" shall indicate the fire-protection rating period, in minutes, that was tested.~~

TABLE ~~715.4~~ 715.5
~~**FIRE DOOR AND FIRE SHUTTER PROTECTION RATINGS**~~
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL[e]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire resistance rating greater than 1 hour	4	3	Not Permitted	Not Permitted	Not permitted	4	Not Permitted	W-240
	3	3[a]	Not Permitted	Not Permitted	Not Permitted	3	Not Permitted	W-180
	2	1-1/2	100 sq. in.[c]	<=100 sq.in. = D-H--90 >100 sq.in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
				<=100 sq.in.				

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL[e]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
Shaft, exit enclosures and exit passageway walls	1-1/2 2	1-1/2 1-1/2	100 sq. in.[c] 100 sq. in.[c, d]	= D-H- 90 >100 sq.in.= D-H-W-90 <=100 sq.in. = D-H-90 <=100 sq.in.= D-H- T-or D-H-T-W-90	Not Permitted Not Permitted	1-1/2 2	Not Permitted Not Permitted	W-90 W-120
Fire barriers having a required fire-resistance rating of 1 hour: Shaft, exit enclosure and exit passageway walls	1	1	100 sq. in.[c, d]	<=100 sq.in. = D-H-60 >100 sq.in.= D-H- T-60 or D-H-T-W-60	Fire protection Not Permitted	Fire resistance 1	Fire protection Not Permitted	Fire resistance W-60
					Fire protection			
Other fire barriers	1	3/4	Maximum size tested	D-H-NT-45	¾		D-H-~~NT~~-45	
	1	1/3[b]	Maximum size tested	D- 20	3/4[b]		D-H-OH-45	
Fire partitions:: Corridor walls	0.5	1/3[b]	Maximum size tested	D-20	1/3		D-H- OH-20	
Other fire partitions	1	¾	Maximum size tested	D-H-45	¾		D-H-45	
	0.5	1/3	Maximum size tested	D-H--20	1/3		D-H-20	

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL[e]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Exterior walls	3	1-1/2	100 sq. in.[c]	<=100 sq.in. = D-H-90 >100 sq.in D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2	1-1/2	100 sq. in.[c]	<=100 sq.in. = D-H-90 >100 sq.in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1	3/4	Maximum size tested	D-H- 45	Fire Protection 3/4		D-H-~~NT~~-45	
Smoke barriers	1	1/3[b]	Maximum size tested	D-20	Fire protection 3/4		D-H-OH-45	

a. Two doors, each with a fire protection rating of 1-1/2 hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.
b. For testing requirements, see Section 715.5.3 ~~715.4.3~~.
c. Fire resistance rated glazing tested to ASTM E119 per section 715.2 shall be permitted, in the maximum size tested.
d. Except where the building is equipped throughout with an automatic sprinkler and the fire-rated glazing meets the criteria established in Section 715.5.5.1.
e. Under the column heading "Fire rated glazing marking door vision panel", W refers to the fire-resistance rating of the glazing, not the frame.

Reason:
(Heilstedt) The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Labeling of Fire Rated Glazing". The scope of the activity is noted as:

Identify root causes of problems selecting, specifying, installing, and inspecting fire protective and fire resistive glazing and other assembly components including the frames. Propose identification requirements and other related code changes.

The marking provisions of the IBC applicable to fire rated glazing ("Marking Provisions") were first adopted as a part of Chapter 7 of the IBC in 2004. In the last development cycle, the Fire Safety Committee recommended that the ICC Board consider submitting the marking of fire rated glazing to the Code Technology Committee (CTC) as an area of study since repeat proposals to change the Marking Provisions were being submitted on a regular basis.

The ICC Board referred the Marking Provisions to the CTC as an area of study and a Study Group (SG), Chaired Carl Wren, was formed. The SG consisted of both fire and building code officials; architects; engineers; fire rated window and door manufacturers; primary fire rated glazing manufacturers; and a fire protection engineer. It was recognized by the SG that the existing marking system, as those marks were designated in product listings, was leading to fire protection products in applications not allowed by the IBC. After numerous meetings and a full hearing before the CTC, the SG and the CTC unanimously approved proposing these changes to the IBC's Marking Provisions.

The primary objective of the CTC in proposing these changes is to make the Marking Provisions of Chapter 7 easier to understand and enforce and to minimize the possibility that the system could result in confusion between fire protection rated products in applications where fire-resistance rated products meeting ASTM E 119 are permitted. The proposal includes the following changes:

1- Adds a new Table 715.3, to define and relate the various test standards for fire rated glazing to the designations used to mark fire rated glazing. A new definition of the term "fire rated glazing" would also be included.

2- While the designations "W," "OH," "D," "DT," "DH" and "XXX" used to mark fire rated glazing will remain as they were originally adopted in 2004, the marking of fire rated glazing in fire door assemblies (D) are simplified by deleting the NH designation (not hose stream tested) and the NT designation (not temperature rise tested). It is clarified that those designations correspond to test standards, not end uses. Tables 715.4 and 715.5 show the markings required for acceptance in specified applications.

3- All text provision used to define and relate test standards to marking designations are deleted in favor of including all of the required marking provisions in Tables 715.3, 715.4 and 715.5. This is intended to provide building and fire code officials with easy access to all of the information needed when inspecting fire window and fire door installations, including required marking designations.

4- In connection with removing many of the text provisions referring to the marking of fire rated glazing and the inclusion of all pertinent marking requirements in tables 715.4 and 715.5, a number of columns are added to those Tables. These new columns specify the required designations that the building and fire code officials will need to look for when inspecting fire rated glazing in the various categories of fire resistance rated walls, fire door assemblies and fire window assemblies identified in Tables 715.4 and 715.5.

5- The size limitation provisions starting at 715.4.6.1 are re-written to eliminate the use of "exceptions" and thus clarify them - no substantive changes to these provisions are intended.

6- It was determined that Table 715.4 inadvertently omitted reference to 1 1/2 hour doors in shaft, exit enclosures and exit passageway walls and this proposal adds that reference to the Table.

7- The Marking Provisions have been written to clarify that fire protection rated glazing tested to NFPA 257 and used in transoms and sidelites in certain fire barriers and corridor walls will also have to be tested to NFPA 252 since they are a part of a door assembly. Accordingly, these glazings are marked D-H-OH-XXX.

(O'Keefe) The marking provisions of the IBC applicable to fire rated glazing ("Marking Provisions") were first adopted as a part of Chapter 7 of the IBC in 2004. In the last development cycle, the Fire Safety Committee recommended that the ICC Board consider submitting the marking of fire rated glazing to the Code Technology Committee (CTC) as an area of study since repeat proposals to change the Marking Provisions were being submitted on a regular basis, because of confusion and misuse of products being marked by individual manufacturers under the current system.

The ICC Board referred the Marking Provisions to the CTC as an area of study and a Study Group (SG), Chaired by Carl Wren, was formed. The SG consisted of both fire and building code officials; architects; engineers; fire rated window and door manufacturers; primary fire rated glazing manufacturers; and a fire protection engineer.

It was recognized by the SG that the existing marking system, as those marks were designated in product listings, was leading to the misuse of fire protection products in applications not allowed by the IBC. It was also recognized that "T" marking were being applied by some manufacturers to designate use of fire protection products in temperature rise doors that in fact did not limit temperature rise and should not be so marked. Attached as support are documents submitted to the CTC Labeling Study Group that show the confusion in listings showing end-use marks that are not permitted by the IBC. After numerous meetings and a full hearing before the CTC, the SG and the CTC unanimously approved proposing these changes to the IBC's Marking Provisions.

The primary objective of the CTC in proposing these changes is to make the Marking Provisions of Chapter 7 easier to understand and enforce and to minimize the possibility that the system could result in confusion between fire protection rated products in applications where fire-resistance rated products meeting ASTM E 119 are required. The proposal includes the following changes:

1- Adds a new Table 715.3, to define and relate the various test standards for fire rated glazing to the designations used to mark fire rated glazing. A new definition of the term "fire rated glazing" would also be included.

2- While the designations "W," "OH," "D," "DT," "DH" and "XXX" used to mark fire rated glazing will remain as they were originally adopted in 2004, the marking of fire rated glazing in fire door assemblies (D) are simplified by deleting the NH designation (not hose stream tested) and the NT designation (not temperature rise tested). It is clarified that those designations correspond to compliance with test standards only, not that they are permitted for end uses. Tables 715.4 and 715.5 show the markings required for acceptance in specified applications.

3- All text provision used to define and relate test standards to marking designations are deleted in favor of including all of the required marking provisions in Tables 715.3, 715.4 and 715.5. This is intended to provide building and fire code officials with easy access to all of the information needed when inspecting fire window and fire door installations, including required marking designations.

4- In connection with removing many of the text provisions referring to the marking of fire rated glazing and the inclusion of all pertinent marking requirements in tables 715.4 and 715.5, a number of columns are added to those Tables. These new columns specify the required designations that the building and fire code officials will need to look for when inspecting fire rated glazing in the various categories of fire resistance rated walls, fire door assemblies and fire window assemblies identified in Tables 715.4 and 715.5.

5- The size limitation provisions starting at 715.4.6.1 are re-written to eliminate the use of "exceptions" and thus clarify them - no substantive changes to these provisions are intended.

6- It was determined that Table 715.4 inadvertently omitted reference to 1 1/2 hour doors in shaft, exit enclosures and exit passageway walls and this proposal adds that reference to the Table.

7- The Marking Provisions have been written to clarify that fire protection rated glazing tested to NFPA 257 and used in transoms and sidelites in certain fire barriers and corridor walls will also have to be tested to NFPA 252 since they are a part of a door assembly. Accordingly, these glazings are marked D-H-OH-XXX. It has also been clarified where fire rated glazing products must be tested to and marked as complying with ASTM E119 in sidelight and transom assemblies in openings requiring greater than ¾-hour protection, and for glazing sizes exceeding 100 sq. inches in doors rated 1-hour and greater.

8. Section 715.4.6.1 was revised to clarify labeling of door assembly components, and to recognize that door assemblies are permitted to have components labeled by different test agencies.

Bibliography: Examples of UL Listing Markings submitted to CTC Labeling Study Group.

Cost Impact: This code change will not increase the cost of construction.

ICCFILENAME: HEILSTEDT-FS3-702

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee agreed with the reorganization of the glazing provisions and the clarity of the fire rated glazing marking provisions. The revised provisions will give the code official all they need to determine if glazing is being used in the right locations.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene, representing Underwriters Laboratories, Inc., requests Disapproval.

Commenter's Reason: We applaud the CTC for attempting to clarify glazing requirements in Section 715. A copy of how the finished Section 715 would look with the changes was not provided in the monograph or to the code development committee. When we literally cut and pasted the proposal together, a number of correlation errors and misnumbered sections were found. These errors and inconsistencies cannot be easily corrected with a public comment, so we reluctantly feel this proposal should be disapproved. Some, but not all, of the problems we found include the following:

1. Section 715.2 states that fire-resistance rated glazing shall not otherwise be required to comply with this section (Section 715), but the proposal then introduces new requirements for fire-resistance rated glazing in section 715.5.8.1.1, 715.6.8.1, Table 715.3 and Table 715.5. This is a conflict.
2. The glazing marking requirements in table 715.3 are confusing and do not correlate well with glazing marking requirements in section 715.5.8.3.1 (formerly section 715.4.7.3) and in Table 715.6 (formerly 715.5). Manufacturers have already changed their markings to meet the requirements established in the 2006 code. This will require manufacturers to change the markings again. A mixture of the new and old markings in the field will create confusion during inspections.
3. Table 715.3 includes a column with the "Definition of Marking", which seems more like code commentary language and not mandatory code language.
4. Section 101.3 clearly states that the code includes the minimum requirements to be met. It is unnecessary, and bad precedence, to include section 715.3.1 titled "Fire rated glazing that exceeds code requirements". For example, there is no need to indicate that 90-minute rated glazing can be used in a 45-minute application. If it is done here then do we need to repeat this concept throughout the code? This is better suited for code commentary, if there is considered a need to communicate that the minimum code requirements can be exceeded.
5. We found what appeared to be incorrect section references in the following new sections: 715.5.3.2, Table 715.4, 715.4, and 715.5.8.
6. Section 715.5.8.1 is titled "Size limitations" and indicates, "Fire-protection rated glazing shall comply with 715.5.8.1.1 and 715.5.8.1.2. However, the new Section 715.5.8.1.1 covers "fire-resistant" glazing, not "fire-protection" glazing. This is outside the scope of this section.
7. The proposal included a numbering system that included five decimal points (e.g. section 715.5.8.1.2.1) which is confusing and may not comply with ICC guidelines. It would be much clearer to organize the sections in a fashion that avoids this level of complexity. This would have been more evident if a final version of how the revised code would look was provided.
8. Section 715.4.6.1.1 suggests components of the door assembly may be labeled, listed or classified by different third party agencies *where tested for such use*. How is an AHJ to know if these components were tested for such use? It would be more appropriate to state when *listed and labeled for such use* by different third party agencies.
9. This marking scheme appears to set a precedent that may allow glazing that does not meet hose or temperature criteria to be installed in applications where it is required.

Again, we applaud the CTC for their work on this, but more work and additional review is needed before this proposal is ready for adoption in the code.

Final Action: AS AM AMPC____ D

FS113–09/10
716.5.3 (IMC 607.5.5)

Proposed Change as Submitted

Proponent: Dave Frable, US General Services Administration, representing the US General Services Administration

Revise as follows:

716.5.3 (IMC 607.5.5) Shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with *approved* fire and smoke *dampers* installed in accordance with their listing.

Exceptions:

1. *Fire dampers* are not required at penetrations of shafts where:
   1.1. Steel exhaust subducts are extended at least 22 inches (559 mm) vertically in exhaust shafts, provided there is a continuous airflow upward to the outside; or
   1.2. Penetrations are tested in accordance with ASTM E 119 or UL 263 as part of the fire-resistance-rated assembly; or
   1.3. Ducts are used as part of an *approved* smoke control system designed and installed in accordance with Section 909 and where the *fire damper* will interfere with the operation of the smoke control system; or

1.4. The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.

2. In Group B and R occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, *smoke dampers* are not required at penetrations of shafts where:

   2.1. Kitchen, clothes dryer, bathroom and toilet room exhaust openings are installed with steel exhaust subducts, having a minimum wall thickness of 0.187-inch (0.4712 mm) (No. 26 gage);

   2.2. The subducts extend at least 22 inches (559 mm) vertically; and

   2.3. An exhaust fan is installed at the upper terminus of the shaft that is powered continuously in accordance with the provisions of Section 909.11, so as to maintain a continuous upward airflow to the outside.

3. *Smoke dampers* are not required at penetrations of shafts in Group B occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 where the air in ducts continues to move and the air handling system is configured to prevent recirculation of return or exhaust air upon fire conditions.

4.~~3.~~ *Smoke dampers* are not required at penetration of exhaust or supply shafts in parking garages that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.

5.~~4.~~ *Smoke dampers* are not required at penetrations of shafts where ducts are used as part of an *approved* mechanical smoke control system designed in accordance with Section 909 and where the *smoke damper* will interfere with the operation of the smoke control system.

6.~~5.~~ *Fire dampers* and *combination fire/smoke dampers* are not required in kitchen and clothes dryer exhaust systems when installed in accordance with the *International Mechanical Code*.

Reason: The intent of this code change is to acknowledge that Group B occupancies protected by an operational fire sprinkler system where the air in ducts continues to move and the air handling system is configured to prevent recirculation of return or exhaust air upon fire conditions provides an acceptable level of safety for building occupants and therefore does not warrant the need for the installation of smoke dampers at all penetrations of shaft duct/air transfer opening penetrations. This code change proposes to remove the current requirement for smoke dampers in shaft wall penetrations, but leave fire dampers in place. This is because smoke travel through ducted ventilation shafts has not been a contributing factor to fire deaths in sprinklered Group B occupancies in recent history. Note: all high-rise office fires where smoke spread has been cited as a problem have either occurred in unsprinklered buildings, partially sprinklered buildings or buildings subject to terrorist attacks. Fire sprinklers control the burning rate (and thus limit smoke production) and maintain near ambient temperature which limits the buoyancy forces that drive smoke to the shafts where stack affect may cause smoke spread to other floors. It is also widely accepted that operating fire sprinklers will prevent room flashover and full floor fires, and will limit the size of room fires. The reliability of sprinklers should not be called into question as an NFPA report issued in 2005 indicated that automatic fire sprinklers successfully operating in reported structural fires was an exemplary 93%. This same report indicated that two-thirds of the automatic fire sprinkler system failures were because the automatic fire sprinkler systems were shut off, an unlikely scenario where jurisdictions adopt the IBC since the IBC requires the supervision of the automatic fire sprinkler system. Hence, the successful operation of an automatic fire sprinkler system designed and installed in compliance with the IBC requirements could be reasonably estimated at 98% (or better, since NFPA indicated that a number of fire incidents extinguished by sprinklers may not even be reported).

In addition to fire sprinklers, these buildings have a number of additional safeguards in place. For example, the IMC and NFPA 90A both require duct smoke detectors to shut off of air handling equipment to minimize the potential of smoke spread through ventilation ducts. Also, the 2009 edition of the IBC now requires a number of additional safety enhancements such as: two way communication at elevator landings; an increase of 50% in egress capacity for exit stairs in all buildings; increased cohesive/adhesive bond strength for sprayed fire resistive materials; exit stair path markings in all high rise buildings; fire service access elevators for buildings greater than 120 feet; and an additional stair and redundant sprinkler risers for buildings greater than 420 feet, etc.

Given the aforementioned protection coupled with the excellent track record for sprinklered B occupancies, and keeping in mind that the purpose of the IBC is to provide minimum requirements to safeguard occupants of buildings from fire and other hazards attributed to the built environment based on sound technical documentation, we strongly believe that it is unreasonable to require smoke dampers in shaft duct/air transfer opening penetrations as an additional means for slowing or stopping the spread of smoke throughout a building.

Note: Though not relevant to this code change, NFPA 90A does not require smoke dampers in shaft walls regardless of whether the building is sprinklered. Also note that some jurisdictions (e.g., Commonwealth of Virginia) are granting similar modifications to the requirement for smoke dampers in exhaust ducts because it is impractical to comply with the IBC and there is no demonstrated need.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Frable-FS1-716.5.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the sprinkler threshold was confusing as written with respect to the area to be sprinklered throughout; the Group B area or the entire building. Further, perhaps this proposal would be better located under current exception #2. Lastly, the language "air……moves" and "prevent recalculation" is confusing as it seems to contradict.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dave Frable, US General Services Administration, representing the US General Services Administration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

716.5.3 (IMC 607.5.5) Shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with *approved* fire and smoke *dampers* installed in accordance with their listing.

Exceptions:

1. *Fire dampers* are not required at penetrations of shafts where:
   1.1. Steel exhaust subducts are extended at least 22 inches (559 mm) vertically in exhaust shafts, provided there is a continuous airflow upward to the outside; or
   1.2. Penetrations are tested in accordance with ASTM E 119 or UL 263 as part of the fire-resistancerated assembly; or
   1.3. Ducts are used as part of an *approved* smoke control system designed and installed in accordance with Section 909 and where the *fire damper* will interfere with the operation of the smoke control system; or
   1.4. The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.
2. In Group B and R occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, *smoke dampers* are not required at penetrations of shafts where:
   2.1. Kitchen, clothes dryer, bathroom and toilet room exhaust openings are installed with steel exhaust subducts, having a minimum wall thickness of 0.187-inch (0.4712 mm) (No. 26 gage);
   2.2. The subducts extend at least 22 inches (559 mm) vertically; and
   2.3. An exhaust fan is installed at the upper terminus of the shaft that is powered continuously in accordance with the provisions of Section 909.11, so as to maintain a continuous upward airflow to the outside.
3. *Smoke dampers* are not required at penetrations of shafts in Group B occupancies that are equipped throughout the entire building with an *automatic sprinkler system* in accordance with Section 903.3.1.1 ~~where the air in ducts continues to move and the air handling system is configured to prevent recirculation of return or exhaust air upon fire conditions.~~ and equipped with an exhaust fan at the upper terminus of the shaft to maintain a upward airflow to the outside that meets one of the following
   3.1. The exhaust fan is powered continuously in accordance with the provisions of Section 909.11.
   3.2. The exhaust fan is powered upon operation of any fire alarm system initiating device and once operated, the exhaust fan is powered continuously in accordance with the provisions of Section 909.11.
4. *Smoke dampers* are not required at penetration of exhaust or supply shafts in parking garages that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.
5. *Smoke dampers* are not required at penetrations of shafts where ducts are used as part of an *approved* mechanical smoke control system designed in accordance with Section 909 and where the *smoke damper* will interfere with the operation of the smoke control system.
6. *Fire dampers* and *combination fire/smoke dampers* are not required in kitchen and clothes dryer exhaust systems when installed in accordance with the *International Mechanical Code*.

Commenter's Reason: The intent of this code change is to acknowledge that Group B occupancies protected by an operational fire sprinkler system throughout the buildings where also equipped with an exhaust fan in the shaft equipped with two sources of power that is capable of maintaining an upward airflow (either at all times or upon activation of the fire alarm system) provides an acceptable level of safety for building occupants and therefore does not warrant the need for the installation of smoke dampers at all penetrations of shaft duct/air transfer opening penetrations. This code change proposes to remove the current requirement for smoke dampers in shaft wall penetrations, but leave fire dampers in place. This is because smoke travel through ducted ventilation shafts has not been a contributing factor to fire deaths in sprinklered Group B occupancies in recent history. Note: all high-rise office fires where smoke spread has been cited as a problem have either occurred in unsprinklered buildings, partially sprinklered buildings or buildings subject to terrorist attacks. Fire sprinklers control the burning rate (and thus limit smoke production) and maintain near ambient temperature which limits the buoyancy forces that drive smoke to the shafts where stack affect may cause smoke spread to other floors

It is also widely accepted that operating fire sprinklers will prevent room flashover and full floor fires, and will limit the size of room fires. The reliability of sprinklers for office buildings should not be called into question as an NFPA report issued in 2009 indicated that automatic wet-pipe fire sprinklers successfully operating in reported structural fires was an exemplary 96%. This same report indicated that two thirds of the automatic fire sprinkler system failures were because the automatic fire sprinkler systems were shut off, an unlikely scenario where jurisdictions adopt the IBC since the IBC requires the supervision of the automatic fire sprinkler system. Hence, the successful operation of an automatic fire sprinkler system designed and installed in compliance with the IBC requirements could be reasonably estimated at 98% (or better, since NFPA indicated that a number of fire incidents extinguished by sprinklers may not even be reported). The report also indicated that in office buildings with wet-pipe sprinklers that operated were 99% effective.

In addition to fire sprinklers, these buildings have a number of additional safeguards in place. For example, the IMC and NFPA 90A both require duct smoke detectors to shut off of air handling equipment to minimize the potential of smoke spread through ventilation ducts. Also, the 2009 edition of the IBC now requires a number of additional safety enhancements such as: two way communication at elevator landings; an increase of 50% in egress capacity for exit stairs in all buildings; increased cohesive/adhesive bond strength for sprayed fire resistive materials; exit stair path markings in all high rise buildings; fire service access elevators for buildings greater than 120 feet; and an additional stair and redundant sprinkler risers for buildings greater than 420 feet, etc.

This code change addresses the technical issues raised by the Fire Safety Committee. Regarding where best located in the code, this change is being proposed as a new exception 3, instead of being tacked on to existing exception 2, because it is only being offered to B occupancies and it does require a 22 inch subduct that is required by exception 2 given the latter is not common practice for return air handling systems in Group B occupancies.

Given the aforementioned protection coupled with the excellent track record for sprinklered B occupancies, and keeping in mind that the purpose of the IBC is to provide minimum requirements to safeguard occupants of buildings from fire and other hazards attributed to the built environment based on sound technical documentation, we strongly believe that it is unreasonable to require smoke dampers in shaft duct/air transfer opening penetrations as an additional means for slowing or stopping the spread of smoke throughout a building.

Note: Though not relevant to this code change, NFPA 90A does not require smoke dampers in shaft walls regardless of whether the building is sprinklered. Also note that some jurisdictions (e.g., Commonwealth of Virginia) are granting similar modifications to the requirement for smoke dampers in exhaust ducts because it is impractical to comply with the IBC and there is no demonstrated need.

Final Action: AS AM AMPC____ D

FS118-09/10-PART I
717.2.1

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing Cellulose Insulation Manufacturers Association (CIMA)

PART I – IBC FIRE SAFETY

Revise as follows:

717.2.1 Fireblocking materials. Fireblocking shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 0.719-inch (18.3 mm) wood structural panels with joints backed by 0.719-inch (18.3 mm) wood structural panels.
4. One thickness of 0.75-inch (19.1 mm) particleboard with joints backed by 0.75-inch (19 mm) particleboard.
5. One-half-inch (12.7 mm) gypsum board.
6. One-fourth-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool, mineral fiber or other approved materials installed in such a manner as to be securely retained in place.
8. Spray-applied cellulose insulation installed as tested for the specific application

Reason: This code change simply adds a new Item 8 to the list of fireblocking materials to recognize spray-applied cellulose insulation as a suitable fireblocking material. It qualifies the use of spray-applied cellulose insulation by indicating that it must be installed as tested for the specific application. The Cellulose Insulation Manufacturers Association (CIMA) has conducted a variety of fireblocking fire tests based on the ASTM E119 time-temperature fire curve exposure to demonstrate that spray-applied cellulose insulation will serve as an adequate fireblocking material.

It should be noted that spray-applied cellulose insulation is different than loose-fill cellulose insulation in that it is sprayed in place using a nozzle under pressure with a small quantity of water added to the insulation to activate the adhesive that, when dried, holds the cellulose insulation in place. Thus, it can be exposed in vertical applications, as well as horizontal applications. Furthermore, it will remain in place after it has dried without any need to restrain or otherwise contain or enclose it.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Thornberry-FS4-717.2.1; RB-1-R302.11.1

Public Hearing Results

PART I- IBC FIRE SAFETY
Committee Action: **Approved as Modified**

Modify the proposal as follows:

717.2.1 Fireblocking materials. Fireblocking shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 0.719-inch (18.3 mm) wood structural panels with joints backed by 0.719-inch (18.3 mm) wood structural panels.
4. One thickness of 0.75-inch (19.1 mm) particleboard with joints backed by 0.75-inch (19 mm) particleboard.
5. One-half-inch (12.7 mm) gypsum board.
6. One-fourth-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool, mineral fiber or other approved materials installed in such a manner as to be securely retained in place.
8. ~~Spray-applied~~ cellulose insulation installed as tested for the specific application

Committee Reason: The committee agreed that cellulose insulation used as fireblocking has been substantiated as another valid option and which allows for current construction practices. The modification allows for more types of cellulose insulation to be used as fireblocking material.

Assembly Action: None

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Ali M. Fattah, PE, City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

Part I – IBC-Fire Safety

717.2.1 Fireblocking materials. Fireblocking shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 0.719-inch (18.3 mm) wood structural panels with joints backed by 0.719-inch (18.3 mm) wood structural panels.
4. One thickness of 0.75-inch (19.1 mm) particleboard with joints backed by 0.75-inch (19 mm) particleboard.
5. One-half-inch (12.7 mm) gypsum board.
6. One-fourth-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool, mineral fiber or other approved materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation installed as ~~tested~~ listed for the specific application.

Commenter's Reason: Requiring the Code Official to review test reports will place an undue burden. The product listing will place conditions of application such as density, material composition, etc.

Public Comment 2:

Tony Crimi, A.C. Consulting Solutions Inc, representing North American Insulation Manufacturers Association (NAIMA), requests Disapproval.

Commenter's Reason: In the IBC, Fireblocking is installed to resist the free passage of flame to other areas of the building through concealed spaces. The ASTM E119 Standard does not contain any specific test configurations for evaluating fireblocking. While the testing submitted by CIMA may be based on exposure to an ASTM E119 time-temperature curve, the details of how the concealed space is protected, and how the fireblocking materials are installed, is not described. More importantly, the proposed code change language itself does not describe the need to conduct any testing in accordance with an ASTM E119 time-temperature curve, nor does it indicate how the fireblocking is to be installed in the assembly, or what, if any, pass/fail criterion are used to decide if the material has performed successfully. Presumably an ASTM E84 test could also be used to conduct an evaluation of "…. installed as tested for the specific application", even though it is a completely different fire exposure, and not related to an ASTM E119 test. At a minimum, a specific test standard, or fire exposure condition, needs to be defined within this new requirement.

Consumer Product Safety Commission ("CPSC") regulates cellulose insulation as a recognized fire threat. The regulation is codified as part of the Code of Federal Regulations (16 C.F.R. § 1404). Indeed, the CPSC states the following in its codified regulations:

> Based on available fire incident information, engineering analysis of the probable fire scenarios, and laboratory tests, the Consumer Product Safety Commission has determined that fire may occur where cellulose insulation is improperly installed too close to the sides or over the top of recessed electrical light fixtures, or installed too close to the exhaust flues from heat producing devices or apparatus such as furnaces, water heaters, and space heaters. These fires may result in serious injuries or deaths. Presently available information indicates that fires may occur where cellulose insulation is improperly installed even though the cellulose insulation complies with the Commission's amended interim standard for cellulose insulation. (16 C.F.R. § 1404.2)

To warn consumers and installers of this danger, the CPSC requires that manufacturers of cellulose insulation label all containers of cellulose with the following statement, using capital letters, CAUTION POTENTIAL FIRE HAZARD. (16 C.F.R. § 1404.4(a)) The CPSC also imposes additional warning language on the manufacturers of cellulose insulation.

Furthermore, the modification to permit loose-fill cellulose insulation to be used as a fireblocking material is not justifiable. Even the proponent noted in their reason statement that spray-applied cellulose insulation is different than loose-fill cellulose insulation in that it is sprayed in place using a nozzle under pressure with a small quantity of water added to the insulation to activate the adhesive that, when dried, holds the cellulose insulation in place. Thus, it can be exposed in vertical applications, as well as horizontal applications. Furthermore, it will remain in place after it has dried without any need to restrain or otherwise contain or enclose it. There is no such assurance with loose-fill cellulose insulation.

Final Action: AS AM AMPC____ D

FS118-09/10-PART II
IRC R302.11.1

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing Cellulose Insulation Manufacturers Association (CIMA)

PART II – IRC BUILDING/ENERGY

Revise as follows:

R302.11.1 Fireblocking materials. Except as provided in Section R302.11, Item 4, fireblocking shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 23/32-inch (18.3 mm) wood structural panels with joints backed by 23/32-inch (18.3 mm) wood structural panels.
4. One thickness of ¾-inch (19.1 mm) particleboard with joints backed by ¾-inch (19 mm) particleboard.
5. One-half-inch (12.7 mm) gypsum board.
6. One-quarter-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place.
8. Spray-applied cellulose insulation installed as tested for the specific application.

Reason: This code change simply adds a new Item 8 to the list of fireblocking materials to recognize spray-applied cellulose insulation as a suitable fireblocking material. It qualifies the use of spray-applied cellulose insulation by indicating that it must be installed as tested for the specific application. The Cellulose Insulation Manufacturers Association (CIMA) has conducted a variety of fireblocking fire tests based on the ASTM E119 time-temperature fire curve exposure to demonstrate that spray-applied cellulose insulation will serve as an adequate fireblocking material.

It should be noted that spray-applied cellulose insulation is different than loose-fill cellulose insulation in that it is sprayed in place using a nozzle under pressure with a small quantity of water added to the insulation to activate the adhesive that, when dried, holds the cellulose insulation in place. Thus, it can be exposed in vertical applications, as well as horizontal applications. Furthermore, it will remain in place after it has dried without any need to restrain or otherwise contain or enclose it.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Thornberry-FS4-717.2.1; RB-1-R302.11.1

Public Hearing Results

PART II - IRC
Committee Action: **Approved as Modified**

Modify proposal as follows:

R302.11.1 Fireblocking materials. Except as provided in Section R302.11, Item 4, fireblocking shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 23/32-inch (18.3 mm) wood structural panels with joints backed by 23/32-inch (18.3 mm) wood structural panels.
4. One thickness of ¾-inch (19.1 mm) particleboard with joints backed by ¾-inch (19 mm) particleboard.
5. One-half-inch (12.7 mm) gypsum board.
6. One-quarter-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place.
8. ~~Spray-applied~~ Cellulose insulation installed as tested for the specific application.

Committee Reason: This change will increase the list of products that can be used for fire blocking and will permit more options. The modification removes the limitation to spray-applied cellulose.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Ali M. Fattah, PE, City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

Part II – IRC Building/Energy

R302.11.1 Fireblocking materials. Except as provided in Section R302.11, Item 4, fireblocking shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 23/32-inch (18.3 mm) wood structural panels with joints backed by 23/32-inch (18.3mm) wood structural panels.
4. One thickness of ¾-inch (19.1 mm) particleboard with joints backed by ¾-inch (19 mm) particleboard.
5. One-half-inch (12.7 mm) gypsum board.
6. One-quarter-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation installed as ~~tested~~ <u>listed</u> for the specific application.

Commenter's Reason: Requiring the Code Official to review test reports will place an undue burden. The product listing will place conditions of application such as density, material composition, etc.

Public Comment 2:

Tony Crimi, A.C. Consulting Solutions Inc, representing North American Insulation Manufacturers Association (NAIMA), requests Disapproval.

Commenter's Reason: In the IBC, Fireblocking is installed to resist the free passage of flame to other areas of the building through concealed spaces. The ASTM E119 Standard does not contain any specific test configurations for evaluating fireblocking. While the testing submitted by CIMA may be based on exposure to an ASTM E119 time-temperature curve, the details of how the concealed space is protected, and how the fireblocking materials are installed, is not described. More importantly, the proposed code change language itself does not describe the need to conduct any testing in accordance with an ASTM E119 time-temperature curve, nor does it indicate how the fireblocking is to be installed in the assembly, or what, if any, pass/fail criterion are used to decide if the material has performed successfully. Presumably an ASTM E84 test could also be used to conduct an evaluation of "…. installed as tested for the specific application", even though it is a completely different fire exposure, and not related to an ASTM E119 test. At a minimum, a specific test standard, or fire exposure condition, needs to be defined within this new requirement.

Consumer Product Safety Commission ("CPSC") regulates cellulose insulation as a recognized fire threat. The regulation is codified as part of the Code of Federal Regulations (16 C.F.R. § 1404). Indeed, the CPSC states the following in its codified regulations:

> Based on available fire incident information, engineering analysis of the probable fire scenarios, and laboratory tests, the Consumer Product Safety Commission has determined that fire may occur where cellulose insulation is improperly installed too close to the sides or over the top of recessed electrical light fixtures, or installed too close to the exhaust flues from heat producing devices or apparatus such as furnaces, water heaters, and space heaters. These fires may result in serious injuries or deaths. Presently available information indicates that fires may occur where cellulose insulation is improperly installed even though the cellulose insulation complies with the Commission's amended interim standard for cellulose insulation. (16 C.F.R. § 1404.2)

To warn consumers and installers of this danger, the CPSC requires that manufacturers of cellulose insulation label all containers of cellulose with the following statement, using capital letters, CAUTION POTENTIAL FIRE HAZARD. (16 C.F.R. § 1404.4(a)) The CPSC also imposes additional warning language on the manufacturers of cellulose insulation.

Furthermore, the modification to permit loose-fill cellulose insulation to be used as a fireblocking material is not justifiable. Even the proponent noted in their reason statement that spray-applied cellulose insulation is different than loose-fill cellulose insulation in that it is sprayed in place using a nozzle under pressure with a small quantity of water added to the insulation to activate the adhesive that, when dried, holds the cellulose insulation in place. Thus, it can be exposed in vertical applications, as well as horizontal applications. Furthermore, it will remain in place after it has dried without any need to restrain or otherwise contain or enclose it. There is no such assurance with loose-fill cellulose insulation.

Final Action: AS AM AMPC____ D

FS122-09/10
719.1

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc., representing North American Insulation Manufacturers Association

Revise as follows:

719.1 General. Insulating materials, including facings such as vapor retarders and *vapor-permeable membranes*, similar coverings and all layers of single and multilayer reflective foil insulations, shall comply with the requirements of this section. Where a flame spread index or a smoke-developed index is specified in this section, such index shall be determined in accordance with ASTM E 84 or UL 723. Any material that is subject to an increase in flame spread index or smoke-developed index beyond the limits herein established through the effects of age, moisture or other atmospheric conditions shall not be permitted.

Exceptions:

2. Foam plastic insulation shall comply with Chapter 26 and have a smoke developed index of not more than 450.

(Exceptions not shown, remain unchanged)

Reason: The exception for foamed plastics in Chapter 26 does not adequately cover smoke developed performance of foamed plastics. Current requirements for glass fiber, mineral fiber, cellulose and reflective plastic core insulation all require both flame spread and smoke development requirements either based on ASTM E84 or UL 723 or 803.1.2. Alternative methods are acceptable for use, however, their performance level needs to address the same hazards as the base requirement, plus any additional hazards that might arise as a result of a specific material.

Justification: For all other thermal and sound insulating materials within the IBC, **including non-combustible insulation materials**, the minimum performance level for materials permitted to be used includes at least some requirements for both flame spread (fire growth) and smoke production. These requirements are primarily based on either ASTM E84 testing or alternative methods such as NFPA 286, CAN/ULC-S102.2, or even UL 1715 with the inclusion of the criterion from 803.1.2. However, in the case of foamed plastics, of the four alternative test methods permitted by 2603.9, only NFPA 286 contains any limits on smoke developed for any foamed plastics by virtue of the inclusion of a reference to section 803.1.
Room corner tests such as FM 4880, UL 1040, NFPA 286 or UL 1715 do evaluate fire growth and flashover. However, with the exception of the criteria for NFPA 286 in 803.1.2, the pass/fail criteria proposed for the room corner tests in the proposed acceptance criteria do not include quantitative evaluation of smoke density. Criteria for fire and smoke performance of building materials are based as much on issues arising from smoke production from burning materials, and smoke migration within the occupied spaces. It is not reasonable to provide an exception to the basic ASTM E84 flame spread and smoked developed requirements which apply to all other types of insulations, even noncombustible insulations, for foamed plastics based on room corner tests unless the limits on smoke production are applied to all of the room corner tests.
There are numerous reported instances of the hazards associated with smoke production from building materials. One is the tragic fire at the Greenwood Health Center in Hartford, CT on Feb 26 2003. The New York Times quoted Chief Charles A. Teale of the Hartford Fire Department as stating that "Most of the 10 residents killed, ranging in ages from 27 to 76, died of smoke inhalation". The same article further goes on to quote officials as saying: "The nursing home itself suffered little damage, though, and the fire was put out in about 15 minutes. Most of the residents were then led back inside, and by midday, 84 of the 148 residents remained at the center".

It is reasonable to allow alternative methods of testing materials to determine their acceptability for use, however, their performance criteria needs to address the same hazards as the base requirement, plus any additional hazards that might arise as a result of a specific material.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CRIMI-FS8-719.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee agreed that Chapter 26, Section 2603 already requires this and therefore this proposal is redundant.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc., representing North American Insulation Manufacturers Association (NAIMA), requests Approval as Submitted.

Commenter's Reason: The purpose of this public comment is to ensure that the IBC requirements for smoke development ratings for foamed plastic materials are clearly stated and easily enforceable. On its own, the requirements under Special Approvals in 2603.9 do not adequately cover smoke developed performance of foamed plastics. In the published report of the Baltimore Code Action Hearings, the Committee agreed that Chapter 26, Section 2603 already requires this and therefore felt that this proposal was redundant. We agree entirely that it is, or at least should be, required. The proposed change here is merely a clarification designed to simplify the code for users, and prevent inadvertent misinterpretation.

The principal concern is that the language of Section 2603.3 begins with the words "Unless otherwise indicated in this section,…." Since 2603.9 is in the same section as 2603.3, and another of the exceptions (#4) in 719.1 directs the code user to 2603.9 for foamed plastic insulations greater than 4 inches in thickness, there have been instances were compliance with the ASTM E84 and UL 723 smoke development ratings have been overlooked.

Final Action: AS AM AMPC____ D

FS123-09/10
719.7

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler, GBH International, representing American Fire Safety Council

Revise as follows:

719.7 Insulation and covering on pipe and tubing. Insulation and covering on pipe and tubing shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450. This shall include insulation coverings on exposed water supply and drainpipes under accessible lavatories and sinks.

> **Exception:** Insulation and covering on pipe and tubing installed in plenums shall comply with the *International Mechanical Code.*

Reason: There have been some statements that insulation coverings required on exposed water supply and drainpipes for ADA compliance are not really insulation products and, therefore, need to comply with the requirements for insulation in the IBC. This code proposal is simply clarification.

The ADA requires that exposed hot water and drainpipes under lavatories and sinks be insulated (sections 4.19.4 and 4.24.6). The ICC/ANSI A117.1/2003 Standard (Accessible and Usable Buildings and Facilities 606.6 Exposed Pipes and Surfaces) states that: "*Water supply and drainpipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks.*" This indicates that we are dealing with an exposed insulation product or material.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HIRSCHLER-FS2-719.7.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee's disapproval was based on the following reasons: This level of protection is not required by the code; this material and application poses no threat to life-safety and regulating it achieves nothing; this proposal would require a Class A finish on a material that is used in a space where other interior finishes are required to only be Class C; the code already requires this material to meet Section 719.7, so this is redundant text or should be handled as an exception if it were not required; and lastly, the ability to enforce this after the building occupancy is a concern.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Marcelo M. Hirschler (GBH International) representing American Fire Safety Council, Approval as Modified by this Public Comment.

Modify the proposal as follows:

719.7 Insulation and covering on pipe and tubing. Insulation and covering on pipe and tubing shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450. This shall include insulation coverings on exposed water supply and drainpipes under ~~accessible~~ lavatories and sinks.

Exception: Insulation and covering on pipe and tubing installed in plenums shall comply with the *International Mechanical Code.*

Commenter's Reason: The technical committee was split on the reasons for disapproving this proposal. With the change to go beyond just accessible lavatories and sinks this addresses one concern expressed. Some of the committee members clearly felt that the added sentence was unnecessary as they stated "the code already requires this material to meet Section 719.7, so this is redundant text or should be handled as an exception if it were not required". However, an explicit statement is important because other committee members felt that this requirement was not needed.

This is not a proprietary product. There are at present at least 4 manufacturers who make these materials and make them so as to meet the requirements of ASTM E 84 of a flame spread index not to exceed 25 and a smoke developed index not to exceed 450. They are: IPS Corporation (500 Distribution Parkway, Collierville, TN, 38017, also known as TrueBro) and their Soft Guard Pus line of products (web site: http://www.ipscorp.com/truebro/softguard), Johns Manville (717 17th St, Denver, CO, 80202) and their Zeston 2000 Series PVC Insulated Fitting Covers and Jacketing (web site: http://www.jm.com/insulation/performance_materials/products/ci55_zeston_2000_pvc.pdf), Plumberex Specialty Products (PO Box 1864, Palm Springs, CA, 92263) and their various lines of products (web site: http://www.plumberex.com/products.htm), and Proto Corporation (10500 47th Street North, Clearwater, FL, 33762) and their line of Proto Fitting Covers, made of Regular PVC and LoSmoke PVC (web site: http://www.protocorporation.com/specifications_pdfs/proto_submittal_sheet.pdf). Other manufacturers use plenum grade insulation materials (ASTM E 84 25/50) for this application (such as tapes).

It is interesting that the US Access Board, who is required to protect the disabled and enforce ADA, has come on record as stating that they feel this requirement is needed for the protection of the disabled and that this requirement is consistent with the requirements of ICC/ANSI A117.1-2003 because the coverings are insulation. The following e-mail from Marsh Mazz of the US Access Board shows that.

From: Mazz, Marsha [mailto:mazz@Access-Board.gov]
Sent: Tuesday, September 29, 2009 6:55 AM
To: Howard Ahern (Plumberex)
Cc: Kim Paarlberg; Jay A. Woodward, AIA; John Battles ; mgiachetti@iccsafe.org; Jim@PaschalEngineering.com
Subject: RE: Pipe and Drain Coverings

Our General Counsel, Mr. James Raggio, requested that I reply to your inquiry regarding an interpretation of the intent of the Access Board's accessibility guidelines pertaining to exposed pipes and surfaces beneath accessible lavatories and sinks. You asked if the requirement that the pipes be "insulated or otherwise configured to protect against contact" is intended to provide thermal protection as well as protection from sharp surfaces, or only to prevent contact with sharp surfaces.

The Access Board's most recent accessibility guideline is the 2004 Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines. Section 606.5 of these guidelines requires the following: *606.5 Exposed Pipes and Surfaces. Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks.*

Criteria in the 2004 ADA and ABA Accessibility Guidelines is based on previous Access Board accessibility guidelines. The lavatory and sink requirement first appeared in 1989, in Section 1190.31(k) of the Access Board's *Minimum Guidelines and Requirements for Accessible Design (MGRAD)*. At that time, the Access Board's accessibility guidelines referenced the ANSI A117.1-1986 Edition. The ANSI A117.1 included the following requirement: *4.19.4 Exposed Pipes and Surfaces. Hot water and drain pipes under lavatories or sinks shall be insulated or otherwise protected if they abut the clearance areas indicated in Fig. 31. There shall be no sharp or abrasive surfaces under lavatories or sinks.*

In 1991, the Access Board issued the Americans with Disabilities Act Accessibility Guidelines (ADAAG) based on its earlier accessibility guidelines. ADAAG retained the earlier requirement in Sections 4.19 Lavatories and 4.24 Sinks. The requirement specifies that: *Hot water and drain pipes under lavatories [and sinks] shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories*. Despite minor changes in wording, the requirements for lavatories and sinks has remained unchanged in the Access Board's accessibility guidelines since 1989.

After publication of ADAAG in 1991, the Access Board published the *ADAAG Manual - a guide to the Americans with Disabilities Act Accessibility Guidelines*. The substance of the Manual is available on-line at http://www.access-board.gov/adaag/about/guide.htm. In the Manual, the Access Board stated the following regarding the exposed pipes and sharp surfaces beneath lavatories:

Exposed Pipes and Surfaces [4.19.4]

To prevent burns, hot water pipes and drain pipes under lavatories must be insulated or otherwise configured to protect against contact. Exposed sharp or abrasive edges are prohibited. Foam or fiber insulation with protective over-wrap on drain, hot water supply, and sharp edges or commercially available rigid pipe covers will satisfy this requirement. The P-trap may also be installed parallel to the wall so that it is located outside the knee/toe space. If an under-lavatory enclosure is used, the specified knee and toe clearances must be maintained.

This guidance clarifies that the Board's requirement is intended to protect against burns due to contact with hot pipes and drains as well as to reduce the potential for injury due to contact with sharp or abrasive elements. Please note that while the Access Board's current accessibility guidelines include provisions for limiting water temperature to 120°F maximum in bathtubs and showers, the guidelines include no such provisions at lavatories and sinks. The reference to "hot water" was removed in 2004 guidelines because it was thought that there was equal potential for wheelchair users to experience adverse reactions or discomfort resulting from contact with cold water supply lines as with those that are hot.

As background to your inquiry, you provided differing interpretations of a parallel requirement in the ICC/ANSI A117.1-2003 Edition from staff at the International Code Council (attached) and a number of state building officials regarding this matter. The Access Board is authorized to provide technical assistance and guidance on its accessibility guidelines and standards. However, we cannot interpret state or local building codes. Please bear in mind that the Access Board does not establish requirements for fire resistant construction, interior finishes or other building materials intended to reduce the risk of flame spread or smoke development. Generally, these requirements are established in state, local and model building and fire codes which usually reference the ASTM E 84 *Standard Test Method for Surface Burning Characteristics of Building Materials*. The Access Board does not provide guidance regarding these building and fire code requirements.

If you have further questions, please don't hesitate to contact me at the telephone number below or by e-mail.

Regards,

Marsha K. Mazz
Technical Assistance Coordinator
U.S. Access Board
1331 F ST, NW
Washington, DC 20004-1111

(202) 272-0020 (direct)
(202) 272-0082 (TTY)

www.access-board.gov
mazz@access-board.gov

Public Comment 2:

Howard Ahern representing Plumberex Specialty Products Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

719.7 Insulation and covering on pipe and tubing. Insulation and covering on pipe and tubing shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450. This shall include insulation coverings ~~on exposed water supply and drainpipes under accessible lavatories and sinks.~~ required by ANSI A117.1 Section 606.6.

Exception: Insulation and covering on pipe and tubing installed in plenums shall comply with the *International Mechanical Code.*

Commenter's Reason: This language is needed to clarify that any insulation covering material on pipe & tubing shall comply with IBC 719.7 including insulation covering materials used to comply with ANSI A117.1. There has been confusion as to whether insulation material requirements for ANSI A117.1 is categorized as a thermal application. The U.S. Access Board issued a letter stating the requirement is "To prevent burns exposed hot water & drain pipes must be insulated." In addition to preventing burns and thermal shock from hot water pipes, the cold water supply must also be insulated to prevent thermal shock as well as protect from sharp surfaces.

The National Mechanical Insulation Committee (NMIC) and the National Insulation Association (NIA) and the mechanical insulation industry has generally adopted the following category definitions:

Category	*Definition*
Cryogenic Applications	*-50 F & Below*
***Thermal Applications**:*	
Refrigeration, chill water and below ambient applications	***-49 F to +75** F*
Medium to high temperature applications	*+**76 F to 1,200 F***
Refractory Applications	*+ 1,200 F & Above*

Insulation that is required by the ADA, ADAAG, ANSI A117.1 and the ABA for exposed drain and water pipes to prevent "thermal Shock" have a service temperature which are classified as a Thermal Application and therefore requires Thermal Insulation and coverings on the pipe.

This is not an arbitrary requirement, IBC 719.7 only exception is for plenum use and there is no exception for the thermal insulation coverings material on pipe used to comply with ANSI A117.1. When Thermal Insulation materials are used as an Interior Finish it is regulated by IBC Chapter 8 Interior Finish Section 803.8: (Thermal & Sound Insulation) Section 803.8 shall comply with IBC Section 719.

ASTM has recognized the risks of combustion posed by PVC jacketing. In the published standard **ASTM C 930-05,** which addresses potential health and safety concerns associated with thermal insulation materials and accessories,

ASTM C 930 identifies "thermal burns, impaired vision from smoke, and toxic effects," as possible negative effects from "combustion" of "PVC jacketing." The proposed amendments to Section 719.7 would address these risks, in so far as they are posed by the PVC jacketing used in under sink pipe insulation, by clarifying that the limits on surface burning characteristics of insulation already imposed by Section 719.7 apply to under sink pipe insulation, as well." This standard referenced the

Consumer Product Safety Commission, NFPA, ANSI, ASTM, EPA, North American Insulation Manufactures Assn. and the National Science Foundation etc.

The following is a response (underlined) to the FS committee's comments:

1. "The Code already requires this material to meet Section 719.7, so this is redundant text". *The added language is very much needed to clarify a thermal insulation ANSI A117.1 requirement and to regulate highly combustible materials that produce large volumes of smoke.*
2. "This material and application poses no threat to life-safety"- *Material that is highly combustible and produces large volumes of smoke is a Life Safety threat especially for people with disabilities. In addition ASTM standard C90 clearly identifies potential threats to life safety from thermal insulation combustion as well as the U.S. Fire Administration report on School fires which reports over 6,000 structural school fires in U.S. schools annually, most of these structural fires are started in the bathrooms.*

3. “This level of protection is not required by the code.” - *719.7 only exception is for plenum use and there is no exception for this insulation and covering material on pipe under lavatories and sinks. IBC Chapter 8 Interior Finish Section 806.3 Thermal Insulation also refers back to Section 719 for its material.*
4. “Would require a Class A finish on a material that is used in a space where other interior finishes are required to only be Class C.”- This is thermal insulation material and not Interior Finish “Trim” material , IBC Chapter 8 clearly defines Thermal Insulation and Trim and the different flame spread and smoke maximum allowed indexes of the ASTM E84 test for each.

The main overwhelming concern for the materials in this safety proposal is combustion and smoke. Insulation covering to protect people with disabilities heightens the requirement that the material be properly tested and conforms to required limits already adopted by the IBC. The added language is not redundant and is needed to bring clarification to this particular ANSI A117.1 requirement that is not exempted by 719.7.

Final Action: AS AM AMPC____ D

FS127-09/10
Table 720.1(3)

Proposed Change as Submitted

Proponent: Sam Francis representing American Forest & Paper Association

Add new text as follows:

TABLE 720.1(3)
MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a,q]

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches)				MINIMUM THICKNESS OF CEILING (inches)			
			4 hr	3 hr	2 hr	1 hr	4 hr	3 hr	2 hr	1 hr
30. Wood I-joist (minimum I-joist depth 9-1/2" with a minimum flange depth of 1-1/2" and a minimum flange cross-sectional area of 2.25 square inches; minimum web thickness of 3/8") @24" o.c. Fiberglass insulation placed between I-joists supported by the resilient channels.	30-1.1	Minimum 0.019" thick resilient channel 16" o.c. (Channels doubled at wallboard end joints), placed perpendicular to the joists and attached to each joist by 1-1/4" Type S drywall screws. Two Layers of ½" Type X gypsum wallboard applied with the long dimension perpendicular to the I-joists with end joints staggered. The base layer is fastened with 1-1/4" Type S drywall screws spaced 12" o.c. and the face layer is fastened with 1-5/8" Type S drywall screws spaced 12" o.c. Face layer end joints shall not occur on the same I-joist as base layer end joints and edge joints shall be offset 24" from base layer joints. Face layer to also be attached to base layer with 1-1/2" Type G drywall screws spaced 8" o.c. placed 6" from face layer end joints. Face layer wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	5/8

Reason: Many code officials have come to rely upon Table 720 as the preferred source of information regarding fire resistance rated assemblies. Because of its importance, we believe that the table should offer the most common generic assemblies. Floor systems utilizing I-joists have increased from less than 10 percent in 1990 to more than 50 percent. With the increased prevalence of I-joist floor/ceiling assemblies, including this assembly in the table will make the IBC more complete and it will be more useful to code officials. It is also expected that the document will be "user friendly", particularly for designers. In an effort to fulfill this expectation, we propose this common assembly for incorporation into Table 720.1(3). It is supported by ASTM E-119 test results as shown on the attached page. The following information and test results are provided with the understanding that their inclusion does not place them within the copyright release requirements of the signature statement.

Cost Impact: This code change proposal will reduce the cost of construction by an unknown amount.

ICCFILENAME: FRANCIS-FS4-TABLE 720.1(3)

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval was based on lack of supporting data (test report) to verify this assembly. Approved design can contain many details and specifications and the committee could not verify these without a test report that included a description.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sam Francis, American Wood Council/AF&PA, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 720.1(3)
MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMSa,q

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches)				MINIMUM THICKNESS OF CEILING (inches)			
			4 hr	3 hr	2 hr	1 hr	4 hr	3 hr	2 hr	1 hr
30. Wood I-joist (minimum I-joist depth 9-1/2" with a minimum flange depth of 1-1/2" and a minimum flange cross-sectional area of 2.25 square inches; minimum web thickness of 3/8") @24" o.c. Fiberglass insulation placed between I-joists supported by the resilient channels.	30-1.1	Minimum 0.019" thick resilient channel 16" o.c. (Channels doubled at wallboard end joints), placed perpendicular to the joists and attached to each joist by 1-1/4" Type S drywall screws. Two Layers of ½" Type X gypsum wallboard applied with the long dimension perpendicular to the <u>resilient channel</u> ~~I-joists~~ with end joints staggered. The base layer is fastened with 1-1/4" Type S drywall screws spaced 12" o.c. and the face layer is fastened with 1-5/8" Type S drywall screws spaced 12" o.c. Face layer end joints shall not occur on the same <u>resilient channel</u> ~~I-joist~~ as base layer end joints and edge joints shall be offset 24" from base layer joints. Face layer to also be attached to base layer with 1-1/2" Type G drywall screws spaced 8" o.c. placed ~~6~~ " <u>1-1/2"</u> from face layer end joints. Face layer wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	5/8

Commenter's Reason: This proposal was submitted to be inserted into Table 720.1(3) as a new item in the table. This design is identical to the assembly shown at AWC's website and was tested using the ASTM E119 test procedure. The REASON STATEMENT in the submittal made reference to the test results. Due to the nature of the electronic submittal and electronic publication of the monograph, the actual test report and data was not transmitted to the committee. Committee members correctly refused to vote in the affirmative on an assembly for which the supporting test data was not provided. In an effort to overcome the problems in distributing the report and data, we are making it available at our website. This satisfies the committee's concern and represents compelling documentation for acceptance of this proposal AS MODIFIED. While making the modifications for FS128, it became apparent that we had made a typing error in entering the information about the construction of the assembly. Namely, the gypsum board long dimension should be perpendicular to the resilient channel, not the joists. So this Public Comment is to ACCEPT the proposal as modified with that correction. The corrected version matches the tested assembly. The information regarding the tested assembly may be found at

<u>http://www.awc.org/fire/testreport.html</u> username: guest password: awc

The test report you see when you choose FS127 is labeled on the website as WIJ1.7. This information was the basis for the original submission of this assembly by AWC to have the assembly listed in Table 720.

More assemblies which have been tested and demonstrated to afford a fire resistance rating mean more flexibility for designers and results in lower construction costs.

Final Action: AS AM AMPC____ D

FS128-09/10
Table 720.1(3)

Proposed Change as Submitted

Proponent: Sam Francis representing American Forest & Paper Association

Revise as follows:

TABLE 720.1(3)
MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS[a,q]

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches)				MINIMUM THICKNESS OF CEILING (inches)			
			4 hr	3 hr	2 hr	1 hr	4 hr	3 hr	2 hr	1 hr
23. Wood I-joist (minimum joist depth 9-1/4" with a minimum flange depth of 1 $^{5}/_{16}$" and a minimum flange cross-sectional area of ~~2.3~~ 2.25 square inches) at 24" o.c. spacing with ~~1" by 4 inch (nominal)~~ a minimum 1x4 (3/4" x 3.5" actual) ~~wood furring strip spacer~~ ledger strip applied parallel to and covering the bottom of the bottom flange of each member, tacked in place. 2" mineral wool insulation, 3.5 pcf (nominal) installed adjacent to the bottom flange of the I-joist and supported by the ~~1"x4" furring strip spacer~~ 1x4 ledger strip.	23-1.1	½" deep single leg resilient channel 16" on center (channels doubled at wallboard end joints), placed perpendicular to the furring strip and joist and attached to each joist by 1-7/8" Type S drywall screws, 5/8" Type C gypsum wallboard applied perpendicular to the channel with end joints staggered at least 4' and fastened with 1-1/8 Type S drywall screws spaced 7" on center. Wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	5/8
27. Wood I-joist (minimum I-joist depth 9-1/2" with a minimum flange depth of 1 $^{5}/_{16}$ " and a minimum flange cross-sectional area of 1.95 square inches; minimum web thickness of 3/8") @24" o.c.	27-1.1	Minimum 0.019" thick resilient channel 16" o.c. (Channels doubled at wallboard end joints), placed perpendicular to the joists and attached to each joist by ~~1-5/8~~ 1-1/4" Type S drywall screws. Two Layers of ½" Type X gypsum wallboard applied with the long dimension perpendicular to the I-joists with end joints staggered. The base layer is fastened with 1-1/4" Type S drywall screws spaced 12" o.c. and the face layer is fastened with 1-5/8" Type S drywall screws spaced 12" o.c. Face layer end joints shall not occur on the same I-joist as base layer end joints and edge joints shall be offset 24" from base layer joints. Face layer to also be attached to base layer with 1-1/2" Type G drywall screws spaced 8" o.c. placed 6" from face layer end joints. Face layer wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	1

Reason: Editorial corrections to entries in the table.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FRANCIS-FS3-TABLE 720.1(3)

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the requirements were being decreased without justification and therefore the proposal was more than editorial.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sam Francis, American Wood Council/AF&PA, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 720.1(3)
MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMSa,q

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches)				MINIMUM THICKNESS OF CEILING (inches)			
			4 hr	3 hr	2 hr	1 hr	4 hr	3 hr	2 hr	1 hr
23. Wood I-joist (minimum joist depth 9-1/4" with a minimum flange depth of 1 5/16" and a minimum flange cross-sectional area of 2.25 square inches) ~~at~~ <u>@</u>24" o.c. spacing with a minimum 1x4 (3/4" x 3.5" actual) <u>wood</u> ledger strip applied parallel to and covering the bottom of the bottom flange of each member, tacked in place. 2" mineral wool insulation, 3.5 pcf (nominal) installed adjacent to the bottom flange of the I-joist and supported by the 1x4 ledger strip.	23-1.1	½" deep single leg resilient channel 16" on center (channels doubled at wallboard end joints), placed perpendicular to the ~~furring~~ <u>ledger </u>strip and joist and attached to each joist by 1-7/8" Type S drywall screws~~,~~<u>.</u> 5/8" Type C gypsum wallboard applied perpendicular to the channel with end joints staggered at least 4' and fastened with 1-1/8 Type S drywall screws spaced 7" on center. Wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	5/8
27. Wood I-joist (minimum I-joist depth 9-1/2" with a minimum flange depth of 1 5/16 " and a minimum flange cross-sectional area of 1.95 square inches; minimum web thickness of 3/8") @<u> </u>24" o.c.	27-1.1	Minimum 0.019" thick resilient channel 16" o.c. (Channels doubled at wallboard end joints), placed perpendicular to the joists and attached to each joist by 1-1/4" Type S drywall screws. Two Layers of ½" Type X gypsum wallboard applied with the long dimension perpendicular to the <u>resilient channel</u> ~~I-joists~~ with end joints staggered. The base layer is fastened with 1-1/4" Type S drywall screws spaced 12" o.c. and the face layer is fastened with 1-5/8" Type S drywall screws spaced 12" o.c. Face layer end joints shall not occur on the same <u>resilient channel</u> ~~I-joist~~ as base layer end joints and edge joints shall be offset 24" from base layer joints. Face layer to also be attached to base layer with 1-1/2" Type G drywall screws spaced 8" o.c. placed ~~6"~~ <u>1-1/2"</u> from face layer end joints. Face layer wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	1

Commenter's Reason: AWC is seeking to have the committee action overturned in favor of the Modification contained in this Comment. The proposal was submitted to be an editorial "clean-up" of the item in the Table 720.1(3). This design is identical to the assembly shown at AWC's website and was tested using the ASTM E119 test procedure. Another submission this cycle made some of the same editorial comments as was shown in our original submittal. When the item was published in the Electronic Monograph for the hearings in Baltimore, it had the editorial corrections made to our submittal. Those changes made this submittal appear to be substantively changing the item in the table. It does NOT SUBSTANTIVELY CHANGE the item. Instead, it corrects all the errors of the item as it is published in the table. The text, as modified herein makes this item match the assembly intended to be described by this item in Table 720.1(3).

In our original submission, the REASON STATEMENT made reference to the test results. Due to the nature of the electronic submittal and electronic publication of the monograph, the actual test report and data was not transmitted to the committee. Committee members appropriately refused to vote in the affirmative on an assembly for which the supporting test data was not provided. Unlike FS127, this assembly is already in the table and the previous committees have seen the test data so we did not provide it with this submittal. However, in an effort to satisfy all concerns, we are making the test report and data from the original submittal available at our website. This satisfies the committee's concern and represents compelling documentation for acceptance of this proposal AS SUBMITTED. The information may be found at http://www.awc.org/fire/testreport.html

username: guest password: awc

The test reports you see when you choose FS128 are labeled on the website as WIJ1.3 for table item number 23-1.1 and WIJ1.6 for table item number 27-1.1. This information was the basis for the original submission of this assembly by AWC. Due to the electronic format of the ICC monograph, AWC failed to ensure this information was readily available to the committee in a timely manner. It was distributed to the public at the hearing in Baltimore. Because of its work load, the committee did not have time to consider these data.

More assemblies which have been tested and demonstrated to afford a fire resistance rating means flexibility for designers and results in lower construction costs.

Final Action: AS AM AMPC____ D

FS133-09/10, Part I
708.14, 801.4

Proposed Change as Submitted

Proponent: Joe Holland or Dave Bueche, Hoover Treated Wood Products, representing Hoover Treated Wood Products

PART I – IBC FIRE SAFETY

Add new text as follows:

801.3 Fire retardant paints and coating. Fire retardant paints and coating applied to wood products shall be permitted in accordance with this chapter for interior finish when there is a change of occupancy. Paints and coatings shall comply with NFPA 703 and be maintained in accordance with the International Fire Code.

(Renumber subsequent sections)

Reason: To correlate the IBC with the IFC and IEBC. This proposal incorporates the provisions currently contained in the IFC and IEBC. Both of these documents are concerned with structures after being occupancy. The IBC does govern existing buildings when there is a change of occupancy, Chapter 34. There is concern with this class of product being used in inappropriate applications in new construction.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Standard NFPA 703 is currently referenced in the I-codes.

ICCFILENAME: HOLLAND-BUESHE-FS1-801.1.1.3; S2-2303.3

Public Hearing Results

PART I- IBC FIRE SAFETY
Committee Action: Disapproved

Committee Reason: the committee felt that this proposal could prohibit the use of a product for new construction that may meet the code for such a use. Further, requirements for change of occupancy belongs in Chapter 34 or the International Existing Building Code for existing buildings.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche representing Hoover Treated Wood Products Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

801.3 Fire retardant paints and coating. Fire retardant paints and coating applied to wood products shall be permitted in accordance with this chapter for interior finish when there is a change of occupancy. Paints and coatings shall comply with NFPA 703 <u>and Section 1703</u> and be maintained in accordance with the International Fire Code.

Commenter's Reason: Committee felt this was a provision for Chapter 34. We disagree. The building code discusses change of occupancy and what is required. Chapter 8 contains the general provisions. Chapter 34 contains the specific provisions. The proposed section is a general provision as it applies to wood products painted to reduce the flame spread.

Final Action: AS AM AMPC____ D

FS133-09/10, Part II
2303.3

Proposed Change as Submitted

Proponent: Joe Holland or Dave Bueche, Hoover Treated Wood Products, representing Hoover Treated Wood Products

PART II – IBC STRUCTURAL

Add new text as follows:

<u>**2303.3 Fire retardant paints and coating.** Fire retardant paints and coating applied to wood products shall be permitted in accordance with Chapter 8. Paints and coatings shall comply with NFPA 703 and be maintained in accordance with the International Fire Code.</u>

(Renumber subsequent sections)

Reason: To correlate the IBC with the IFC and IEBC. This proposal incorporates the provisions currently contained in the IFC and IEBC. Both of these documents are concerned with structures after being occupancy. The IBC does govern existing buildings when there is a change of occupancy, Chapter 34. There is concern with this class of product being used in inappropriate applications in new construction.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Standard NFPA 703 is currently referenced in the I-codes.

ICCFILENAME: HOLLAND-BUESHE-FS1-801.1.1.3; S2-2303.3

Public Hearing Results

PART II- IBC STRUCTURAL
Committee Action: **Disapproved**

Committee Reason: Based on the committee's action on FS133-09/10 Part I.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche representing Hoover Treated Wood Products Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2303.3 Fire retardant paints and coating. Fire retardant paints and coating applied to wood products shall be permitted in accordance with Section 801.3 ~~Chapter 8. Paints and coatings shall comply with NFPA 703 and be maintained in accordance with the International Fire Code.~~

Commenter's Reason: Section 801.3 refers one to NFPA 703 and the IFC, they are not needed to be repeated. Part II clarifies that painted products are not FRTW and are allowed only for interior finish where they can be maintained.

Final Action: AS AM AMPC____ D

FS139-09/10
809 (New)

Proposed Change as Submitted

Proponent: Joe McELvaney, representing self

Add new Section as follows:

Section 809
Children's Playground Structures

809.1 Children's playground structures. Structures intended as children's playgrounds that exceed 10 feet (3048 mm) in height and 150 square feet (14 m2) in area shall comply with Sections 809.1.1 through 809.1.4.

809.1.1 Materials. Children's playground structures shall be constructed of noncombustible materials or of combustible materials that comply with the following:

1. Fire-retardant-treated wood complying with Section 2302.
2. Light-transmitting plastics complying with Section 2606.
3. Foam plastics (including the pipe foam used in soft-contained play equipment structures) having a maximum heat-release rate not greater than 100 kilowatts when tested in accordance with UL 1975.
4. Aluminum composite material (ACM) meeting the requirements of Class A interior finish in accordance with Chapter 8 when tested as an assembly in the maximum thickness intended for use.
5. Textiles and films complying with the flame propagation performance criteria contained in NFPA 701.
6. Plastic materials used to construct rigid components of soft-contained play equipment structures (such as tubes, windows, panels, junction boxes, pipes, slides and decks) exhibiting a peak rate of heat release not exceeding 400 kW/m^2 when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation at a thickness of 6 mm.
7. Ball pool balls, used in soft-contained play equipment structures, having a maximum heat-release rate not greater than 100 kilowatts when tested in accordance with UL 1975. The minimum specimen test size shall be 36 inches by 36 inches (914mmby 914 mm) by an average of 21 inches (533 mm) deep, and the balls shall be held in a box constructed of galvanized steel poultry netting wire mesh.
8. Foam plastics shall be covered by a fabric, coating or film meeting the flame propagation performance criteria of NFPA 701.
9. The floor covering placed under the children's playground structure shall exhibit a Class I interior floor finish classification, as described in Section 804, when tested in accordance with NFPA 253.

809.1.2 Fire protection. Children's playground structures located within the compartment shall be provided with the same level of approved fire suppression and detection devices required for similar structures in the same compartment.

809.1.3 Separation. Children's playground structures shall have a minimum horizontal separation from other structures of 20 feet (6090 mm).

809.1.4 Area limits. Children's playground structures shall not exceed 300 square feet (28 m^2) in area, unless a special investigation has demonstrated adequate fire safety.

Reason: The current 2009 IBC has a section 402.12 for children's playground structures. This section currently only applies to Malls. However children's playground equipment can be found in all types of buildings and not just in malls. This new section will allow the code official to enforce these rules in any building that chooses to have children's playground equipment.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MCELVANEY-FS1-809 NEW.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that Chapter 4 requirements should perhaps be removed if these requirements were to move to Chapter 8, however the committee was not convinced that Chapter 8 was appropriate as it deals only with interior finishes. Chapter 4 might be more appropriate as it deals with amusement structures. Lastly, the terms structure and compartment need to be defined in this context.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), representing American Fire Safety Council; Robert J. Davidson (Davidson Code Concepts, LLC) representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**402.12 Children's playground structures.** Structures intended as children's playgrounds that exceed 10 feet (3048 mm) in height and 150 square feet (14 m^2) in area shall comply with Sections 402.12.1 through 402.12.4.~~

~~**402.12.1 Materials.** Children's playground structures shall be constructed of noncombustible materials or of combustible materials that comply with the following:~~

1. ~~Fire-retardant-treated wood.~~
2. ~~Light-transmitting plastics complying with Section 2606.~~
3. ~~Foam plastics (including the pipe foam used in soft-contained play equipment structures) having a maximum heat-release rate not greater than 100 kW when tested in accordance with UL 1975.~~
4. ~~Aluminum composite material (ACM) meeting the requirements of Class A interior finish in accordance with Chapter 8 when tested as an assembly in the maximum thickness intended for use.~~
5. ~~Textiles and films complying with the flame propagation performance criteria contained in NFPA 701.~~
6. ~~Plastic materials used to construct rigid components of soft-contained play equipment structures (such as tubes, windows, panels, junction boxes, pipes, slides and decks) exhibiting a peak rate of heat release not exceeding 400 kW/m^2 when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation at a thickness of 6 mm.~~
7. ~~Ball pool balls, used in soft-contained play equipment structures, having a maximum heat release rate not greater than 100 kW when tested in accordance with UL 1975. The minimum specimen test size shall be 36 inches by 36 inches (914 mm by 914 mm) by an average of 21 inches (533 mm) deep, and the balls shall be held in a box constructed of galvanized steel poultry netting wire mesh.~~
8. ~~Foam plastics shall be covered by a fabric, coating or film meeting the flame propagation performance criteria of NFPA 701.~~
9. ~~The floor covering placed under the children's playground structure shall exhibit a Class I interior floor finish classification, as described in Section 804, when tested in accordance with NFPA 253.~~

~~**402.12.2 Fire protection.** Children's playground structures located within the mall shall be provided with the same level of *approved* fire suppression and detection devices required for kiosks and similar structures.~~

~~**402.12.3 Separation.** Children's playground structures shall have a minimum horizontal separation from other structures within the mall of 20 feet (6090 mm).~~

~~**402.12.4 Area limits.** Children's playground structures shall not exceed 300 square feet (28 m^2) in area, unless a special investigation has demonstrated adequate fire safety.~~

402.12 Children's play structures. Children's play structures shall comply with Section 424. The minimum horizontal separation between children's play structures, kiosks and similar structures within the mall shall be 20 feet (6096 mm).

Section ~~809~~ 424
Children's Play ~~Playground~~ Structures

~~809.1~~ 424.1 Children's play ~~playground~~ structures. ~~Structures intended as children's playgrounds~~ Children's play structures installed inside all occupancies covered by this code that exceed 10 feet (3048 mm) in height and 150 square feet (14 m2) in area shall comply with Sections 424.2 through 424.5 ~~809.1.1 through 809.1.4~~.

~~809.1.1~~ 424.2 Materials. Children's play ~~playground~~ structures shall be constructed of noncombustible materials or of combustible materials that comply with the following:

1. Fire-retardant-treated wood complying with Section 2302.
2. Light-transmitting plastics complying with Section 2606.
3. Foam plastics (including the pipe foam used in soft-contained play equipment structures) having a maximum heat-release rate not greater than 100 kilowatts when tested in accordance with UL 1975 or when tested in accordance with NFPA 289, using the 20 kW ignition source.
4. Aluminum composite material (ACM) meeting the requirements of Class A interior finish in accordance with Chapter 8 when tested as an assembly in the maximum thickness intended for use.
5. Textiles and films complying with the flame propagation performance criteria contained in NFPA 701.
6. Plastic materials used to construct rigid components of soft-contained play equipment structures (such as tubes, windows, panels, junction boxes, pipes, slides and decks) exhibiting a peak rate of heat release not exceeding 400 kW/m^2 when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation at a thickness of 6 mm.
7. Ball pool balls, used in soft-contained play equipment structures, having a maximum heat-release rate not greater than 100 kilowatts when tested in accordance with UL 1975 or when tested in accordance with NFPA 289, using the 20 kW ignition source. The minimum specimen test size shall be 36 inches by 36 inches (914 mm by 914 mm) by an average of 21 inches (533 mm) deep, and the balls shall be held in a box constructed of galvanized steel poultry netting wire mesh.
8. Foam plastics shall be covered by a fabric, coating or film meeting the flame propagation performance criteria of NFPA 701.
9. The floor covering placed under the children's play ~~playground~~ structure shall exhibit a Class I interior floor finish classification, as described in Section 804, when tested in accordance with NFPA 253.

~~809.1.2~~ 424.3 Fire protection. Children's play ~~playground~~ structures ~~located within the compartment~~ shall be provided with the same level of approved fire suppression and detection devices required for other ~~similar~~ structures in the same occupancy ~~compartment~~.

~~809.1.3~~ 424.4 Separation. Children's play structures shall have a minimum horizontal separation from building walls, partitions and from elements of the means of egress of 5 feet (1524 mm). Children's play ~~playground~~ structures shall have a minimum horizontal separation from other children's play structures of 20 feet (6090 mm).

~~809.1.2~~ 424.5 Area limits. Children's playground structures shall not exceed 300 square feet (28 m^2) in area, unless a special investigation, acceptable to the code official, has demonstrated adequate fire safety.

Commenter's Reason: The technical committee was concerned that the proposal was placed in the wrong location because Chapter 8 addresses interior finish only, and suggested that it would be better placed in Chapter 4 as a separate section. That is why a new section is being proposed for this language. The intent of this proposal is that it should apply to all such large children's playground structures (to be called play structures), as long as they are placed indoors. As stated by the original submitter, children's play equipment can be found in all types of buildings and not just in malls.

The revised language also makes a few other changes that handle the issue raised by the technical committee of the words "similar structures" and "compartment". In the revised language the words "similar" and "compartment" are eliminated from the new section and it simply discusses "children's play structures".

Since new Section 424 covers children's play structures in all buildings, there is no need to retain the same requirements in their entirety in Section 402.12. Section 402.12 was revised to retain only the 20-foot separation requirements between children's play structures, kiosks and similar structures, which are only applicable in malls.

In areas other than covered malls, the code does not currently include separation distances between kiosks and children's' play structure. However, it was felt appropriate to include both a 20-foot separation between children's play structures (if there is more than one) and a minimum five-foot separation from walls, partitions and elements of the means of egress to ensure that adequate space is provided around the structure for proper sprinkler operation and unimpeded egress.

The new language also makes the change approved by the IFC committee in F58 parts I and II, where it allows the use of NFPA 289 as an alternate for UL 1975. NFPA 289 is more versatile than UL 1975 and is also likely to offer lower variability. The 20 kW gas burner ignition source in NFPA 289 was specifically designed with the intent of being a substitute for UL 1975.

Analysis: NFPA 289 was introduced in Code Change Proposal F58 09/10 Parts I and II and was found to be in compliance with ICC's policy on referenced standards.

Final Action: AS AM AMPC____ D

FS142-09/10
1403.5 (New)

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing The Extruded Polystyrene Foam Association

Add new text as follows:

1403.5 Vertical and Lateral Flame Propagation. Exterior walls greater than 20 feet (6 096 mm) in height above grade plane that contain combustible exterior wall coverings shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

Exceptions:

1. Exterior walls of Type V construction
2. Exterior walls that contain as the only combustible material, one or more of the following components:
    1. Thermal- and sound-insulating materials that meet the requirements of Section 1406.2.2.
    2. Architectural trim and embellishments.
    3. Combustible exterior wall veneers installed to heights not exceeding 40 ft. above grade plane.

(Renumber subsequent numbers)

Reason: This new section is proposed to address the potential vertical and lateral flame spread that can occur either on or within exterior wall assemblies that contain combustible materials.

Newer construction practices such as the addition of combustible weather resistant barriers allow significant amounts of combustible materials/products (other than foam plastics) to be installed on or in exterior walls. This code change proposal adds the requirement for NFPA 285 testing for exterior walls that contain these types of combustible materials. This requirement is already in place for any exterior walls that contain foam plastic insulation or use MCM exterior veneers.

Testing has shown that when a combustible weather resistive barrier was added to an exterior wall system that had successfully met the criteria for NFPA 285, that the addition of the barrier caused failure to occur in the NFPA 285 test.

Small-scale testing has shown that these types of materials can provide significant amounts of combustible fuel loading to a wall assembly and they are not currently regulated by the Code.

With the advent of newer exterior wall technologies such as “rainscreen” systems, the openings in the exterior veneer will allow flames and or heat to readily impact and ignite the barrier material. Due to the built-in standoffs of these systems, the barrier materials could then exhibit significant vertical or lateral flame propagation.

The Code proposal requires the NFPA 285 testing for exterior walls on Types I, II, III, or IV construction since these types of construction allow either none or limited combustibles in the exterior walls. The 20 ft. height limit provides a safety margin on the height of wall that can use these materials without testing. Also, while the code allows combustible exterior wall covering up to 40 ft., this proposal has as a limit 20 ft. since these materials can provide a hidden or concealed fire situation.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: Standard NFPA 285 is currently referenced in the I-codes.

ICCFILENAME: BEITEL-FS1-1403.5.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee was concerned that there was no area limitations imposed on architectural trim or exterior wall veneers.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jesse J. Beitel, Hughes Associates Inc, representing Extruded Polystyrene Foam Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1403.5 Vertical and Lateral Flame Propagation. Exterior walls on buildings of Type I, II, III or IV construction that are greater than ~~20~~ 40 feet (12 192 mm) in height above grade plane and ~~that~~ contain a combustible water-resistive barrier ~~exterior wall coverings~~ shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

~~**Exceptions:**~~

1. ~~Exterior walls of Type V construction~~
2. ~~Exterior walls that contain as the only combustible material, one or more of the following components:~~
   1. ~~Thermal- and sound-insulating materials that meet the requirements of Section 1406.2.2.~~
   2. ~~Architectural trim and embellishments.~~
3. ~~Combustible exterior wall veneers installed to heights not exceeding 40 ft. above grade plane.~~

(Renumber subsequent sections.)

Reason: This new section is proposed to address the potential vertical and lateral flame spread that can occur either on or within exterior wall assemblies that contain combustible materials.

Newer construction practices such as the addition of combustible water-resistant barriers allow significant amounts of combustible materials/products (other than foam plastics) to be installed on or in exterior walls. This code change proposal adds the requirement for NFPA 285 testing for exterior walls that contain these types of combustible materials. This requirement is already in place for any exterior walls that contain foam plastic insulation or use MCM exterior veneers.

Testing has shown that when a combustible water-resistive barrier was added to an exterior wall system that had successfully met the criteria for NFPA 285, that the addition of the barrier caused failure to occur in the NFPA 285 test.

Small-scale testing has shown that these types of materials can provide significant amounts of combustible fuel loading to a wall assembly and they are not currently regulated by the Code.

With the advent of newer exterior wall technologies such as “rainscreen” systems, the openings in the exterior veneer will allow flames and or heat to readily impact and ignite the barrier material. Due to the built-in standoffs of these systems, the barrier materials could then exhibit significant vertical or lateral flame propagation.

The Code proposal requires the NFPA 285 testing for exterior walls on Types I, II, III, or IV construction since these types of construction allow either none or limited combustibles in the exterior walls. The 40 ft. height limit follows the code allowance for combustible exterior wall covering up to 40 ft.

This Comment has revised the original proposal by being more specific with respect to addressing the materials of concern. Floor discussion and potential modifications all addressed exceptions and not the issue that gave rise to this code change. The comment now addresses the concerns raised by the Committee and others.

Final Action: AS AM AMPC____ D

FS143-09/10
1404.12 (New)

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler, GBH International, representing American Fire Safety Council

1. Add a new definition as follows:

SECTION 1402
DEFINITIONS

Polypropylene siding - a shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings.

2. Add new section as follows

1404.12 Polypropylene siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of 1404.12.1, 1404.12.2 or 1404.12.3 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the manufacturer's installation instructions.
1404.12.1 Flame Spread Index. The polypropylene siding material shall comply with the requirements of ASTM D 7254. The certification shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E 84 or UL 723.

1404.12.2 Heat Release. The polypropylene siding material shall comply with the requirements of ASTM D 7254 and a 4 foot by 8 foot (1.22 x 2.44 m) section of the polypropylene siding material shall exhibit a peak rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source at the thickness intended for use.

1404.12.3 Fire Separation Distance. The polypropylene siding shall comply with all the requirements of ASTM D 7254 and the fire separation distance between a building with polypropylene siding and the adjacent building shall be no less than 10 feet (3.05 m).

1405.18 Polypropylene siding. Polypropylene siding conforming to the requirements of this section and complying with 1404.12 shall be permitted on exterior walls of buildings of Type V construction located in areas where the basic wind speed specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1405.18.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform with the water-resistive barrier requirements in Section 1403. Siding and accessories shall be installed in accordance with approved manufacturer's instructions. Unless otherwise specified in the approved manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and 0.125-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 0.75 inch (19 mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

3. Add new standards to Chapter 35 as follows:

ASTM D 7254-07 Standard specification for polypropylene (PP) siding,
NFPA 289-09 Standard Method of Fire Test for Individual Fuel Packages

Reason: Polypropylene siding is being used in construction now although the IBC does not permit it. Therefore, it is important to regulate the use of polypropylene siding in a way that it can be used safely. The new sections are similar to the existing sections on vinyl siding, except for the fire testing. Vinyl siding is known to have adequate fire performance since the siding needs to be made of rigid (unplasticized) PVC in accordance with ASTM D 3679. Polypropylene is known not to have adequate fire performance unless properly fire retarded.

A new standard specification has been issued for polypropylene siding, ASTM D 7254. The specification addresses many of the key requirements for the material. Unfortunately the fire test requirement in ASTM D 7254 is not explicit enough. ASTM D 7254 does not require that, when fire testing is conducted in the ASTM E 84 (Steiner tunnel), the test specimen must remain in place during the test and flaming drips and falling test specimens are not allowed to happen. This requirement is critical for materials that are used exposed so that the flame spread index assesses actual surface flame spread on the material surface. The standards committee responsible for the ASTM E 84 fire test (ASTM E05) decided that this issue should be addressed in the code rather than in the standard itself. Polypropylene that has not been appropriately fire retarded will release abundant amount of heat, much more than other combustible sidings permitted by the code, such as wood siding or vinyl (PVC) siding, and spread fire through flaming drips. Such flaming drips will contribute to ignite mulch and debris found near the building and spread the fire. Table 1 shows such results.

Recent fire tests were also conducted in the Steiner tunnel, ASTM E 84, on a rigid PVC material 0.06 in. thick; it exhibited a flame spread index of 10. Under the same test conditions, a fire retarded polypropylene material 0.15 in. thick exhibited a flame spread index of 50. These are both very adequate values, in view of the fact that both the polypropylene material and the PVC material remained in place during the ASTM E 84 test and did not generate flaming drips.

Table 1: Results of Steiner Tunnel Tests (ASTM E 84)

Material	Flame Spread Index	Maximum Flame Front Advance (ft)	Time to Max. Flame Front Advance (min:s)	Flaming on Floor (Duration) (min:s)
PVC	10	4.6	7:48	None
FR Polypropylene	50	19.5	6:24	4:18

This shows that it is possible to use fire retarded polypropylene materials that give very adequate flame spread values and also very adequate heat release values, without flaming drips. Consequently, polypropylene siding should only be used when it is shown to exhibit the appropriate fire performance.

When polypropylene siding material (which does not have the appropriate fire performance) is tested in ASTM E 84 (Steiner tunnel) the test specimen will often fall ahead of the arrival of the flame giving incorrect results.

Table 2 shows new results of cone calorimeter heat release tests with polypropylene and PVC:

Table 2: Results of Cone Calorimeter (ASTM E 1354) Tests

Material	Peak Heat Release Rate	Total Heat Released	Time to Ignition	Effective Heat of Combustion	Fire Performance Index
	kW/m^2	MJ/m^2	s	MJ/kg	$s\ m^2/kW$
PVC	186.8	16.7	36	9.2	0.19
Non FR Polypropylene	768.3	47.2	23	40.3	0.03

Table 3 shows some earlier results with polypropylene, PVC and wood materials in the cone calorimeter:

Table 3 - Cone Calorimeter Data on Plastics and Douglas Fir

Material	Pk HRR (kW/m^2)	THR (MJ/m^2)	TTI (s)	EHC (MJ/kg)	FPI ($s\ m^2/kW$)
		Flux 20 kW/m^2			
PVC Rigid, Custom Inj. Mold.	40	3.0	5159	1.4	1343
PVC Rigid, Extrusion	102	2.9	3591	7.3	31.4
PP Non FR	1170	231.3	218	72.0	0.19
PP FR	236		382	23.6	1.62
PE Non FR	913	161.9	403	41.1	0.44
XLPE FR	88	87.6	750	22.4	8.08
Douglas Fir	237	46.5	254	13.1	1.10
		Flux 40 kW/m^2			
PVC Rigid, Custom Inj. Mold.	175	24.3	73	5.1	0.42
PVC Rigid, Extrusion	183	90.8	85	13.3	0.46
PP Non FR	1509	206.9	86	42.1	0.06
PP FR	243		80	23.9	0.33
PE Non FR	1408	221.0	159	46.6	0.06
XLPE FR	192	126.2	105	24.2	0.55
Douglas Fir	221	64.1	34	17.6	0.15
		Flux 70 kW/m^2			
PVC Rigid, Custom Inj. Mold.	191	93.0	45	12.7	0.24
PVC Rigid, Extrusion	190	96.5	48	10.8	0.25
PP Non FR	2421	231.1	41	43.1	0.02
PE Non FR	2735	227.5	47	42.6	0.02
XLPE FR	268	129.2	35	24.7	0.13
Douglas Fir	196	50.0	12	13.5	0.06

Table 3 shows that, when tested in the cone calorimeter, ASTM E 1354, under the same conditions, it was found that non fire retarded polypropylene exhibits a peak heat release rate of 1509 kW/m^2, while a non fire retarded PVC material exhibits a peak heat release rate of 183 kW/m^2, and a Douglas fir material exhibits a peak heat release rate of 221 kW/m^2. Such a very high heat release rate is unacceptable for a siding material. Testing in the cone calorimeter, including the testing above, is normally conducted in the horizontal orientation with radiant heat exposing the test specimen from above, thus capturing any flaming drips and assessing their effects.

Table 4 shows that wood materials, when not fire retarded, will usually exhibit flame spread index values that are less than 200 and will correspond to Class B or Class C categories. At the same time rigid PVC (vinyl) materials will generally exhibit flame spread index values less than 25. Neither wood nor PVC materials will cause flaming drips or molten material burning on the ground.

Table 4. Steiner tunnel (ASTM E 84) Data for Wood and Vinyl Materials

Material/Product	Flame Spread Index Low	Flame Spread Index High	Material/Product	Flame Spread Index Low	Flame Spread Index High
Cellulose fiberboard ceiling tile	70	80	Ponderosa pine B	105	170

Cottonwood	115		Poplar	170	185
Cypress	145	150	Red Gum	140	155
Douglas fir	70	100	Red oak flakeboard	70	190
Douglas fir overlay	110	140	Red Oak Flooring	100	100
Douglas fir/cedar plywood	190	230	Red Pine	140	
Eastern White Pine	85		Redwood	65	70
Hemlock/cedar plywood	190		Southern yellow pine	130	195
Lauan hardwood	150	170	Vinyl faced plywood	110	130
Lodgepole Pine	95		Vinyl profile	15	20
Maple flooring	105		Vinyl Siding	10	15
Northern white pine A	190	215	Vinyl vapor barrier	10	15
Northern white pine B	120	180	Walnut	130	140
Pacific silver fir	70		West Coast Hemlock	60	70
Pacific Yellow Cedar	80		Western Red Cedar	70	
Particleboard	135	180	Western spruce	100	
Plywood paneling over gypsum	130	150	Western white pine	75	
Ponderosa pine A	170	230	Yellow birch	105	110

Figure 1 shows char from a PVC siding fire (no foam backing): the material softened, charred and burned but is still substantially intact. Figure 2 shows a vertical PP sheet melting and resulting in flaming drips on the floor.

The reason that heat release rate and floor flaming are important issues is because it has been shown that the heat radiated by siding is a major contributor to the ignition of neighboring houses, as is the spread of fire along the ground, particularly when there are loose combustibles present.

That is the reason that the third option allows polypropylene siding to be used, but with a larger separation distance, when the results of the ASTM E 84/UL 723 (Steiner tunnel) test are based on a test specimen that is not self supporting and falls to the floor of the tunnel during the test. The standard ASTM E 84 states: "1.4 Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place." Therefore valid test results require the test specimen to stay in place ahead of the exposing flame.

Polypropylene siding should not be used in buildings other than Type V construction.

Figure 1 – remains of vinyl siding fire

Figure 2 Polypropylene siding melting and flaming on the floor.
(No figure 2 attached)

NFPA 289 was developed to test individual fuel packages and is similar in concept to UL 1975, already widely used in the code.

Cost Impact The code does not at present allow the use of polypropylene siding. In order to safely use polypropylene siding construction costs would have to increase either by using materials that would meet test requirements for adequate fire safety or by increasing fire separation distances.

Analysis: Code change proposal FS143 and FS144 address new requirements for polypropylene siding. The committee needs to make its intent clear with respect to these provisions. A review of the standard(s) proposed for inclusion in the code, ASTM D 7254-07 and NFPA 289-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: HIRSCHLER-FS6-1404.12.doc

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standards indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: The committee was concerned that NFPA 289 was not appropriate for polypropylene materials. Further, no fire data to substantiate the fire hazard was provided.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), representing American Fire Safety Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Polypropylene siding - a shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings.

1404.12 Polypropylene Siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D 7254 and those of 1404.12.1 or those of 1404.12.2 ~~or 1404.12.3~~ by an approved quality control agency. Polypropylene siding shall be installed in accordance with the requirements of 1405.18 and in accordance with the manufacturer's installation instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1404.12.1 Flame Spread Index. ~~The polypropylene material shall comply with the requirements of ASTM D7254.~~ The certification of the flame spread index shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E 84 or UL 723.

~~**1404.12.2 Heat Release**. The polypropylene siding material shall comply with the requirements of ASTM D 7254 and a 4 foot by 8 foot (1.22 x 2.44 m) section of the polypropylene siding material shall exhibit a peak rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source at the thickness intended for use.~~

1404.12.~~3~~2 Fire Separation Distance. ~~The polypropylene siding shall comply with all the requirements of ASTM D7254 and~~ The fire separation distance between a building with polypropylene siding and the adjacent building shall be no less than 10 feet (3.05 m).

1405.18 Polypropylene siding. Polypropylene siding conforming to the requirements of this section and complying with 1404.12 shall be limited to exterior walls of Type VB construction located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hours (45 m/s) and the building height is less than or equal to 40 feet (12,192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12,192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be installed in accordance with the manufacturer's installation instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

~~**1405.18.1 Application.** The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform with the water-resistive barrier requirements in Section 1403. Siding and accessories shall be installed in accordance with approved manufacturer's instructions. Unless otherwise specified in the approved manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and 0.125-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 0.75 inch (19 mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.~~

CHAPTER 35

ASTM D 7254 *Standard specification for polypropylene (PP) siding*
~~***NFPA 289*** *Standard Method of Fire Test for Individual Fuel Packages (2009)*~~

Commenter's Reason: The committee had a valid concern regarding the use of NFPA 289 for testing this material and this option has been eliminated. Polypropylene siding material does not normally contain flame retardants or any other additives that will prevent it from forming a pool fire as soon as it is exposed to a flame. Therefore, when polypropylene siding is exposed to the flame in the ASTM E 84 Steiner tunnel test it immediately starts melting and burning occurs in the floor of the tunnel, with no material left in the tunnel ceiling where the test sample should be. This material gets a low flame spread index (ASTM D 7254 requires a flame spread index under 200, just like for wood siding) but it is not a valid result because the material is no longer in the test position when the flame comes by.

This is a problem because polypropylene that is not properly flame retarded will generate about 4 times as much heat as vinyl (PVC) or as wood or even properly fire retarded polypropylene (see peak heat release rate in the table below) and it ignites much more rapidly. Therefore if polypropylene siding is made with typical polypropylene that has not been treated, the siding is a very dangerous product and polypropylene siding should not be allowed to be used based only on the requirements of ASTM D 7254. This means that proposal FS144 should not be approved.

Table: Results of Cone Calorimeter (ASTM E 1354) Tests (4 inch x 4 inch test sample)			
Material	**Peak Heat Release Rate**	**Time to Ignition**	**Effective Heat of Combustion**
	kW/m^2	s	MJ/kg
PVC (vinyl)	190	36	9
Wood	220	34	15
Non FR Polypropylene	770	23	40
FR Polypropylene	200	60	25

It is possible to make properly flame retarded polypropylene and use it for siding because flame retarded polypropylene can easily be compounded so that it does not melt/drip and pass the requirements of a flame spread index of 200 in the ASTM E 84 test. In fact, the original proposal includes an ASTM E 84 test with an FR polypropylene material that gave a flame spread index of 50. Such a material should be permitted for use but not the unsafe material normally offered for sale.

The missing Figure from the proposal (that could also be found with proposal RB148) is found below. It shows what happens when normal non flame retarded polypropylene (the material that is used in siding) burns: it forms a pool fire. The photograph is not polypropylene siding but its component material.

Analysis: Public comments to FS143 and FS144 address new requirements for polypropylene siding. The membership needs to make their preference clear with respect to these provisions.

Final Action: AS AM AMPC____ D

FS144-09/10, Part I
1402 (New), 1404.8 (New), 1405.13 (New), Chapter 35

Proposed Change as Submitted

Proponent: Matthew Dobson, representing Vinyl Siding Institute

PART I – IBC FIRE SAFETY

1. Add new text as follows:

1402 DEFINITIONS

Polypropylene Siding. A shaped material made principally from polypropylene that is used to clad exterior walls covering.

2. Add new text as follows:

1404.8 Polypropylene Siding. Polypropylene siding shall conform to the requirements of ASTM D7254.

(Renumber subsequent sections)

3. Add new text as follows:

1405.13 Polypropylene Siding. Polypropylene siding conforming to the requirements of this section and complying with ASTM D7254 shall be permitted on exterior walls of buildings located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hours (45m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceed 100 mile per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1405.13.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform with the weather-resistive barrier requirements in Section 1403. Siding and accessories shall be installed in accordance with approved manufacturer's instructions.

(Renumber subsequent sections)

4. Add new text to Chapter 35 standards as follows:

ASTM D7254 – 07 Standard Specification for Polypropylene (PP) Siding…1402, 1404.8, 1405.13

Reason: The purpose of this change is to assist code officials with the recognition of polypropylene (PP) siding. This product has reached a level of maturity including the establishment of an acceptance criterion through ES and an ASTM product standard. By providing this recognition in the code, building officials will be able to quickly reference the product and installation provisions.

Currently there is confusion in the market place between vinyl siding and PP siding. In many instances the PP siding is thought to be vinyl siding, this new language will help the code official to understand the requirements of the product established by ES and ASTM and what to enforce relative to its installation.

D7254 – 07 Standard Specification for Polypropylene (PP) Siding

The ASTM standard provides all necessary manufacturing tests and specifications to ensure the product meets the intent of the code from safety and welfare to wind performance. Included with this proposal are copies of the acceptance criteria and the ASTM standard D7254.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Code change proposal FS143 and FS144 address new requirements for polypropylene siding. The committee needs to make its intent clear with respect to these provisions. A review of the standard(s) proposed for inclusion in the code, ASTM D7254-07, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: DOBSON-FS1-1404.8; RB2-202 PART II

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

PART I- IBC FIRE SAFETY
Committee Action: Approved as modified

Modify the proposal as follows:

Polypropylene Siding. A shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings ~~covering~~.

1405.13 Polypropylene Siding. Polypropylene siding conforming to the requirements of this section and complying with ASTM D7254 shall be limited to ~~permitted on~~ exterior walls of Type VB construction ~~buildings~~ located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hours (45m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceed 100 mile per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

(Portions of the proposal not shown remain unchanged)

Committee Reason: The committee agreed that ASTM D7254 was the appropriate material standard and appropriate installation requirements were provided. The modification created further consistency with the referenced standard and the current ICC ES Acceptance Criteria.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Matthew Dobson, Vinyl Siding Institute (VSI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1405.13 Polypropylene Siding. Polypropylene siding conforming to the requirements of this section and complying with ASTM D7254 shall be limited to exterior walls of Type V~~B~~ construction, unless it has been tested in accordance with NFPA 268 and complies with section 1406.2 located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hours (45m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceed 100 mile per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

(Portion of proposal not shown, remains unchanged.)

Commenter's Reason: The modifications to this proposal, which were accepted by the IBC FS committee, reflected what is currently in the acceptance criteria for polypropylene siding, AC366. In reviewing this issue further and after discussions with ICC-ES staff it was confirmed that the reference to Type VB in AC366 is an error and will be corrected, hopefully by these hearings. It was supposed to reference to Type V and was processed as an editorial fix to Type VB. Additionally we have added the referenced sections of the IBC that have to do with testing protocol necessary should the product be used with other types of construction. This change in language is also from AC366. This modification makes the code consistent with the products current acceptance criteria.

Analysis: Public comments to FS143 and FS144 address new requirements for polypropylene siding. The membership needs to make their preference clear with respect to these provisions.

Public Comment 2:

Sam Francis, American Wood Council/AF&PA, request Disapproval.

Polypropylene is a new combustible product designed for the exterior of buildings. Its fire performance in this intended application is unknown. Additionally, ASTM D7254 purports to provide fire regulation by requiring polypropylene siding to perform to a flame spread rating Class C per ASTM E84 the "Standard Test Method for Surface Burning Characteristics of Building Materials." However, the Scope E84 is limited to materials that do not melt and drip when heated. Polypropylene melts and drips when heated and thus not suitable for classifying in accordance with E84. A more appropriate test for evaluating exterior fire performance is ASTM E2707 "Standard Test Method for Determining Fire Penetration of Exterior Wall

Assemblies Using a Direct Flame Impingement Exposure." The proponents have not provided any E2707 technical data for polypropylene and other comparable siding for comparison.

Public Comment 3:

Marcelo M. Hirschler (GBH International), representing American Fire Safety Council, requests Disapproval.

When polypropylene siding is normally sold it is made with material that neither contains flame retardants nor contains any other additives that will prevent it from forming a pool fire as soon as it is exposed to a flame. Therefore, when polypropylene siding is exposed to the flame in the ASTM E 84 Steiner tunnel test it immediately starts melting and burning occurs in the floor of the tunnel, with no material left in the tunnel ceiling where the test sample should be. This material gets a low flame spread index (ASTM D 7254 requires a flame spread index under 200, just like for wood siding) but it is not a valid result because the material is no longer in the test position when the flame comes by. Therefore if polypropylene siding is made with typical polypropylene that has not been treated, the siding is a very dangerous product and polypropylene siding should not be allowed to be used based only on the requirements of ASTM D 7254.

It is also notable that the IRC-BE committee agreed that polypropylene siding should not be added to the IRC code but the IBC-FS committee supported its addition to the IBC code, where it would be allowed into more severe applications. This is not safe.

Polypropylene siding should only be approved if it meets some type of added fire safety requirements beyond those the industry incorporated into ASTM D 7254, for example as required by the public comments I submitted for RB148 (for the IRC) and by FS143 (for the IBC). If that level of safety cannot be required, the use of polypropylene siding should not be approved by the code.

The figure that follows shows what happens when normal non flame retarded polypropylene (the material that is used in siding) burns: it forms a pool fire. The photograph is not polypropylene siding but its component material.

Final Action: AS AM AMPC____ D

FS144-09/10, Part II
IRC R202, 703.13, 703.13.1, Chapter 44

Proposed Change as Submitted

Proponent: Matthew Dobson, representing Vinyl Siding Institute

1. Add new text as follows:

R202 DEFINITIONS

Polypropylene Siding. A shaped material made principally from polypropylene that is used to clad exterior walls covering.

2. Add new text as follows:

TABLE R703.4
WEATHER–RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	Water Resistive Barrier Required	Wood or wood structural panel sheathing	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
(NEW) Polypropylene Siding[x]	Varies	Lap	Yes	0.120 nail (shank) with a .313 head[y,z]	Not allowed[aa,bb]	Not allowed[aa,bb]	Not allowed[aa,bb]	Not allowed	As specified by the manufacturer instructions or test report

(Portions of table and footnotes not shown remain unchanged)

aa. Where the sheathing is applied directly over wood structural panels or other approved backing capable of independently resisting the design wind pressure, the polypropylene siding shall be installed in accordance with the manufacturer's installation instructions.

bb. Where the polypropylene siding manufacturer's product specifications provide an approved design wind pressure rating for installation over fiberboard, gypsum or foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacture's installation instructions.

3. Add new text as follows:

R703.13 Polypropylene Siding. Polypropylene siding shall comply with requirements of ASTM D 7254.

R703.13.1 Installation. Polypropylene siding shall be installed in accordance with the manufacturer's installation instructions.

4. Add new text to Chapter 44 standards as follows:

ASTM D7254 – 07 Standard Specification for Polypropylene (PP) Siding…Table R703.4, R703.13

Reason: The purpose of this change is to assist code officials with the recognition of polypropylene (PP) siding. This product has reached a level of maturity including the establishment of an acceptance criterion through ES and an ASTM product standard. By providing this recognition in the code, building officials will be able to quickly reference the product and installation provisions.

Currently there is confusion in the market place between vinyl siding and PP siding. In many instances the PP siding is thought to be vinyl siding, this new language will help the code official to understand the requirements of the product established by ES and ASTM and what to enforce relative to its installation.

D7254 – 07 Standard Specification for Polypropylene (PP) Siding

The ASTM standard provides all necessary manufacturing tests and specifications to ensure the product meets the intent of the code from safety and welfare to wind performance. Included with this proposal are copies of the acceptance criteria and the ASTM standard D7254.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Code change proposal FS143 and FS144 address new requirements for polypropylene siding. The committee needs to make its intent clear with respect to these provisions. A review of the standard(s) proposed for inclusion in the code, ASTM D7254-07, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: DOBSON-FS1-1404.8; RB2-202 PART II

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

PART II - IRC
Committee Action: Disapproved

Committee Reason: Based on the committee's previous action on RB148-09/10. Also, this material is not permitted in the IBC.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Matthew Dobson, Vinyl Siding Institute Inc (VSI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Polypropylene Siding. A shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings ~~covering~~.

Table R703.4
WEATHER–RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	Water Resistive Barrier Required	Wood or wood structural panel sheathing	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
(NEW) Polypropylene Siding[x]	Varies	Lap	Yes	Min. Nom. 0.120 nail (shank) with a .313 head[y,z]	Not allowed[aa,bb]	Not allowed[aa,bb]	Not allowed[aa,bb]	Not allowed	As specified by the manufacturer instructions or test report

aa. Where the sheathing is applied directly over wood structural panels or other approved backing capable of independently resisting the design wind pressure, the polypropylene siding shall be installed in accordance with the manufacturer's installation instructions.

bb. Where the polypropylene siding manufacturer's product specifications provide an approved design wind pressure rating for installation over fiberboard, gypsum or foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacture's installation instructions.

703.13 Polypropylene Siding. Polypropylene siding shall comply with requirements of ASTM D 7254.

703.13.1 Installation. Polypropylene siding shall be installed in accordance with the manufacturer's installation instructions.

CHAPTER 44

ASTM D7254 – 07 Standard Specification for Polypropylene (PP) Siding…Table R703.4, R703.13

Commenter's Reason: The companion version of this proposal was accepted by the IBC Fire Safety Committee (see FS144 Part I). One of the reasons the IRC Building/Energy Committee did not accept the proposal is because the provision is not currently in the IBC. The IBC Fire Safety committee has accepted this proposal for the IBC so it is logical to have the similar provision placed in the IRC.

This change will help code officials understand how to identify the difference between vinyl siding and polypropylene siding by using the established ASTM standard as criteria for acceptance in the IRC and IBC. Currently polypropylene siding is recognized through the established acceptance criteria which includes the ASTM standard and will continue to be in the future.

By recognizing polypropylene siding in both the IRC and IBC building officials will be able to easily determine when polypropylene siding is allowed and when it is not allowed. For example in higher density settings when lot-line requirements and fire rated assemblies are applied in section R302 of the IRC, polypropylene siding would not be allowed where vinyl siding is allowed.

This change will make buildings safer and give building and fire officials a clearer understanding of how the products are different and should be regulated differently.

Public Comment 2:

Marcelo M. Hirschler (GBH International), representing American Fire Safety Council, requests Disapproval.

When polypropylene siding is normally sold it is made with material that neither contains flame retardants nor contains any other additives that will prevent it from forming a pool fire as soon as it is exposed to a flame. Therefore, when polypropylene siding is exposed to the flame in the ASTM E 84 Steiner tunnel test it immediately starts melting and burning occurs in the floor of the tunnel, with no material left in the tunnel ceiling where the test sample should be. This material gets a low flame spread index (ASTM D 7254 requires a flame spread index under 200, just like for wood siding) but it is not a valid result because the material is no longer in the test position when the flame comes by. Therefore if polypropylene siding is made with typical polypropylene that has not been treated, the siding is a very dangerous product and polypropylene siding should not be allowed to be used based only on the requirements of ASTM D 7254.

It is also notable that the IRC-BE committee agreed that polypropylene siding should not be added to the IRC code but the IBC-FS committee supported its addition to the IBC code, where it would be allowed into more severe applications. This is not safe.

Polypropylene siding should only be approved if it meets some type of added fire safety requirements beyond those the industry incorporated into ASTM D 7254, for example as required by the public comments I submitted for RB148 (for the IRC) and by FS143 (for the IBC). If that level of safety cannot be required, the use of polypropylene siding should not be approved by the code.

The figure that follows shows what happens when normal non flame retarded polypropylene (the material that is used in siding) burns: it forms a pool fire. The photograph is not polypropylene siding but its component material.

Final Action: AS AM AMPC____ D

FS145-09/10
1402 (New), 1404.13 (New), Table 1405.2, 1405.10.2 (New)

Proposed Change as Submitted

Proponent: Olene Bigelow, representing International Masonry Institute

1. Add new text as follows:

1402 DEFINITIONS

COMPOSITE NATURAL STONE. A veneer consisting of natural stone laminated to, or combined with, other like units to form a larger unit, or to dissimilar materials to form a cladding to be anchored or adhered to an approved substrate.

2. Add new text as follows:

1404.13 Porcelain Tile. Porcelain tile shall conform to the requirements of ANSI 137.1.3 for ceramic tile having an absorption of 0.5% or less according to ANSI 137.4.1 – Class Table and ANSI 137.1.6.1 Allowable Properties by Tile Type – Table 10.

3. Revise as follows:

TABLE 1405.2
MINIMUM THICKNESS OF WEATHER COVERINGS

Covering Type	Minimum Thickness (Inches)
Porcelain Tile	0.25
Composite Natural Stone	0.50

(Portions of table not shown remain unchanged)

4. Add new text as follows:

1405.10.2 Exterior adhered masonry veneers - porcelain tile and composite natural stone. Adhered units shall not exceed 5/8" thickness and a maximum of 24" in any face dimension nor more than 3 square feet in total face area and shall not weigh more than 9 pounds per square foot. Porcelain tile and composite natural stone shall be adhered to an approved backing system.

Reason: There is currently no definition for composite natural stone in the IBC. This proposal would add that definition. Currently, there is no definition for porcelain tile in the IBC. As one of myriad types of ceramic tile, its unique characteristics and extremely low absorption rate requires it be dealt with differently from other materials, especially when applied as an exterior adhered veneer. These materials are relatively new in exterior applications and fall outside the scope of TMS 402/ACI 530/ASCE 6. With no specific code requirements found in IBC, installations of these materials are being found inadequate and some significant failures have occurred. See attached photographs. When these units and/or their adhesion system fail, for whatever ultimate reason, public safety is put at risk.

Here, only a few units have fallen, so far. No mechanical attachment.

Another project: Upon stripping the façade, it appears an attempt was made to “anchor” the units, but it was clearly unsuccessful

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Standards ANSI A137 are currently referenced in the I-codes.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee was concerned about the disposition of the referenced standard, ANSI 137. Further, the committee felt the proposal should be limited to porcelain tiles only and suggests the proponent bring the change back for final action with the approved standard and the suggested revisions.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Olene Bigelow, representing International Masonry Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1402 DEFINITIONS

~~**COMPOSITE NATURAL STONE.** A veneer consisting of natural stone laminated to, or combined with, other like units to form a larger unit, or to dissimilar materials to form a cladding to be anchored or adhered to an approved substrate.~~

~~**1404.13 Porcelain Tile.**~~ **PORCELAIN TILE.** Porcelain tile shall conform to the requirements of ANSI 137.1.3 for ceramic tile having an absorption of 0.5% or less according to ANSI 137.4.1 – Class Table and ANSI 137.1.6.1 Allowable Properties by Tile Type – Table 10.

TABLE 1405.2
MINIMUM THICKNESS OF WEATHER COVERINGS

Covering Type	Minimum Thickness (Inches)
Porcelain Tile	0.25
~~Composite Natural Stone~~	~~0.50~~

(Portions of table not shown remain unchanged)

1405.10.2 Exterior adhered masonry veneers - porcelain tile ~~and composite natural stone~~. Adhered units shall not exceed 5/8" thickness and a maximum of 24" in any face dimension nor more than 3 square feet in total face area and shall not weigh more than 9 pounds per square foot. Porcelain tile ~~and composite natural stone~~ shall be adhered to an approved backing system.

Commenter's Reason: Currently, there is no definition for porcelain tile in the IBC. As one of myriad types of ceramic tile, its unique characteristics and extremely low absorption rate requires it be dealt with differently from other materials, especially when applied as an exterior adhered veneer. These materials are relatively new in exterior applications and fall outside the scope of TMS 402/ACI 530/ASCE 6. With no specific code requirements found in IBC, installations of these materials are being found inadequate and some significant failures have occurred. Since no code provisions exist to cover these exterior applications, installers are sometimes using the same setting materials that are used for interior applications, which is inappropriate in most cases. When these units and/or their adhesion system fail, for whatever ultimate reason, public safety is put at risk.

In response to the committee's request, the proposal as submitted for final action is limited to porcelain tile only. Further, as requested by the committee, two printed and two digital copies of the referenced standard in question, ANSI 137.1 – 2008 edition have been forwarded to ICC staff.

Final Action: AS AM AMPC____ D

FS149-09/10
1405.7

Proposed Change as Submitted

Proponent: Gary J. Ehrlich, PE, representing National Association of Home Builders

Revise as follows:

1405.7 Stone veneer. Stone veneer units not exceeding 10 inches (254 mm) in thickness shall be anchored directly to masonry, concrete or to stud construction by one of the following methods:

1. *(No change to current text)*
2. With <u>wood</u> stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) corrosion-resistant wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to wood studs spaced a maximum of 16 inches (406 mm) o.c. On studs, the mesh shall be attached with 2-inch-long (51 mm) corrosion-resistant steel wire furring nails at 4 inches (102 mm) o.c. providing a minimum 1.125-inch (29 mm) penetration into each stud and with 8d common nails at 8 inches (203 mm) o.c. into top and bottom plates or with equivalent wire ties. There shall be not less than a 0.1055-inch (2.68 mm) corrosion-resistant wire, or approved equal, looped through the mesh for every 2 square feet (0.2 m2) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it will lie in the

stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer.

3. With cold-formed steel stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) corrosion-resistant wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to steel studs spaced a maximum of 16 inches (406 mm) o.c. The mesh shall be attached with 2-inch-long (51 mm) corrosion-resistant #8 self-drilling, tapping screws at 4 inches (102 mm) o.c. providing a minimum 0.5-inch (12.7 mm) penetration into each stud, and at 8 inches (203 mm) o.c. into top and bottom tracks or with equivalent wire ties. There shall be not less than a 0.1055-inch (2.68 mm) corrosion-resistant wire, or approved equal, looped through the mesh for every 2 square feet (0.2 m2) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer. The cold-formed steel framing members shall have a minimum uncoated thickness of 0,043 inches (1.09 mm).

Reason: The purpose of this proposal is to provide guidance for stone veneer anchored to cold-formed steel stud backing. The current language only addresses wood studs, leaving attachment to cold-formed steel stud backing as an alternate means and methods. The language mirrors the wood stud language, with appropriate revisions based on ICC-ES stone veneer reports and BIA Technical Note 28B on Brick Veneer/Steel Stud Walls.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Ehrlich-FS1-1405 7

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

1405.7 Stone veneer. Stone veneer units not exceeding 10 inches (254 mm) in thickness shall be anchored directly to masonry, concrete or to stud construction by one of the following methods:

1. *(No change to current text)*
2. With wood stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) corrosion-resistant wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to wood studs spaced a maximum of 16 inches (406 mm) o.c. On studs, the mesh shall be attached with 2-inch-long (51 mm) corrosion-resistant steel wire furring nails at 4 inches (102 mm) o.c. providing a minimum 1.125-inch (29 mm) penetration into each stud and with 8d common nails at 8 inches (203 mm) o.c. into top and bottom plates or with equivalent wire ties. There shall be not less than a 0.1055-inch (2.68 mm) corrosion-resistant wire, or approved equal, looped through the mesh for every 2 square feet (0.2 m2) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer.
3. With cold-formed steel stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) ~~corrosion-resistant~~ zinc-coated or non-metallic coated wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to steel studs spaced a maximum of 16 inches (406 mm) o.c. The mesh shall be attached with ~~2-inch-long (51 mm)~~ corrosion-resistant #8 self-drilling, tapping screws at 4 inches (102 mm) o.c. ~~providing a minimum 0.5-inch (12.7 mm) penetration into each stud~~, and at 8 inches (203 mm) o.c. into top and bottom tracks or with equivalent wire ties. All screws shall extend through the steel connection a minimum of three exposed threads. There shall be not less than a 0.1055-inch (2.68 mm) ~~corrosion-resistant~~ zinc-coated or non-metallic coated wire, or approved equal, looped through the mesh for every 2 square feet (0.2 m2) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer. The cold-formed steel framing members shall have a minimum ~~uncoated~~ bare steel thickness of 0.0428~~3~~ inches (1.087~~9~~ mm).

Committee Reason: This proposal provides a reasonable extension of stone veneer to steel studs in Section 1405.7, item 3. It also clarifies that current item 2 is specifically applicable for anchoring to wood studs. The modification substitutes wording in item 3 that is more in line with common steel industry terminology. The addition of appropriate steel stud requirements exposes problems with the current wood stud requirement (item 2) that should be addressed by a public comment.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gary J. Ehrlich, PE, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1405.6 Stone veneer. Stone veneer units not exceeding 10 inches (254 mm) in thickness shall be anchored directly to masonry, concrete or to stud construction by one of the following methods:

1. *(No change to current text)*
2. With wood stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) zinc-coated or non-metallic coated ~~corrosion-resistant~~ wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to wood studs spaced a maximum of 16 inches (406 mm) o.c. On studs, the mesh shall be attached with 2-inch-long (51 mm) corrosion-resistant steel wire furring nails at 4 inches (102 mm) o.c. providing a minimum 1.125-inch (29 mm) penetration into each stud and with 8d common nails at 8 inches (203 mm) o.c. into top and bottom plates or with equivalent wire ties. There shall be not less than a 0.1055-inch (2.68 mm) zinc-coated or non-metallic coated ~~corrosion-resistant~~ wire, or approved equal, ~~looped through the mesh~~ attached to the stud with 8d annular threaded nails 0.113 inches in diameter (2.807 mm) minimum for every 2 square feet (0.2 m2) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer.
3. With cold-formed steel stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) zinc-coated or non-metallic coated wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to steel studs spaced a maximum of 16 inches (406 mm) o.c. The mesh shall be attached with corrosion-resistant #8 self-drilling, tapping screws at 4 inches (102 mm) o.c., and at 8 inches (203 mm) o.c. into top and bottom tracks or with equivalent wire ties. All screws shall extend through the steel connection a minimum of three exposed threads. There shall be not less than a 0.1055-inch (2.68 mm) zinc-coated or non-metallic coated wire, or approved equal, ~~looped through the mesh~~ attached to the stud with corrosion-resistant #8 self-drilling, tapping screws for every 2 square feet (0.2 m2) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer. The cold-formed steel framing members shall have a minimum bare steel thickness of 0.0428 inches (1.087 mm).

Commenter's Reason: The purpose of this public comment is to correlate the stone veneer attachment provisions for wood and cold-formed steel studs and provide further technical improvements. The language for corrosion-resistant mesh and wire under the wood stud section is amended to match the change to zinc- or non-metallic coated mesh and wire made by a Steel Framing Alliance floor modification. Also, at the request of the seismic engineering community, the requirements for the stone tie are changed to require the tie be attached directly to the studs. This is a significantly more stable connection than attaching the tie just to the mesh.

Public Comment 2:

Steven Winkel, FAIA, PE; J. Daniel Dolan, PhD, PE, representing the Federal Emergency Management Agency/Building Seismic Safety Council Code Resource Support Committee (FEMA/BSSC CRSC), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1405.7 Stone veneer. Stone veneer units not exceeding 10 inches (254 mm) in thickness shall be anchored directly to masonry, concrete or to stud construction by one of the following methods:

1. *(No change to current text)*
2. With wood stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) corrosion-resistant wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to wood studs spaced a maximum of 16 inches (406 mm) o.c. On studs, the mesh shall be attached with 2-inch long (51 mm) corrosion-resistant steel wire furring nails at 4 inches (102 mm) o.c. providing a minimum 1.125-inch (29 mm) penetration into each stud and with 8d ~~common~~ annular threaded nails at 8 inches (203 mm) o.c. into top and bottom plates or with equivalent wire ties. There shall be not less than a 0.1055-inch (2.68 mm) corrosion-resistant wire, or approved equal, ~~looped through the mesh~~ attached to the stud with a minimum of a 8d (0.131 in. diameter) annular threaded nail for every 2 square feet (0.2 m^2) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer.
3. With cold-formed steel stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) zinc-coated or non-metallic coated wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to steel studs spaced a maximum of 16 inches (406 mm) o.c. The mesh shall be attached with corrosion-resistant #8 self-drilling, tapping screws at 4 inches (102 mm) o.c., and at 8 inches (203 mm) o.c. into top and bottom tracks or with equivalent wire ties. All screws shall extend through the steel connection a minimum of three exposed threads. There shall be not less than a 0.1055-inch (2.68 mm) corrosion-resistant wire, or approved equal, ~~looped through the mesh~~ attached to the stud with a minimum of a #8 self-drilling, tapping screw extending through the steel framing a minimum of three exposed threads for every 2 square feet (0.2 m2) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg

shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer. The cold-formed steel framing members shall have a minimum base steel thickness of 0.0428 inches (1.087 mm).

Commenter's Reason Statement: The modification is proposed for two reasons:

1. In order for the ties between the structural framing and the stone masonry veneer to function properly, they need to be attached to the wall framing (studs). As the two requirements are currently written, the ties (wires) can simply be looped through a steel mesh that is attached to the studs. The wire mesh has too much flexibility to effectively hold the stone in place and, therefore, this modification is submitted to require that the wires or ties be directly attached to the studs.
2. Recent shake table testing at the University of California at San Diego showed that smooth shank nails did not perform satisfactorily when used in withdrawal to hold masonry veneer on a wood light-frame wall system. The nails withdrew from the framing at accelerations below the design load. The requirement that annular threaded (ring-shank) nails be used will correct this problem because of their increased withdrawal strength and lower sensitivity to moisture changes.

Final Action: AS AM AMPC____ D

FS150-09/10, Part I
1405.10.2 (New), 1405.10.2.1 (New), 1405.10.2.2 (New), 1405.10.2.3 (New)

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company, Representing the Masonry Veneer Manufacturers Association (MVMA)

PART I – IBC FIRE SAFETY

Add new text as follows:

1405.10 Adhered masonry veneer. Adhered masonry veneer shall comply with the applicable requirements in Section 1405.10.1 and Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.

1405.10.1 Interior adhered masonry veneers. Interior adhered masonry veneers shall have a maximum weight of 20 psf (0.958 kg/m2) and shall be installed in accordance with Section 1405.10. Where the interior adhered masonry veneer is supported by wood construction, the supporting members shall be designed to limit deflection to 1/600 of the span of the supporting members.

1405.10.2 Exterior adhered masonry veneer. Exterior adhered masonry veneer shall be in accordance with section 1405.10

1405.10.2.1 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section 1404.2 and, where applied over wood-based sheathing, shall include a water-resistive vapor-permeable barrier with a performance at least equivalent to two layers of Grade D paper.

> **Exception:** Where the water-resistive barrier that is applied over wood-based sheathing has a water resistance equal to or greater than that of 60-minute Grade D paper and is separated from the adhered masonry veneer by an intervening, substantially nonwater-absorbing layer or drainage space.

1405.10.2.2 Flashing at foundation. A corrosion-resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gage galvanized or plastic with a minimum vertical attachment flange of 3 ½ inches (89 mm) shall be installed a minimum of 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section 1405.4 to direct moisture to the exterior. The water-resistive barrier shall lap over the exterior of the attachment flange of the screed or flashing.

1405.10.2.3 Installation. Adhered masonry veneer shall be installed in accordance with the manufacturer's instructions..

Reason:
PART I-The added section for exterior adhered masonry veneer compliments the existing section for interior adhered masonry veneer.

The proposed language for water-resistive barriers is modeled after similar requirements for stucco (section 2510.6).

The proposed language for flashing at the foundation is similar to the weep screed requirements for stucco and compliments the performance requirements of section 1405.4 Flashing (*Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior . . . . .*) while at the same time allowing for alternates to the stucco-specific weep screed.

Adhered masonry veneer manufacturers require their products to be installed per their instructions and the building code should support this requirement with enforceable language.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: WOESTMAN -FS3-1410.2 PART I AND WOESTMAN-RB2-703.12.1 PART II

Public Hearing Results

PART I- IBC FIRE SAFETY
Committee Action: Disapproved

Committee Reason: The committee felt that the proposal was confusing because of the circular code references. Reference back to 1405.10 does not get the code user forward to the subsection of 1405.10.2.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Woestman, Kellen Company, representing Masonry Veneer Manufacturers Association (MVMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1405.10 Adhered masonry veneer. Adhered masonry veneer shall comply with the applicable requirements in Section 1405.10~~.1~~ and Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.

1405.10.~~2~~1 Exterior adhered masonry veneer. Exterior adhered masonry veneer shall be installed in accordance with section 1405.10 and in accordance with the manufacturer's instructions.

1405.10.~~2~~1.1 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section ~~1404.2~~ 2510.6. ~~and, where applied over wood-based sheathing, shall include a water-resistive vapor-permeable barrier with a performance at least equivalent to two layers of Grade D paper.~~

> ~~**Exception:** Where the water-resistive barrier that is applied over wood-based sheathing has a water resistance equal to or greater than that of 60-minute Grade D paper and is separated from the adhered masonry veneer by an intervening, substantially nonwater-absorbing layer or drainage space.~~

1405.10.~~2~~1.2 Flashing at foundation. A corrosion-resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gauge galvanized or plastic with a minimum vertical attachment flange of 3 1/2 inches (89 mm) shall be installed to extend a minimum of 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section 1405.4 ~~to direct moisture to the exterior~~. The water-resistive barrier shall lap over the exterior of the attachment flange of the screed or flashing.

1405.10.~~1~~2 Interior adhered masonry veneers. Interior adhered masonry veneers shall have a maximum weight of 20 psf (0.958 kg/m2) and shall be installed in accordance with Section 1405.10. Where the interior adhered masonry veneer is supported by wood construction, the supporting members shall be designed to limit deflection to 1/600 of the span of the supporting members.

Commenter's Reason: This public comment addresses comments at the committee hearings last fall. The section numbering has been revised. Requirements for exterior adhered masonry veneer are placed ahead of existing requirements for interior adhered masonry veneer because code requirements for exterior adhered masonry veneer are expected to be needed more often.

Adhered masonry veneer manufacturers require their products to be installed per their instructions (which complement building code requirements) and the building code should support the requirement to be installed consistent with the manufacturer's instructions with enforceable language.

Requirements for water-resistive barriers are revised to refer to Section 2510.6 (stucco) instead of copying that text to this section of the code. Wall preparation for stucco and for exterior adhered masonry veneer is very similar (flashing, WRB, lath, scratch coat . . .) and referring to Section 2510.6 helps with consistency in the code for WRB requirements.

The proposed language for flashing at the foundation is similar to the flashing at foundation / weep screed requirements for stucco and compliments the performance requirements of Section 1405.4 Flashing (*Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior . . . . . .*) while at the same time allowing for alternates to the stucco-specific weep screed.

Final Action: AS AM AMPC____ D

FS150-09/10, Part II
IRC R703.12.1 (New)

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company, Representing the Masonry Veneer Manufacturers Association (MVMA)

PART II – IRC BUILDING/ENERGY

Add new text as follows:

R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall be installed in accordance with the manufacturer's instructions.

<u>**R703.12.1 Flashing at foundation.** A corrosion-resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gage galvanized or plastic with a minimum vertical attachment flange of 3 ½ inches (89 mm) shall be installed a minimum of 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section R703.8 to direct moisture to the exterior. The water-resistive barrier, as required by Table R703.4 Footnote w, shall lap over the exterior of the attachment flange of the screed or flashing.</u>

Reason:
PART II- The proposed language for flashing at the foundation is similar to the weep screed requirements for stucco and compliments the flashing performance requirements of section R703.8 Flashing (*Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components . . . .) while at the same time allowing for effective alternates to the stucco-specific weep screed.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: WOESTMAN -FS3-1410.2 PART I AND WOESTMAN-RB2-703.12.1 PART II

Public Hearing Results

PART II - IRC
Committee Action: **Approved as Submitted**

Committee Reason: This change provides a prescriptive method for flashing or weep screeds for adhered masonry veneer. The committee suggests the proponent improve the language to clarify where the flashing should start, above or below the plate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Woestman, Kellen Company, representing Masonry Veneer Manufacturers Association (MVMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall be installed in accordance with the manufacturer's instructions.

R703.12.1 Flashing at foundation. A corrosion-resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gage galvanized or plastic with a minimum vertical attachment flange of 3 1/2 inches (89 mm) shall be installed <u>to extend</u> a minimum of 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section R703.8 ~~to direct moisture to the exterior~~. The water-resistive barrier, as required by Table R703.4 Footnote w, shall lap over the exterior of the attachment flange of the screed or flashing.

Commenter's Reason: This public comment addresses the committee suggestion to clarify where the flashing should be placed.
In addition, this public comment addresses concerns shared with MVMA members regarding the proposed language. Installing flashing in accordance with Section R703.8 requires flashing to "extend to the surface of the exterior wall finish" and requires flashing to "prevent entry of water into the wall cavity or penetration of water to the building structural framing components." The text proposed to be deleted is redundant.

Final Action: AS AM AMPC____ D

FS151-09/10, Part I
1405.10.2 (New), 1405.2.1 (New)

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company, Representing the Masonry Veneer Manufacturers Association (MVMA)

PART I – IBC FIRE SAFETY

Add new text as follows:

1405.10 Adhered masonry veneer. Adhered masonry veneer shall comply with the applicable requirements in Section 1405.10.1 and Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.

1405.10.1 Interior adhered masonry veneers. Interior adhered masonry veneers shall have a maximum weight of 20 psf (0.958 kg/m2) and shall be installed in accordance with Section 1405.10. Where the interior adhered masonry veneer is supported by wood construction, the supporting members shall be designed to limit deflection to 1/600 of the span of the supporting members.

<u>**1405.10.2 Exterior adhered masonry veneer**. Exterior adhered masonry veneer shall be in accordance with section 1405.10</u>

<u>**1405.10.2.1 Clearances.** Adhered masonry veneer shall be installed a minimum of 4 inches (102 mm) above the earth or 2 inches (51 mm) above paved areas or ½ inch (12 mm) above exterior walking surfaces supported by the same foundation which supports the exterior wall.</u>

Reason:
PART I: The added section for exterior adhered masonry veneer compliments the existing section for interior adhered masonry veneer.
The clearance requirements are consistent with stucco applications and go one step further by specifying a minimum of ½" clearance to exterior walking surfaces which are supported by the same foundation that supports the wall to which the exterior veneer is adhered. The proposed requirement that both the wall and the walking surface be supported by the same foundation, along with existing IBC flashing performance requirements of section 1405.4 for exterior wall intersections with porches, decks, balconies, and similar architectural features, limits this ½" clearance to building elements stable to each other and required to be flashed to manage water. This ½" clearance requirement allows for architectural and aesthetic improvements in the installation of adhered masonry veneer.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WOESTMAN -FS4-1410.2 PART I AND WOESTMAN-RB3-R703.12.1 PART II

Public Hearing Results

PART I- IBC FIRE SAFETY
Committee Action: Disapproved

Committee Reason: The committee felt that the proposal was confusing because of the circular code references. Reference back to 1405.10 does not get the code user forward to the subsection of 1405.10.2.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Woestman, Kellen Company, representing Masonry Veneer Manufacturers Association (MVMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1405.10 Adhered masonry veneer. Adhered masonry veneer shall comply with the applicable requirements in Section 1405.10~~.1~~ and Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.

1405.10.~~2~~1 Exterior adhered masonry veneer. Exterior adhered masonry veneer shall be installed in accordance with section 1405.10 and in accordance with the manufacturer's instructions.

1405.10.~~2~~1.1 Clearances. On exterior stud walls, adhered masonry veneer shall be installed a minimum of 4 inches (102 mm) above the earth, or a minimum of 2 inches (51 mm) above paved areas, or a minimum of 1/2 inch (12 mm) above exterior walking surfaces which are supported by the same foundation ~~which~~ that supports the exterior wall.

1405.10.~~1~~2 Interior adhered masonry veneers. Interior adhered masonry veneers shall have a maximum weight of 20 psf (0.958 kg/m2) and shall be installed in accordance with Section 1405.10 and the manufacturer's instructions. Where the interior adhered masonry veneer is supported by wood construction, the supporting members shall be designed to limit deflection to 1/600 of the span of the supporting members.

Commenter's Reason: This public comment follows the format proposed in FS150 Part I which addresses the committee comments of a circular code reference.

Also, the "clearances" text is revised to clarify the requirements are for exterior stud walls. The clearance requirements are consistent with stucco applications and go one step further by specifying a minimum of ½" clearance to exterior walking surfaces which are supported by the same foundation that supports the wall to which the exterior veneer is adhered. The proposed requirement that both the wall and the walking surface be supported by the same foundation, along with existing IBC flashing performance requirements of section 1405.4 for exterior wall intersections with porches, decks, balconies, and similar architectural features, limits this ½" clearance to building elements stable to each other and required to be flashed to manage water. This ½" clearance requirement allows for architectural and aesthetic improvements in the installation of adhered masonry veneer.

Final Action: AS AM AMPC____ D

FS151-09/10, Part II
IRC R703.12.1 (New)

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company, Representing the Masonry Veneer Manufacturers Association (MVMA)

PART II – IRC BUILDING/ENERGY

Add new text as follows:

R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall be installed in accordance with the manufacturer's instructions.
R703.12.1 Clearances. Adhered masonry veneer shall be installed a minimum of 4 inches (102 mm) above the earth or 2 inches (51 mm) above paved areas or ½ inch (12 mm) above exterior walking surfaces supported by the same foundation which supports the exterior wall.

Reason:
PART I: The added section for exterior adhered masonry veneer compliments the existing section for interior adhered masonry veneer.

The clearance requirements are consistent with stucco applications and go one step further by specifying a minimum of ½" clearance to exterior walking surfaces which are supported by the same foundation that supports the wall to which the exterior veneer is adhered. The proposed requirement that both the wall and the walking surface be supported by the same foundation, along with existing IBC flashing performance requirements of section 1405.4 for exterior wall intersections with porches, decks, balconies, and similar architectural features, limits this ½" clearance to building elements stable to each other and required to be flashed to manage water. This ½" clearance requirement allows for architectural and aesthetic improvements in the installation of adhered masonry veneer.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WOESTMAN -FS4-1410.2 PART I AND WOESTMAN-RB3-R703.12.1 PART II

Public Hearing Results

PART II- IRC B/E
Committee Action: **Disapproved**

Committee Reason: The committee feels this is a good start but the list needs to be reworked so that the application is clear. The list should appear as numbered items as is done in other sections of the code. The proponent should rework this and bring it back.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Woestman, Kellen Company, representing Masonry Veneer Manufacturers Association (MVMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall be installed in accordance with the manufacturer's instructions.

R703.12.1 Clearances. <u>On exterior stud walls,</u> ~~A~~<u>a</u>dhered masonry veneer shall be installed

<u>1.</u> ~~a m~~<u>M</u>inimum of 4 inches (102 mm) above the earth, or
<u>2.</u> <u>Minimum of</u> 2 inches (51 mm) above paved areas, or
<u>3.</u> <u>Minimum of</u> 1/2 inch (12 mm) above exterior walking surfaces <u>which are</u> supported by the same foundation ~~which~~ <u>that</u> supports the exterior wall.

Commenter's Reason: This public comment addresses the committee recommendation to list the proposed requirements as numbered items.

This proposal also clarifies the proposed requirements are applicable to stud walls.

The clearance requirements proposed are consistent with stucco applications and go one step further by specifying a minimum of ½" clearance to exterior walking surfaces which are supported by the same foundation that supports the wall to which the exterior veneer is adhered. The proposed requirement that both the wall and the walking surface be supported by the same foundation, along with existing IRC flashing performance requirements of section R703.8 for exterior wall intersections with porches, decks, or stairs, limits this ½" clearance to building elements stable to each other and required to be flashed to manage water. This ½" clearance requirement allows for architectural and aesthetic improvements in the installation of adhered masonry veneer.

Final Action: AS AM AMPC____ D

FS155-09/10, Part I
1406.2.1

Proposed Change as Submitted

Proponent: Michael Love, representing Metropolitan Washington DC Fire Marshal's Committee

PART I – IBC Fire Safety

Revise as follows:

1406.2.1 Ignition resistance. Combustible exterior wall coverings shall be tested in accordance with NFPA 268.

Exceptions:

1. Wood or wood-based products.
2. Other combustible materials covered with an exterior covering other than vinyl sidings listed in Table 1405.2.
3. Aluminum having a minimum thickness of 0.019 inch (0.48mm).
4. Exterior wall coverings on exterior walls of Type V construction.

1406.2.1.1 Fire separation 5 feet or less. Where installed on exterior walls having a fire separation distance of 5 feet (1524 mm) or less to buildings, structures or decks, combustible exterior wall coverings shall not exhibit sustained flaming as defined in NFPA 268.

Exceptions:

1. Decks constructed of fire retardant treated wood
2. Exterior balconies and decks protected by automatic sprinklers as provided for in Section 903.3.1.2.1

1406.2.1.2 Fire separation greater than 5 feet. For fire separation distances greater than 5 feet (1524 mm) to buildings, structures or decks, an assembly shall be permitted that has been exposed to a reduced level of incident radiant heat flux in accordance with the NFPA 268 test method without exhibiting sustained flaming. The minimum fire separation distance required for the assembly shall be determined from Table1406.2.1.2 based on the maximum tolerable level of incident radiant heat flux that does not cause sustained flaming of the assembly.

Exceptions:

1. Decks constructed of fire retardant treated wood
2. Exterior balconies and decks protected by automatic sprinklers as provided for in Section 903.3.1.2.1

Reason:
Part I- A technical change is needed to Section 1406 relating to the lack of fire resistance of the exterior surface of exterior combustible walls when directly exposed to combustible decks. It is likely that code development did not consider the need to require fire resistance for the exterior wall from these structures but there is a growing concern for the number of fires that start on and under combustible decks which when ignited burn fiercely.

This code change proposal is not intended to address all fires that could present an exposure to combustible exterior walls. It focuses on the higher risk and increased likelihood for a fire involving a combustible deck that is directly attached or within five feet of the combustible exterior wall. Since decks would have a limited exposure to a building any additional expenditure for more fire resistant materials is reduced. Ultimately a sheathing of gypsum even in thin layers increases the resistance.

1406.2.1.1 and 1406.2.1.1 both add the same language to include proximity to buildings, structures or decks and allows an exception for decks constructed of fire retardant wood.

This code change proposal is not intended to address all fires that could present an exposure to combustible exterior walls. It focuses on the higher risk and increased likelihood for a fire involving a combustible deck that is directly attached to or within five feet of the combustible exterior wall. Since decks would have a limited exposure to a building any additional expenditure for more fire resistant materials is reduced. Ultimately a sheathing of gypsum even in thin layers increases the resistance.

These fires are rarely extinguished before it has spread into the void of the exterior combustible wall or up the exterior surface of the walls and into the attic. While the most frequent facing surface of the exterior wall is vinyl siding this is listed in specs as non-combustible. There is experience that indicates no effective resistance to fire though as the siding readily melts away to allow fire access to the substrate sheathing which most often is a combustible material such as Oriented Strand Board (OSB), low density fiber board and Rigid Foam Insulation. These common materials are combustible but OSB resists direct flame longer then rigid foam insulation. Tests conducted by the National Institute for Standards and Technology showed that when a plume of heated gases and flame impinges on a combustible exterior wall it will ignite the combustible exterior wall that is within five feet. This scenario may actually be less dramatic then a well advanced fire involving an attached deck which could preheat the combustible wall and directly expose it to a vertical flame. This exposure and create a more intense flame spread vertically on the wall. Some materials used as a substrate to the exterior siding will resist fire more then others; some materials readily spread fire vertically directly to the roof along the exterior surface; into a non-fire resistant soffit then into the attic, or destroys the integrity of the substrate material and the enters the wall void.

Decks have become more like exterior rooms with furniture, outdoor kitchens and primarily the presence of people. Barbecue grills, lighting and the inappropriate disposal of smoking materials are all hazards that have been the causes of fires that first ignite decks then spread easily to and into the structure of a home or similar building. Once ignited decks burn violently with direct flame and radiant heat exposure to combustible exterior walls. The fact that the fuel in a deck is open on all sides which enhances oxidization for complete combustion and ample direct flame as well as preheating from radiant heat make them a perfect primary fire source to feed fires that most often spread to and involve the roof and attic of homes. The direct flaming attack on these walls cause nearly immediate destruction of combustible and easily degraded sidings to allow immediate access and exposure to the interior structure. Due to the unique flow of the heat and gases from the deck fires into the structure these fires most often result in near total loss of structure. In the Washington D.C Metro area these fires have resulted in many fires one incident which killed a firefighter and another fire incident that severely burned multiple firefighters.

Cost Impact: Part I & II- Product information indicates that a product such as a gypsum-based exterior sheathing is comparable to other sheathing and is more resistant to fire.

ICCFILENAME: LOVE-FS1-1406.2.1.1-RB-1-R302.1.2

Public Hearing Results

PART I- IBC FIRE SAFETY
Committee Action: **Disapproved**

Committee Reason: The committee felt the proposal was not coordinated with the definition of fire separation distance, was too broad in its application and was already cover in the projection requirements of the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), representing American Fire Safety Council; Robert J. Davidson (Davidson Code Concepts, LLC) representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1406.2.1 Ignition resistance. Combustible exterior wall coverings shall be tested in accordance with NFPA 268.

Exceptions:

1. Wood or wood-based products.
2. Other combustible materials covered with an exterior covering other than vinyl sidings listed in Table 1405.2.
3. Aluminum having a minimum thickness of 0.019 inch (0.48mm).
4. Exterior wall coverings on exterior walls of Type V construction.

1406.2.1.1 Fire separation 5 feet or less. Where installed on exterior walls having a fire separation distance of 5 feet (1524 mm) or less to buildings, structures or decks, combustible exterior wall coverings shall not exhibit sustained flaming as defined in NFPA 268.

<u>**Exceptions:**</u>

~~1. Decks constructed of fire retardant treated wood~~

<u>1. Decks constructed of noncombustible materials or of materials that, when tested in accordance with the test procedures set forth in ASTM E 84, or UL 723, for a test period of 30 minutes, comply with the following;</u>

<u>1.1. The material shall exhibit a flame spread index not exceeding 25 and shall show no evidence of progressive combustion following the extended 30 minute test;</u>

<u>1.2. The material shall exhibit a flame front that does not progress more than 10 1/2 feet (3200 mm) beyond the centerline of the burner at any time during the extended 30 minute test; and</u>

<u>1.3. The deck boards shall bear a label indicating the required performance levels.</u>

2. Exterior balconies and decks protected by automatic sprinklers as provided for in Section 903.3.1.2.1

1406.2.1.2 Fire separation greater than 5 feet. For fire separation distances greater than 5 feet (1524 mm) to buildings, structures or decks, an assembly shall be permitted that has been exposed to a reduced level of incident radiant heat flux in accordance with the NFPA 268 test method without exhibiting sustained flaming. The minimum fire separation distance required for the assembly shall be determined from Table1406.2.1.2 based on the maximum tolerable level of incident radiant heat flux that does not cause sustained flaming of the assembly.

~~**Exceptions:**~~

~~1. Decks constructed of fire retardant treated wood~~

~~2. Exterior balconies and decks protected by automatic sprinklers as provided for in Section 903.3.1.2.1~~

Commenter's Reason: The comment restricts the requirement for improved fire performance decks (or sprinklered decks) to buildings with fire separations of up to 5 feet and does not address those where the fire separation is greater. Moreover, the requirement for the decks is more generic than in the original proposal and allows both noncombustible materials and materials that meet a fire test (which fire-retardant-treated wood also meets) so that the materials to be used are not exclusive. Finally, the enforceability is enhanced by the requirement to add a label to the deck boards with the required performance levels.

Final Action: AS AM AMPC____ D

FS155-09/10, Part II
IRC R302.1.2 (New)

Proposed Change as Submitted

Proponent: Michael Love, representing Metropolitan Washington DC Fire Marshal's Committee

PART II – IRC Building/Energy

Add new text as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

R302.1.2. **Combustible Exterior Walls and Combustible Decks .** Combustible exterior wall coverings and sheathing that are ignitable below 12.5 KW/m^2 and exhibit sustained flaming shall not be used where installed on exterior walls having a fire separation distance of 5 feet (1524 mm) to combustible decks or balconies.

Exception: Decks constructed of fire retardant treated wood

Reason:
Part II- Add a new section to IRC Chapter 3 as R302.1.2 to increase fire resistance of combustible exterior walls when directly exposed to combustible decks. It is likely that the code development process did not consider the need to require fire resistance for the exterior wall from decks but there is a growing concern for the number of fires that start on and under combustible decks which when ignited burn fiercely. IRC considers exposure buildings in regard to fire spread but does not include the hazard of combustible deck fires. While IRC has some limited passive fire resistance of residential construction through use of fire blocking and compartmentation it does not recognize the hazard of a deck involved in fire to the structure of the main building through the exterior facing of the wall.

This code change proposal is not intended to address all fires that could present an exposure to combustible exterior walls. It focuses on the higher risk and increased likelihood for a fire involving a combustible deck that is directly attached to or within five feet of the combustible exterior wall. Since decks would have a limited exposure to a building any additional expenditure for more fire resistant materials is reduced. Ultimately a sheathing of gypsum even in thin layers increases the resistance.

These fires are rarely extinguished before it has spread into the void of the exterior combustible wall or up the exterior surface of the walls and into the attic. While the most frequent facing surface of the exterior wall is vinyl siding this is listed in specs as non-combustible. There is experience that indicates no effective resistance to fire though as the siding readily melts away to allow fire access to the substrate sheathing which most often is a combustible material such as Oriented Strand Board (OSB), low density fiber board and Rigid Foam Insulation. These common materials are combustible but OSB resists direct flame longer then rigid foam insulation. Tests conducted by the National Institute for Standards and Technology showed that when a plume of heated gases and flame impinges on a combustible exterior wall it will ignite the combustible exterior wall that is within five feet. This scenario may actually be less dramatic then a well advanced fire involving an attached deck which could preheat the combustible wall and directly expose it to a vertical flame. This exposure and create a more intense flame spread vertically on the wall. Some materials used as a substrate to the exterior siding will resist fire more then others; some materials readily spread fire vertically directly to the roof along the exterior surface; into a non-fire resistant soffit then into the attic, or destroys the integrity of the substrate material and the enters the wall void.

Decks have become more like exterior rooms with furniture, outdoor kitchens and primarily the presence of people. Barbecue grills, lighting and the inappropriate disposal of smoking materials are all hazards that have been the causes of fires that first ignite decks then spread easily to and into the structure of a home or similar building. Once ignited decks burn violently with direct flame and radiant heat exposure to combustible exterior walls. The fact that the fuel in a deck is open on all sides which enhances oxidization for complete combustion and ample direct flame as well as preheating from radiant heat make them a perfect primary fire source to feed fires that most often spread to and involve the roof and attic of homes. The direct flaming attack on these walls cause nearly immediate destruction of combustible and easily degraded sidings to allow immediate access and exposure to the interior structure. Due to the unique flow of the heat and gases from the deck fires into the structure these fires most often result in near total loss of structure. In the Washington D.C Metro area these fires have resulted in many fires one incident which killed a firefighter and another fire incident that severely burned multiple firefighters.

Cost Impact: Part I & II- Product information indicates that a product such as a gypsum-based exterior sheathing is comparable to other sheathing and is more resistant to fire.

ICCFILENAME: LOVE-FS1-1406.2.1.1-RB-1-R302.1.2

Public Hearing Results

PART II- IRC B/E
Committee Action: Disapproved

Committee Reason: This is intended for a specific type of housing but the language addresses more than intended. This change would create permit issues with respect to replacement. This will make compliance difficult. Also, the content of the deck could ignite even though the exception is used.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), representing American Fire Safety Council; Robert J. Davidson (Davidson Code Concepts, LLC) representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

~~**R302.1.2. Combustible Exterior Walls and Combustible Decks.** Combustible exterior wall coverings and sheathing that are ignitable below 12.5 KW/m^2 and exhibit sustained flaming shall not be used where installed on exterior walls having a fire separation distance of 5 feet (1524 mm) to combustible decks or balconies.~~

~~**Exception:** Decks constructed of fire retardant treated wood.~~

<u>**R302.1.2 Combustible Exterior Walls and Combustible Decks.** In areas where the authority having jurisdiction determines that there is elevated danger of fires starting on or under decks and where decks or balconies are separated from exterior walls by a fire separation distance of 5 feet (1524 mm) or less, the exterior walls and decks shall comply with one R302.1.2.1 or R302.1.2.2.</u>

<u>**R302.1.2.1 Exterior Walls.** The exterior walls shall have exterior wall coverings and sheathing constructed of materials that, when exposed to an incident heat flux of 12.5 kW/m^2, do not ignite or spread flame.</u>

<u>**R302.1.2.2 Deck Construction.** The decks shall be constructed of noncombustible materials or of materials that, when tested in accordance with the test procedures set forth in ASTM E 84, or UL 723, for a test period of 30 minutes, comply with the R302.1.2.2.1 through R302.1.2.2.3.</u>

<u>**R302.1.2.2.1 Flame spread.** Material shall exhibit a flame spread index not exceeding 25 and shall show no evidence of progressive combustion following the extended 30 minute test.</u>

<u>**R302.1.2.2.2 Flame front**. Material shall exhibit a flame front that does not progress more than 10 1/2 feet (3200 mm) beyond the centerline of the burner at any time during the extended 30 minute test.</u>

<u>**R302.1.2.2.3 Label.** The deck boards shall bear a label indicating the required performance levels.</u>

Commenter's Reason: The technical committee was concerned that the proposal addressed too many different types of occupancies and this was addressed by limiting the application to construction in areas where the ahj determines that there is an elevated danger of fires starting under decks. Moreover, additional concerns involved compliance and clarification of fire performance; the enforceability is enhanced by the requirement to add a label to the deck boards with the required performance levels. This was also clarified by amending the language. Finally, the concern about the use of a single material, fire retardant treated wood was also addressed by discussing fire performance of the deck. The heat flux of 12.5 kW/m^2 was chosen because it is the heat flux used in NFPA 268, and that ensures that the ignitability and flame spread is minimized and that some degree of fire protection is applied. NFPA 268 is required in Chapter 14 of the IBC but is not referenced in the IRC and it is not included in the comment.

Final Action: AS AM AMPC____ D

FS156-09/10, Part I

1404.12, 1405.2, 1405.18 (New), 1405.18.1 (New), Table 1405.18.1 (New), 1405.18.2 (New), 1405.18.2.1 (New), Table 1405.18.2.1 (New), 1405.18.2.2 (New), Table 1405.18.2.2 (New), 1405.14.1, 1405.14.2 (New), 1405.14.2.1 (New), 1405.14.2.2 (New), 1405.14.2.3 (New), 2304.6;

Proposed Change as Submitted

Proponent: Jay H. Crandell, PE, d/b/a ARES Consulting, representing the Foam Sheathing Coalition

PART I – IBC STRUCTURAL

1. Add new text as follows:

1404.12 Foam plastic sheathing. Foam plastic sheathing shall comply with requirements for foam plastic insulation in Section 2603. When used as a water-resistive barrier, the foam plastic sheathing material and installation shall be approved in accordance with Section 1404.2.

2. Revise as follows:

1405.2 Weather protection. *Exterior walls* shall provide weather protection for the building. The materials of the minimum nominal thickness specified in Table 1405.2 shall be acceptable as *approved* weather coverings. Foam plastic sheathing used in exterior wall covering assemblies with approved exterior weather coverings shall comply with Section 1405.18.

3. Add new text as follows:

1405.18 Foam plastic sheathing. Foam plastic sheathing used in exterior wall covering assemblies shall comply with this section, Section 2603, Chapter 13, and the foam sheathing manufacturer's approved installation instructions.

1405.18.1 Minimum thickness. The thickness of foam plastic sheathing shall comply with Table 1405.18.1.

> **Exception:** Where foam plastic sheathing is applied directly over or behind wall sheathing or other solid substrate capable of separately resisting the required wind pressure, the limitations of Table 1405.18.1 shall not apply.

TABLE 1405.18.1
REQUIREMENTS FOR FOAM PLASTIC SHEATHING
IN EXTERIOR WALL COVERING ASSEMBLIES[1,2]

Foam Plastic Sheathing Material[3]	Foam Sheathing Thickness (in)[3]	Maximum Wind Speed (mph) – Exposure B[4]			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16"oc framing	24"oc framing	16"oc framing	24"oc framing
Siding Attached Directly Over Foam Plastic Sheathing per Section 1405.18.2.1					
EPS	¾"	110	NP	90	NP
	1"	130	100	125	NP
	≥1-1/2"	130	130	130	125
Polyiso-cyanurate	½" (faced)	130	90	115	NP
	¾" (faced)	130	120	130	100
	1" (faced)	130	130	130	110
	≥1-1/2" (faced)	130	130	130	115
XPS	½" (faced)	125	85	105	NP
	¾"	110	NP	90	NP
	1"	130	95	120	NP
	≥1-1/2"	130	130	130	115
Siding Offset from Foam Sheathing per Section 1405.18.2.2					
EPS	¾"	95	NP	NP	NP
	1"	125	85	105	NP
	≥1-1/2"	130	130	130	105
Polyiso-	½" (faced)	120	NP	100	NP

cyanurate	¾” (faced) 1” (faced) ≥1-1/2” (faced)	130 130 130	100 110 120	130 130 130	85 95 100
XPS	½” (faced) ¾” 1” ≥1-1/2”	110 95 125 130	NP NP 85 120	90 NP 105 130	NP NP NP 100

For SI: 1 inch = 25.4 mm, 1 mile per hour = 1.609 km/h
NP = not permitted

1. Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m) or 0.9 for a mean roof height of 60 feet (18.3 m). For greater mean roof heights, an approved design shall be required.
2. Foam plastic sheathing panels shall be permitted to be oriented parallel or perpendicular to framing members.
3. Foam plastic sheathing shall meet or exceed the following material standards: Expanded Polystyrene (EPS) – ASTM C578 (Type II, min.1.35 lb/ft^3 density), Polyisocyanurate – ASTM C1289 (Type 1, min.), and extruded polystyrene (XPS) – ASTM C578 (Type X, min. 1.30 lb/ft^3 density). Where a “faced” product is indicated, a facer shall be provided on both faces of the foam plastic sheathing. Where facing is not indicated in the table, faced and unfaced foam plastic sheathing shall be permitted. For all foam plastic sheathing products, approved manufacturer data shall be permitted in lieu of the table requirements.
4. Multiply tabulated maximum wind speed by 0.85 for wind exposure C or by 0.78 for wind exposure D.
5. Interior finish shall be minimum 1/2-inch (12.7 mm) thick gypsum wall board or an approved product with equivalent or greater out-of-plane bending strength and stiffness.

1405.18.2 Siding attachment over foam sheathing. Siding shall be attached over foam sheathing in accordance with Section 1405.18.2.1, Section 1405.18.2.2, or an approved design. In no case shall the siding material be used in a manner that exceeds its application limits.

Exception: Where the siding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.

1405.18.2.1 Direct siding attachment. Approved weather coverings installed directly over foam sheathing without separation by an air space shall comply with Table 1405.18.2.1 in regard to nail diameter, penetration, and nail spacing for the applicable foam sheathing thickness and wind speed condition. The siding fastener and siding installation shall otherwise comply with Chapter 14.

Exceptions:

1. For adhered masonry veneer, refer to Section 1405.10
2. For vinyl siding, refer to Section 1405.14.
3. For exterior insulation and finish systems, refer to Section 1408.

TABLE 1405.18.2.1
FASTENING REQUIREMENTS FOR DIRECT SIDING ATTACHMENT OVER FOAM PLASTIC SHEATHING[1,2]

Minimum Nail Diameter[3] (inches)	Nail Spacing along Stud[4] (inches)	Maximum Foam Sheathing Thickness[5] (inches)	16”oc WALL FRAMING Maximum Wind Speed (mph)			24”oc WALL FRAMING Maximum Wind Speed (mph)		
			Exposure B	Exposure C	Exposure D	Exposure B	Exposure C	Exposure D
0.113	6	2	140	120	110	120	100	90
	8	2	130	110	100	100	85	DR
	12	1	100	85	DR	85	DR	DR
0.120	6	3	140	120	110	120	100	90
	8	2	130	110	100	110	90	85
	12	1.5	110	90	85	90	DR	DR
0.135	6	3	140	120	110	130	110	100
	8	3	140	120	110	110	90	85
	12	2	110	90	85	90	DR	DR

For SI: 1 inch = 25.4 mm; 1 mph = 1.609 km/h
DR = design required

1. Maximum wind speed values are based on a minimum 1-1/4 inch (31.8 mm) penetration of a smooth shank nail fastener into wood framing of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS.

2. Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m) or 0.9 for a mean roof height of 60 feet (18.3 m). For greater mean roof heights, an approved design shall be required.
3. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths to provide a minimum 1-1/4 inch (31.8 mm) penetration into wood framing. Specified nails in accordance with Chapter 1405 or the siding manufacturer's approved installation instructions shall meet all other requirements in ASTM F1667 or be otherwise approved for the intended application.
4. 'Nail spacing along stud' refers to spacing of siding fasteners in the vertical direction. A minimum of one fastener shall be applied at each intersection of an individual siding member with a wall stud.
5. Maximum foam sheathing thickness values are based on a maximum 24-inch (0.6 m) stud spacing, a maximum siding dead load of 11 psf (0.53 kPa), and S_{DS} per Section 1613.5.4 not exceeding 0.83g. Siding dead load shall not exceed 8 psf (0.39 kPa) for and S_{DS} of 1.17g, 6 psf (0.29 kPa) for S_{DS} of 1.5g, or 3.0 psf (0.14 kPa) for S_{DS} of 3.0 g.

1405.18.2.2 Offset siding attachment. When an airspace separates the siding from direct contact with the foam plastic sheathing, the approved weather coverings shall be attached in accordance with Chapter 14 to minimum 1x3 wood furring strips placed over the foam sheathing. Furring shall be attached through the foam sheathing to wall framing in accordance with Table 1405.18.2.2. When placed horizontally, wood furring strips shall be preservative treated wood in accordance with Section 2303.1.8 or naturally durable wood and fasteners shall be corrosion resistant in accordance with Section 2304.9.5.

Exception: Furring strips shall not be required over foam plastic sheathing behind anchored stone and masonry veneer installed in accordance with Section 1405.6. Veneer ties shall be installed on the surface of the foam plastic sheathing with fasteners of sufficient length to pass through the thickness of foam plastic sheathing and penetrate framing to provide required pull-out resistance determined in accordance with Chapter 16.

TABLE 1405.18.2.2
FASTENING REQUIREMENTS FOR WOOD FURRING OVER FOAM PLASTIC SHEATHING[1,2,3]

Fastener Type	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring[4] (inches)	Maximum Thickness of Foam Sheathing[5] (inches)	16"oc FURRING Maximum Wind Speed (mph) Exposure B	Exposure C	Exposure D	24"oc FURRING Maximum Wind Speed (mph) Exposure B	Exposure C	Exposure D
0.120" diameter smooth shank nail	1-1/4	8	2	130	110	100	110	90	85
		12	1.5	110	90	85	90	DR	DR
		16	1	90	DR	DR	DR	DR	DR
0.135" diameter smooth shank nail	1-1/4	8	3	130	110	100	110	90	85
		12	2	110	90	85	90	DR	DR
		16	1.5	100	85	DR	DR	DR	DR
#8 wood screw	1	12	3	140	120	110	140	120	110
		16	2	140	120	110	140	120	110
¼" lag screw[6]	1-1/2	24	3	140	120	110	140	120	110

For SI: 1" = 25.4 mm; 1 mph = 1.609 km/h
DR = design required
1. Furring strips shall be spaced a maximum of 24"oc in a vertical or horizontal orientation. Table values are based on minimum ¾-inch (19.1 mm) thick furring strip and wood studs of Spruce-Pine-Fir or any softwood species with a specific gravity of 0.42 or greater per AFPA/NDS.
2. Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m) or 0.9 for a mean roof height of 60 feet (18.3 m). For greater mean roof heights, an approved design shall be required.
3. Where minimum required siding fastener penetration exceeds ¾ inch (19.1 mm), a minimum 2x furring strip shall be used unless approved deformed shank siding nails or siding screws are used to provide equivalent withdrawal strength.
4. In a vertical orientation, furring strips shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, furring strips shall be fastened at each stud intersection with a number of fasteners equivalent to the required fastener spacing. In no case shall fasteners be spaced more than 24 inches (0.6 m) apart.
5. Maximum foam sheathing thickness values are based on a maximum 24-inch (0.6 m) stud spacing, a maximum siding dead load of 11 psf (0.53 kPa), and S_{DS} per Section 1613.5.4 not exceeding 0.83g. Siding dead load shall not exceed 8 psf (0.39 kPa) for and S_{DS} of 1.17g, 6 psf (0.29 kPa) for S_{DS} of 1.5g, or 3.0 psf (0.14 kPa) for S_{DS} of 3.0 g.
6. Lag screws shall be installed with a standard cut washer and shall be pre-drilled in accordance with AF&PA NDS-05. Approved self-drilling screws of equal or greater shear and withdrawal strength shall be permitted without pre-drilling.

4. Revise as follows:

1405.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6 or foam plastic sheathing in accordance with Sections 1405.14.2 and 1405.18. Siding shall be applied to conform with the water-resistive barrier requirements in Section 1403. Siding and accessories shall be installed in accordance with approved manufacturer's instructions. Unless otherwise specified in the approved manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and 1/8-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 3/4 inch (19 mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

5. Add new text as follows:

1405.14.2 Foam Plastic Sheathing. Vinyl siding used with foam plastic sheathing shall be installed in accordance with 1405.14.2.1, 1405.14.2.2., and 1405.14.2.3.

Exception: Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing, or other approved backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with 1405.14.1.

1405.14.2.1 Basic Wind Speed Not Exceeding 90 mph and Exposure Category B. Where the basic wind speed does not exceed 90 mph, the Exposure Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 1-1/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, and fastened 16 inches on center. The foam plastic sheathing shall comply with Section 1405.18.1 and shall not exceed a maximum thickness of 1.5 inches (38 mm) for a 0.120-inch diameter nail or 2.0 inches (51 mm) for a 0.135-inch diameter nail. Vinyl siding shall be permitted to be installed on furring strips in accordance with Section 1405.18.2.2 and the siding manufacturer's installation instructions when foam plastic sheathing thickness complies with Section 1405.18.1.

1405.14.2.2 Basic Wind Speed Exceeding 90mph or Exposure Categories C and D. Where the basic wind speed exceeds 90 mph or the Exposure Category is C or D, or all conditions of 1405.14.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the wind loads required by Chapter 16. The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and minimum ½-inch (12.7 mm) thick gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.
2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.

   Exception: The above adjustments shall not apply when vinyl siding is attached to wood furring strips installed over the foam plastic sheathing in accordance with Section 1405.18.2.2 and such installation is in accordance with the vinyl siding manufacturer's installation instructions.

1405.14.2.3 Manufacturer Specification. Where the vinyl siding manufacturer's product specifications provide an approved design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.

6. Revise as follows:

2304.6 Wall sheathing. Except as provided for in Section 1405 for weatherboarding or where stucco construction that complies with Section 2510 is installed, enclosed buildings shall be sheathed with one of the materials of the nominal thickness specified in Table 2304.6, foam sheathing in accordance with Section 1405.18, or any other approved material of equivalent strength and durability.

Reason:

Part I-As with a related IRC proposal, this proposal is a comprehensive clarification and upgrading of requirements for foam plastic sheathing and siding installation over foam plastic sheathing. It primarily addresses adequate foam sheathing thickness and siding attachment over foam sheathing to resist a range of design wind load conditions, beyond which design is required or installation in accordance with manufacturer instructions specific to application of siding over foam sheathing. It also provides siding connections through foam sheathing that provide adequate support to resist the dead load of siding installed over foam sheathing and limits the siding weight, particularly in higher seismic conditions (beyond which design is required or approved installation guidelines). As a whole, these provisions are necessary to ensure appropriate use of foam sheathing and siding materials together on exterior wall assemblies in a way that best compliments existing exterior wall covering provisions in Chapter 14. A detailed explanation of the test data and analysis justifying the proposed requirements can be found at www.foamsheathing.org.

In support of proposed new Section 1405.18.1, the wind pressure resistance of foam sheathing used in this proposal is based on certified full-scale (4'x8' panel) testing conducted at the NAHB Research Center, Inc. Samples included specimens from various manufacturers representing the industry at large. The design wind speed data (without rounding or capping values) is shown in the table below for informational purposes. The values in the proposed table have been rounded to the nearest 5 mph increment and capped at 130 mph (Exposure B) which corresponds to a maximum wind speed of 110 mph in exposure C or 100 mph Exposure D. This proposal is needed to avoid potential exclusion of foam sheathing products due to the incompleteness of current code requirements which can negatively affect other concerns such as energy conservation code requirements and green building interests. Most importantly, these requirements will ensure that foam sheathing is used appropriately to prevent building envelope damage, particularly in higher wind conditions and with thinner material used on more widely spaced studs (e.g., 24"oc center on gable roof ends which typically have no interior finish). These requirements also agree reasonably well with the generally successful use of foam sheathing on typical wall assemblies (e.g., 16"oc framing or 24"oc framing with interior finish) on many buildings in lower wind regions of the U.S.

TABLE R703.3.1- Part A (Actual design values based on test data – not rounded or capped as in the proposal)
MAXIMUM WIND SPEED (mph – 3 SECOND GUST) PERMITTED
FOR FOAM PLASTIC SHEATHING
WITH DIRECTLY ATTACHED SIDING PER SECTION R703.3.2.1

Foam Sheathing Material[3]	Foam Sheathing Nominal Thickness (in)	Maximum Wind Speed (mph) – Exposure B[4]			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16"oc framing	24"oc framing	16"oc framing	24"oc framing
EPS	¾" (unfaced) 1" (unfaced) 1-1/2" (unfaced)	110 147 222	73 98 148	92 123 186	61 82 124
Polyiso-cyanurate	½" (faced) ¾" (faced) 1" (faced) 1-1/2" (faced)	136 177 193 207	91 118 129 138	114 148 162 173	76 99 108 116
XPS	½" (faced) ¾" (unfaced) 1" (unfaced) 1-1/2" (unfaced)	125 109 145 208	84 73 97 139	105 91 121 174	70 61 81 116

Design value based on the minimum tested uniform pressure capacity for each sheathing type and thickness category divided by a safety factor of 1.5 and ASCE 7-05 positive pressure design loads for wall corner zone and a 10 sq ft wind effective area (negative pressure is resisted by the foam sheathing and siding assembly). Because the 1.5 safety factor is applied to a minimum test value (not the average), these requirements are more stringent than safety margins required for other building envelop components such as doors and windows which are also important to envelope integrity. This "minimum test value" basis also serves to better control safety margins with regard to variability in material properties or performance.

TABLE R703.3.1 – Part B (Actual design values based on test data – not rounded or capped as in the proposal)
MAXIMUM WIND SPEED (mph – 3 SECOND GUST) PERMITTED
FOR FOAM PLASTIC SHEATHING
WITH FURRED SIDING PER SECTION R703.3.2.2[1]

Foam Plastic Sheathing Material[2]	Foam Sheathing Nominal Thickness (in)[2]	Maximum Wind Speed (mph) – Exposure B[3,4]			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16"oc framing	24"oc framing	16"oc framing	24"oc framing
EPS	¾" 1" ≥1-1/2"	95 127 192	63 85 128	80 106 161	53 71 107
Polyiso-cyanurate	½" (faced) ¾" (faced) 1" (faced) ≥1-1/2" (faced)	118 153 167 179	78 102 112 120	98 128 140 150	66 85 93 100
XPS	½" (faced) ¾" 1" ≥1-1/2"	108 94 126 180	72 63 84 120	91 79 105 151	61 53 70 101

Design value based on the minimum tested uniform pressure capacity for each sheathing type and thickness category divided by a safety factor of 1.5 and ASCE 7-05 negative pressure design loads for wall corner zone and a 10 sq ft wind effective area. Because the siding is spaced away from foam sheathing in this wall covering assembly condition, it does not contribute to foam sheathing resistance. Thus, the foam sheathing must independently resist the negative wind pressure load. The furring strips provide adequate bearing at connection to secure the foam sheathing as well as the siding material.

In support of proposed new Section 1405.18.2, the generalized connection requirements for siding over foam sheathing are based on an analysis using the AF&PA NDS-2005 connection design provisions in consideration of withdrawal to resist wind pressure and shear strength to resist siding dead load. To account for the "gap" in the connection caused by the presence of foam sheathing, the provisions of AF&PA TR12 were used to downgrade connection strength based on the thickness of foam sheathing (i.e., width of gap in the connection). The design shear strength was based on calculated ultimate capacity divided by a safety factor of 2 while conservatively ignoring any benefit of the foam material filling the gap in the siding or furring connection to wall framing. Wind loads were based on application of the full ASCE 7-05 components and cladding wind pressure applied to the exterior wall covering while conservatively ignoring any distribution of wind pressure to other wall layers. In addition, the wind pressures were based on the most stringent wall corner zone condition and an effective wind area of 10 sq ft.

Addition of new Section 1405.14.2 provides special requirements and limitations for use of foam plastic sheathing with vinyl siding. The proposed changes are consistent approved changes now included in the 2009 IRC. These changes are needed to ensure appropriate use of vinyl siding wind pressure ratings when foam sheathing is used, thus preventing inadequate performance.

Limited changes to other parts of the code are made in coordination with the above improvements.

Part II- As with a related IBC proposal, this proposal is a comprehensive clarification and upgrading of requirements for foam sheathing and siding installation over foam sheathing. It primarily addresses adequate foam sheathing thickness and siding attachment over foam sheathing to resist design wind loads within the scope of the IRC (e.g., up to 110 mph, Exposure D). It also provides siding connections through foam sheathing that provide adequate support to resist the dead load of siding installed over foam sheathing. As a whole, these provisions are necessary to ensure appropriate use of foam sheathing and siding materials together on exterior wall assemblies in a way that best compliments existing exterior wall covering provisions in Section R703 of the code. A detailed explanation of the test data and analysis justifying the proposed requirements can be found at www.foamsheathing.org.

In support of proposed new Section R703.3.1, the wind pressure resistance of foam sheathing used in this proposal is based on certified full-scale (4'x8' panel) testing conducted at the NAHB Research Center, Inc. Samples included specimens from various manufacturers representing the industry at large. The design wind speed data (without rounding or capping values) is shown in the table below for informational purposes. The values in the proposed table have been rounded to the nearest 5 mph increment and capped at 130 mph (Exposure B) as this corresponds to a maximum wind speed of 110 mph in exposure C, which is essentially the scope limit of the IRC. This proposal is needed to avoid potential exclusion of foam sheathing products due to the incompleteness of current code requirements which can negatively affect other concerns such as energy conservation code requirements and green building interests. Most importantly, these requirements will ensure that foam sheathing is used appropriately to prevent building envelope damage, particularly in higher wind conditions and with thinner material used on more widely spaced studs (e.g., 24"oc center on gable roof ends which typically have no interior finish). These requirements also agree reasonably well with the generally successful use of foam sheathing on typical wall assemblies (e.g., 16"oc framing or 24"oc framing with interior finish) on many homes in lower wind regions of the U.S.

TABLE R703.3.1- Part A (Actual design values based on test data – not rounded or capped as in the proposal)
MAXIMUM WIND SPEED (mph – 3 SECOND GUST) PERMITTED
FOR FOAM PLASTIC SHEATHING
WITH DIRECTLY ATTACHED SIDING PER SECTION R703.3.2.1

Foam Sheathing Material[3]	Foam Sheathing Nominal Thickness (in)	Maximum Wind Speed (mph) – Exposure B[4]			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16"oc framing	24"oc framing	16"oc framing	24"oc framing
EPS	¾" (unfaced) 1" (unfaced) 1-1/2" (unfaced)	110 147 222	73 98 148	92 123 186	61 82 124
Polyiso-cyanurate	½" (faced) ¾" (faced) 1" (faced) 1-1/2" (faced)	136 177 193 207	91 118 129 138	114 148 162 173	76 99 108 116
XPS	½" (faced) ¾" (unfaced) 1" (unfaced) 1-1/2" (unfaced)	125 109 145 208	84 73 97 139	105 91 121 174	70 61 81 116

Design value based on the minimum tested uniform pressure capacity for each sheathing type and thickness category divided by a safety factor of 1.5 and ASCE 7-05 positive pressure design loads for wall corner zone and a 10 sqft wind effective area (negative pressure is resisted by the foam sheathing and siding assembly). Because the 1.5 safety factor is applied to a minimum test value (not the average), these requirements are more stringent than safety margins required for other building envelop components such as doors and windows which are also important to envelope integrity. This "minimum test value" basis also serves to better control safety margins with regard to variability in material properties or performance.

TABLE R703.3.1 – Part B (Actual design values based on test data – not rounded or capped as in the proposal)
MAXIMUM WIND SPEED (mph – 3 SECOND GUST) PERMITTED
FOR FOAM PLASTIC SHEATHING
WITH FURRED SIDING PER SECTION R703.3.2.2[1]

Foam Plastic Sheathing Material[2]	Foam Sheathing Nominal Thickness (in)[2]	Maximum Wind Speed (mph) – Exposure B[3,4]			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16"oc framing	24"oc framing	16"oc framing	24"oc framing
EPS	¾" 1" ≥1-1/2"	95 127 192	63 85 128	80 106 161	53 71 107
Polyiso-cyanurate	½" (faced) ¾" (faced) 1" (faced) ≥1-1/2" (faced)	118 153 167 179	78 102 112 120	98 128 140 150	66 85 93 100
XPS	½" (faced) ¾" 1" ≥1-1/2"	108 94 126 180	72 63 84 120	91 79 105 151	61 53 70 101

Design value based on the minimum tested uniform pressure capacity for each sheathing type and thickness category divided by a safety factor of 1.5 and ASCE 7-05 negative pressure design loads for wall corner zone and a 10 sqft wind effective area. Because the siding is spaced away from foam sheathing in this wall covering assembly condition, it does not contribute to foam sheathing resistance. Thus, the foam sheathing must independently resist the negative wind pressure load. The furring strips provide adequate bearing at connection to secure the foam sheathing as well as the siding material.

In support of proposed new Section R703.3.2, the generalized connection requirements for siding over foam sheathing are based on an analysis using the AF&PA NDS-2005 connection design provisions in consideration of withdrawal to resist wind pressure and shear strength to resist siding dead load. To account for the "gap" in the connection caused by the presence of foam sheathing, the provisions of AF&PA TR12 were used to downgrade connection strength based on the thickness of foam sheathing (i.e., width of gap in the connection). The design shear strength was based on calculated ultimate capacity divided by a safety factor of 2 while conservatively ignoring any benefit of the foam material filling the gap in the siding or furring connection to wall framing. Wind loads were based on application of the full ASCE 7-05 components and cladding wind pressure applied to the exterior wall covering while conservatively ignoring any distribution of wind pressure to other wall layers. In addition, the wind pressures were based on the most stringent wall corner zone condition and an effective wind area of 10 sqft.

Changes to other parts of Section R703, including changes to Table R703.4 and various siding attachment requirements, are made in coordination with the above improvements.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: ASTM standards within this proposed are currently referenced in the I-codes.

Public Hearing Results

PART I- IBC FIRE SAFETY
Committee Action: Disapproved

Committee Reason: The proponent requested disapproval at this time so that the proposal requirements for foam plastic sheathing can be better coordinated with the energy code. This includes the treatment of positive and negative wind pressures, performance of the lateral force system as well as fastener requirements.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jay H. Crandell, PE, ARES Consulting, representing Foam Sheathing Coalition; Mark Nowak, representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1404.12 Foam plastic sheathing. Foam plastic sheathing shall comply with requirements for foam plastic insulation in Section 2603. When used as a water-resistive barrier, the foam plastic sheathing material and installation shall be approved in accordance with Section 1404.2. When used in exterior wall covering assemblies in accordance with Table 1405.18.1 of Section 1405.18.1, foam sheathing shall be identified by the trademarks of an *approved* testing and inspection agency in accordance with Section 1703 and 2603.2 indicating compliance with the wind pressure resistance requirements of Table 1405.18.1 where not already addressed in the applicable material standards.

1405.18 Foam plastic sheathing. Foam plastic sheathing used in exterior wall covering assemblies shall comply with this section, Section 2603, Chapter 13, and the foam sheathing manufacturer's approved installation instructions. Wall assemblies with foam plastic sheathing that are intended to serve as part of the lateral force resisting system of a structure shall be braced with approved materials designed to resist the in-plane shear force determined in accordance with Chapter 16. Wall assemblies with foam plastic sheathing attached to gravity load supporting members that require buckling restraint shall have such restraint provided by other approved materials. The use of foam plastic sheathing in accordance with this section shall not be permitted where the basic wind speed exceeds 110 mph.

~~**1405.18.1 Minimum thickness.** The thickness of foam plastic sheathing shall comply with Table 1405.18.1.~~

Exceptions:

1. Where foam plastic sheathing is covered with ~~applied directly over or behind~~ wall sheathing or other solid material ~~substrate~~ capable of separately resisting the required wind pressure, the limitations of Section 1405.18.1 and the basic wind speed limit of 110 mph ~~Table 1405.18.1~~ shall not apply.
2. Where foam plastic sheathing is covered with cladding and applied directly over wall sheathing or other solid material, all capable of separately resisting the full design wind pressure, the limitations of Section 1405.18.1 and the basic wind speed limit of 110 mph shall not apply.

1405.18.1 Minimum thickness. The thickness of foam plastic sheathing shall comply with Table 1405.18.1. The components and cladding design wind pressure determined in accordance with Section 1609 shall not exceed the allowable wind pressure value in accordance with Table 1405.18.1.

~~**TABLE 1405.18.1**~~
~~**REQUIREMENTS FOR FOAM PLASTIC SHEATHING**~~
~~**IN EXTERIOR WALL COVERING ASSEMBLIES[1,2]**~~

~~Foam Plastic Sheathing Material[3]~~	~~Foam Sheathing Thickness (in)[3]~~	~~Maximum Wind Speed (mph) – Exposure B[4]~~			
		~~Walls with Interior Finish[5]~~		~~Walls without Interior Finish~~	
		~~16"oc framing~~	~~24"oc framing~~	~~16"oc framing~~	~~24"oc framing~~
~~Siding Attached Directly Over Foam Plastic Sheathing per Section 1405.18.2.1~~					
~~EPS~~	~~¾"~~	~~110~~	~~NP~~	~~90~~	~~NP~~
	~~1"~~	~~130~~	~~100~~	~~125~~	~~NP~~
	~~≥1-1/2"~~	~~130~~	~~130~~	~~130~~	~~125~~
~~Polyiso-cyanurate~~	~~½" (faced)~~	~~130~~	~~90~~	~~115~~	~~NP~~
	~~¾" (faced)~~	~~130~~	~~120~~	~~130~~	~~100~~
	~~1" (faced)~~	~~130~~	~~130~~	~~130~~	~~110~~
	~~≥1-1/2" (faced)~~	~~130~~	~~130~~	~~130~~	~~115~~
~~XPS~~	~~½" (faced)~~	~~125~~	~~85~~	~~105~~	~~NP~~
	~~¾"~~	~~110~~	~~NP~~	~~90~~	~~NP~~
	~~1"~~	~~130~~	~~95~~	~~120~~	~~NP~~
	~~≥1-1/2"~~	~~130~~	~~130~~	~~130~~	~~115~~
~~Siding Offset from Foam Sheathing per Section 1405.18.2.2~~					
~~EPS~~	~~¾"~~	~~95~~	~~NP~~	~~NP~~	~~NP~~

	~~1”~~ ~~≥1-1/2”~~	~~125~~ ~~130~~	~~85~~ ~~130~~	~~105~~ ~~130~~	~~NP~~ ~~105~~
~~Polyiso-cyanurate~~	~~½” (faced)~~ ~~¾” (faced)~~ ~~1” (faced)~~ ~~≥1-1/2” (faced)~~	~~120~~ ~~130~~ ~~130~~ ~~130~~	~~NP~~ ~~100~~ ~~110~~ ~~120~~	~~100~~ ~~130~~ ~~130~~ ~~130~~	~~NP~~ ~~85~~ ~~95~~ ~~100~~
~~XPS~~	~~½” (faced)~~ ~~¾”~~ ~~1”~~ ~~≥1-1/2”~~	~~110~~ ~~95~~ ~~125~~ ~~130~~	~~NP~~ ~~NP~~ ~~85~~ ~~120~~	~~90~~ ~~NP~~ ~~105~~ ~~130~~	~~NP~~ ~~NP~~ ~~NP~~ ~~100~~

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 1.609 km/h~~
~~NP = not permitted~~

1. ~~Tabulated maximum wind speed values are based on a mean roof height of 30 feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m) or 0.9 for a mean roof height of 60 feet (18.3 m). For greater mean roof heights, an approved design shall be required.~~
2. ~~Foam plastic sheathing panels shall be permitted to be oriented parallel or perpendicular to framing members.~~
3. ~~Foam plastic sheathing shall meet or exceed the following material standards: Expanded Polystyrene (EPS) – ASTM C578 (Type II, min.1.35 lb/ft^3 density), Polyisocyanurate – ASTM C1289 (Type 1, min.), and extruded polystyrene (XPS) – ASTM C578 (Type X, min. 1.30 lb/ft^3 density). Where a “faced” product is indicated, a facer shall be provided on both faces of the foam plastic sheathing. Where facing is not indicated in the table, faced and unfaced foam plastic sheathing shall be permitted. For all foam plastic sheathing products, approved manufacturer data shall be permitted in lieu of the table requirements.~~
4. ~~Multiply tabulated maximum wind speed by 0.85 for wind exposure C or by 0.78 for wind exposure D.~~
5. ~~Interior finish shall be minimum 1/2-inch (12.7 mm) thick gypsum wall board or an approved product with equivalent or greater out-of-plane bending strength and stiffness.~~

TABLE 1405.18.1
ALLOWABLE WIND PRESSURE VALUE (PSF) FOR FOAM PLASTIC SHEATHING IN EXTERIOR WALL COVERING ASSEMBLIES[1]

Foam Plastic Sheathing Material[2]	Foam Sheathing Thickness (in)	Allowable (ASD) Components and Cladding Design Wind Pressure (psf) (basic wind speed not to exceed 110 mph per Section 1405.18)			
		Walls with Interior Finish[3]		Walls without Interior Finish	
		16”oc framing	24”oc framing	16”oc framing	24”oc framing
EPS	¾” 1” ≥1-1/2”	21.8 38.8 89.0	NP 19.4 39.5	15.3 27.2 62.3	NP 13.6 27.7
Polyiso-cyanurate	½” (faced) ¾” (faced) 1” (faced) ≥1-1/2” (faced)	33.3 56.4 67.5 77.4	14.8 25.1 30.0 34.4	23.3 39.5 47.2 54.1	10.4 17.6 21.0 24.1
XPS	½” (faced) ¾” 1” ≥1-1/2”	28.3 21.4 38.0 78.2	12.6 NP 29.0 34.7	19.8 15.0 26.6 54.7	NP NP 20.3 24.3

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa.
NP = not permitted (allowable design wind pressure less than 10 psf)

1. Foam plastic sheathing panels shall be permitted to be oriented parallel or perpendicular to framing members.
2. Foam plastic sheathing shall meet or exceed the following material standards: Expanded Polystyrene (EPS) – ASTM C578 (Type II, min.1.35 lb/ft^3 density), Polyisocyanurate – ASTM C1289 (Type 1, min.), and extruded polystyrene (XPS) – ASTM C578 (Type X, min. 1.30 lb/ft^3 density). Where a “faced” product is indicated, a facer shall be provided on both faces of the foam plastic sheathing. Where facing is not indicated in the table, faced and unfaced foam plastic sheathing shall be permitted. For all foam plastic sheathing products, approved manufacturer data shall be permitted in lieu of the table requirements.
3. Interior finish shall be minimum 1/2-inch (12.7 mm) thick gypsum wall board or an approved product with equivalent or greater out-of-plane bending strength and stiffness.

1405.18.2 Siding attachment over foam sheathing. Siding shall be attached over foam sheathing in accordance with Section 1405.18.2.1, Section 1405.18.2.2, or an approved design. In no case shall the siding material be used in a manner that exceeds its application limits. When required by the basic wind speed and wind exposure applicability of Section 1706, wall cladding installation over foam sheathing shall be subject to special inspection in accordance with Section 1706.4.

Exception: Where the siding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.

1405.18.2.1 Direct siding attachment. Approved weather coverings installed directly over foam sheathing without separation by an air space shall comply with Table 1405.18.2.1 in regard to minimum fastening requirements ~~nail diameter, penetration, and nail spacing~~ and maximum foam sheathing thickness limitations to support siding dead load ~~for the applicable foam sheathing thickness and wind speed condition~~. The siding fastener and siding installation shall otherwise comply with Chapter 14, shall be capable of resisting all other applicable design loads determined in accordance with Chapter 16, and in no case shall result in a less stringent fastening requirement than required by Chapter 14 or the manufacturer’s installation instructions for the specific siding material used.

Exception~~s~~:

~~1.~~ ~~For adhered masonry veneer, refer to Section 1405.10.~~
~~2.~~ ~~For vinyl siding, refer to Section 1405.14.~~
~~3.~~ For exterior insulation and finish systems, refer to Section 1408.

~~**TABLE 1405.18.2.1**~~
~~**FASTENING REQUIREMENTS FOR DIRECT SIDING**~~
~~**ATTACHMENT OVER FOAM PLASTIC SHEATHING[1,2]**~~

~~Minimum Nail Diameter[3] (inches)~~	~~Nail Spacing along Stud[4] (inches)~~	~~Maximum Foam Sheathing Thickness[5] (inches)~~	~~16"oc WALL FRAMING Maximum Wind Speed (mph)~~			~~24"oc WALL FRAMING Maximum Wind Speed (mph)~~		
			~~Exposure B~~	~~Exposure C~~	~~Exposure D~~	~~Exposure B~~	~~Exposure C~~	~~Exposure D~~
~~0.113~~	~~6~~	~~2~~	~~140~~	~~120~~	~~110~~	~~120~~	~~100~~	~~90~~
	~~8~~	~~2~~	~~130~~	~~110~~	~~100~~	~~100~~	~~85~~	~~DR~~
	~~12~~	~~1~~	~~100~~	~~85~~	~~DR~~	~~85~~	~~DR~~	~~DR~~
~~0.120~~	~~6~~	~~3~~	~~140~~	~~120~~	~~110~~	~~120~~	~~100~~	~~90~~
	~~8~~	~~2~~	~~130~~	~~110~~	~~100~~	~~110~~	~~90~~	~~85~~
	~~12~~	~~1.5~~	~~110~~	~~90~~	~~85~~	~~90~~	~~DR~~	~~DR~~
~~0.135~~	~~6~~	~~3~~	~~140~~	~~120~~	~~110~~	~~130~~	~~110~~	~~100~~
	~~8~~	~~3~~	~~140~~	~~120~~	~~110~~	~~110~~	~~90~~	~~85~~
	~~12~~	~~2~~	~~110~~	~~90~~	~~85~~	~~90~~	~~DR~~	~~DR~~

~~For SI: 1 inch = 25.4 mm; 1 mph = 1.609 km/h~~
~~DR = design required~~

1. ~~Maximum wind speed values are based on a minimum 1-1/4 inch (31.8 mm) penetration of a smooth shank nail fastener into wood framing of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS.~~
2. ~~Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m) or 0.9 for a mean roof height of 60 feet (18.3 m). For greater mean roof heights, an approved design shall be required.~~
3. ~~Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths to provide a minimum 1-1/4 inch (31.8 mm) penetration into wood framing. Specified nails in accordance with Chapter 1405 or the siding manufacturer's approved installation instructions shall meet all other requirements in ASTM F1667 or be otherwise approved for the intended application.~~
4. ~~'Nail spacing along stud' refers to spacing of siding fasteners in the vertical direction. A minimum of one fastener shall be applied at each intersection of an individual siding member with a wall stud.~~
5. ~~Maximum foam sheathing thickness values are based on a maximum 24-inch (0.6 m) stud spacing, a maximum siding dead load of 11 psf (0.53 kPa), and S_{DS} per Section 1613.5.4 not exceeding 0.83g. Siding dead load shall not exceed 8 psf (0.39 kPa) for and S_{DS} of 1.17g, 6 psf (0.29 kPa) for S_{DS} of 1.5g, or 3.0 psf (0.14 kPa) for S_{DS} of 3.0 g.~~

TABLE 1405.18.2.1
SIDING MINIMUM FASTENING REQUIREMENTS
FOR DIRECT SIDING ATTACHMENT OVER FOAM PLASTIC SHEATHING
TO SUPPORT SIDING DEAD LOAD[1]

Siding Fastener Through Foam Sheathing into:	Siding Fastener -Type and Minimum Size[2]	Siding Fastener Vertical Spacing (inches)	Maximum Foam Sheathing Thickness (inches) 16"oc Fastener Horizontal Spacing Siding Weight:			Maximum Foam Sheathing Thickness (inches) 24"oc Fastener Horizontal Spacing Siding Weight:		
			3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Wood Framing (minimum 1-1/4 inch penetration)	0.113" diameter nail	6	4	3	1	4	2	0.75
		8	4	2	0.75	4	1.5	DR
		12	4	1.5	DR	3	0.75	DR
	0.120" diameter nail	6	4	3	1.5	4	2	0.75
		8	4	2	1	4	1.5	0.5
		12	4	1.5	0.5	3	1	DR
	0.131" diameter nail	6	4	4	1.5	4	3	1
		8	4	3	1	4	2	0.75
		12	4	2	0.75	4	1	DR
Steel Framing (minimum penetration of steel thickness + 3 threads)	#8 screw into 33 mil steel or thicker	6	3	3	1.5	3	2	DR
		8	3	2	0.5	3	1.5	DR
		12	3	1.5	DR	3	0.75	DR
	#10 screw into 33 mil steel	6	4	3	2	4	3	0.5
		8	4	3	1	4	2	DR
		12	4	2	DR	3	1	DR
	#10 screw into 43 mil steel or thicker	6	4	4	3	4	4	2
		8	4	4	2	4	3	1.5
		12	4	3	1.5	4	3	DR

For SI: 1 inch = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa
DR = design required

1. Tabulated requirements are based on wood framing of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS and minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
2. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Self-drilling tapping screw fasteners for connection of siding to steel framing shall comply with the requirements of AISI S200. Specified fasteners in accordance with Chapter 1405 or the siding manufacturer's approved installation instructions shall meet all other requirements in ASTM F1667, AISI S200 or be otherwise approved for the intended application.

1405.18.2.2 Offset siding attachment. When an airspace separates the siding from direct contact with the foam plastic sheathing, the approved weather coverings shall be attached in accordance with Chapter 14 to minimum 1x3 wood or minimum 33 mil steel hat channel furring ~~strips~~ placed over the foam sheathing. Furring shall be attached through the foam sheathing to wall framing in accordance with Table 1405.18.2.2 in regard to minimum fastening requirements and maximum foam sheathing thickness limitations to support siding dead load. Furring and connections shall be separately designed to resist all other applicable loads determined in accordance with Chapter 16. When placed horizontally, wood furring ~~strips~~ shall be preservative treated wood in accordance with Section 2303.1.8 or naturally durable wood and fasteners shall be corrosion resistant in accordance with Section 2304.9.5. Steel hat channel furring shall have a minimum G60 galvanized coating.

> **Exception:** Furring ~~strips~~ shall not be required over foam plastic sheathing behind anchored stone and masonry veneer installed in accordance with Section 1405.6. Veneer ties shall be installed on the surface of the foam plastic sheathing with fasteners of sufficient length to pass through the thickness of foam plastic sheathing and penetrate framing to provide required pull-out resistance determined in accordance with Chapter 16.

~~TABLE 1405.18.2.2~~
~~FASTENING REQUIREMENTS FOR WOOD FURRING~~
~~OVER FOAM PLASTIC SHEATHING[1,2,3]~~

~~Fastener Type~~	~~Minimum Penetration into Wall Framing (inches)~~	~~Fastener Spacing in Furring[4] (inches)~~	~~Maximum Thickness of Foam Sheathing[5] (inches)~~	~~16"oc FURRING~~ ~~Maximum Wind Speed (mph)~~			~~24"oc FURRING~~ ~~Maximum Wind Speed (mph)~~		
				~~Exposure B~~	~~Exposure C~~	~~Exposure D~~	~~Exposure B~~	~~Exposure C~~	~~Exposure D~~
~~0.120" diameter smooth shank nail~~	~~1-1/4~~	~~8~~	~~2~~	~~130~~	~~110~~	~~100~~	~~110~~	~~90~~	~~85~~
		~~12~~	~~1.5~~	~~110~~	~~90~~	~~85~~	~~90~~	~~DR~~	~~DR~~
		~~16~~	~~1~~	~~90~~	~~DR~~	~~DR~~	~~DR~~	~~DR~~	~~DR~~
~~0.135" diameter smooth shank nail~~	~~1-1/4~~	~~8~~	~~3~~	~~130~~	~~110~~	~~100~~	~~110~~	~~90~~	~~85~~
		~~12~~	~~2~~	~~110~~	~~90~~	~~85~~	~~90~~	~~DR~~	~~DR~~
		~~16~~	~~1.5~~	~~100~~	~~85~~	~~DR~~	~~DR~~	~~DR~~	~~DR~~
~~#8 wood screw~~	~~1~~	~~12~~	~~3~~	~~140~~	~~120~~	~~110~~	~~140~~	~~120~~	~~110~~
		~~16~~	~~2~~	~~140~~	~~120~~	~~110~~	~~140~~	~~120~~	~~110~~
~~¼" lag screw[6]~~	~~1-1/2~~	~~24~~	~~3~~	~~140~~	~~120~~	~~110~~	~~140~~	~~120~~	~~110~~

~~For SI: 1" = 25.4 mm; 1 mph = 1.609 km/h~~
~~DR = design required~~

1. ~~Furring strips shall be spaced a maximum of 24"oc in a vertical or horizontal orientation. Table values are based on minimum ¾-inch (19.1 mm) thick furring strip and wood studs of Spruce-Pine-Fir or any softwood species with a specific gravity of 0.42 or greater per AFPA/NDS.~~
2. ~~Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m) or 0.9 for a mean roof height of 60 feet (18.3 m). For greater mean roof heights, an approved design shall be required.~~
3. ~~Where minimum required siding fastener penetration exceeds ¾ inch (19.1 mm), a minimum 2x furring strip shall be used unless approved deformed shank siding nails or siding screws are used to provide equivalent withdrawal strength.~~
4. ~~In a vertical orientation, furring strips shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, furring strips shall be fastened at each stud intersection with a number of fasteners equivalent to the required fastener spacing. In no case shall fasteners be spaced more than 24 inches (0.6 m) apart.~~
5. ~~Maximum foam sheathing thickness values are based on a maximum 24-inch (0.6 m) stud spacing, a maximum siding dead load of 11 psf (0.53 kPa), and S_{DS} per Section 1613.5.4 not exceeding 0.83g. Siding dead load shall not exceed 8 psf (0.39 kPa) for and S_{DS} of 1.17g, 6 psf (0.29 kPa) for S_{DS} of 1.5g, or 3.0 psf (0.14 kPa) for S_{DS} of 3.0 g.~~
6. ~~Lag screws shall be installed with a standard cut washer and shall be pre-drilled in accordance with AF&PA NDS-05. Approved self-drilling screws of equal or greater shear and withdrawal strength shall be permitted without pre-drilling.~~

TABLE 1405.18.2.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION
OVER FOAM PLASTIC SHEATHING TO SUPPORT SIDING DEAD LOAD[1,2]

Furring Material	Framing Member	Fastener Type and Minimum Size	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing (inches) 16"oc FURRING[4] Siding Weight:			Maximum Thickness of Foam Sheathing (inches) 24"oc FURRING[4] Siding Weight:		
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Minimum 1x Wood Furring[3]	Minimum 2x Wood Stud	0.120" diameter nail	1-1/4	8	4	4	1.5	4	2	1
				12	4	2	1	4	1.5	0.5
				16	4	2	0.5	4	1	DR
		0.131" diameter nail	1-1/4	8	4	4	2	4	3	1
				12	4	3	1	4	2	0.75
				16	4	2	0.75	4	1.5	DR
		#8 wood screw[5]	1	12	4	4	1.5	4	3	1
				16	4	3	1	4	2	0.5
				24	4	2	0.5	4	1	DR
		¼" lag screw[5]	1-1/2	12	4	4	3	4	4	1.5
				16	4	4	2	4	3	1
				24	4	3	1	4	2	0.5
Minimum 33mil Steel Hat Channel or Minimum 1x Wood Furring[3]	33 mil Steel Stud	#8 screw	Steel thickness + 3 threads	12	3	1.5	DR	3	0.5	DR
				16	3	1	DR	2	DR	DR
				24	2	DR	DR	2	DR	DR
		#10 screw	Steel	12	4	2	DR	4	1	DR

Furring Material	Framing Member	Fastener Type and Minimum Size	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing (inches)					
					16"oc FURRING[4]			24"oc FURRING[4]		
					Siding Weight:			Siding Weight:		
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
			thickness + 3 threads	16	4	1.5	DR	3	DR	DR
				24	3	DR	DR	2	DR	DR
	43 mil or thicker Steel Stud	#8 Screw	Steel thickness + 3 threads	12	3	1.5	DR	3	0.5	DR
				16	3	1	DR	2	DR	DR
				24	2	DR	DR	2	DR	DR
		#10 screw	Steel thickness + 3 threads	12	4	3	1.5	4	3	DR
				16	4	3	0.5	4	2	DR
				24	4	2	DR	4	0.5	DR

For SI: 1" = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa.
DR = design required

1. Table values are based on: (1) minimum ¾-inch (19.1 mm) thick wood furring and wood studs of Spruce-Pine-Fir or any softwood species with a specific gravity of 0.42 or greater per AFPA/NDS, (2) minimum 33 mil steel hat channel furring of 33 ksi steel, and (3) steel framing of indicated nominal steel thickness and minimum 33 ksi steel for 33mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
2. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Self-drilling tapping screw fasteners for connection of siding to steel framing shall comply with the requirements of AISI S200. Specified fasteners in accordance with Chapter 1405 or the siding manufacturer's approved installation instructions shall meet all other requirements in ASTM F1667 or AISI S200 or be otherwise approved for the intended application.
3. Where the required siding fastener penetration into wood material exceeds ¾ inch (19.1 mm) and is not more than 1-1/2 inches (38.1 mm), a minimum 2x wood furring shall be used unless approved deformed shank siding nails or siding screws are used to provide equivalent withdrawal strength allowing connection to 1x wood furring.
4. Furring shall be spaced a maximum of 24"oc in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, furring strips shall be fastened at each stud intersection with a number of fasteners equivalent to the required fastener spacing. In no case shall fasteners be spaced more than 24 inches (0.6 m) apart.
5. Lag screws shall be installed with a standard cut washer. Lag screws and wood screws shall be pre-drilled in accordance with AF&PA/NDS. Approved self-drilling screws of equal or greater shear and withdrawal strength shall be permitted without pre-drilling.

1405.14.2 Foam Plastic Sheathing. Vinyl siding used with foam plastic sheathing shall be installed in accordance with 1405.14.2.1, 1405.14.2.2 and 1405.14.2.3.

Exception: Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing, or other approved backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with 1405.14.1.

1405.14.2.1 Basic Wind Speed Not Exceeding 90 mph and Exposure Category B. Where the building mean roof height does not exceed 30 feet (9.1 m), the basic wind speed does not exceed 90 mph, the Exposure Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 1-1/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, and fastened 16 inches on center. The foam plastic sheathing shall comply with Section 1405.18.1 and shall not exceed a maximum thickness of 1.5 inches (38 mm) for a 0.120-inch diameter nail or 2.0 inches (51 mm) for a 0.135-inch diameter nail. Vinyl siding shall be permitted to be installed on furring strips in accordance with Section 1405.18.2.2 and the siding manufacturer's installation instructions when foam plastic sheathing thickness complies with Section 1405.18.1.

1405.14.2.2 Basic Wind Speed Exceeding 90mph or Exposure Categories C and D. Where the basic wind speed exceeds 90 mph or the Exposure Category is C or D, or all conditions of 1405.14.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the wind loads required by Chapter 16. The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and minimum ½-inch (12.7 mm) thick gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.
2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.

~~**Exception:** The above adjustments shall not apply when vinyl siding is attached to wood furring strips installed over the foam plastic sheathing in accordance with Section 1405.18.2.2 and such installation is in accordance with the vinyl siding manufacturer's installation instructions.~~

1405.14.2.3 Manufacturer Specification. Where the vinyl siding manufacturer's product specifications provide an approved design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.

(Portions of proposal not shown, remain unchanged).

Commenter's Reason: This public comment responds to constructive criticism and supportive recommendations received at the first hearing. Every effort has been made to follow-up with the various interests and to respond with improvements to the original proposal. These improvements are also coordinated with a complimentary PC on FS156-09/10 Part 2 (IRC) as also requested by the IRC CDC which approved the original proposal with a request for further refinements at Final Action. These refinements are coordinated and comprehensively made in this one PC for reasons addressed separately as follows:

Inclusion of Steel Framing

Tables 1405.18.2.1 and 1405.18.2.2 now include siding connections for use with light-frame cold-formed steel in addition to light-frame wood as requested at the first hearing. These are needed to provide siding connection solutions applicable to light-frame cold-formed steel construction to ensure coordination with IECC energy code requirements for this type of construction (as mentioned in the IBC-S committee's reason for disapproval). The Steel Framing Alliance (SFA), American Iron and Steel Institute (AISI), and the Foam Sheathing Coalition (FSC) have worked together toward this end.

The original proposal included connection solutions for attachment of siding over foam sheathing only for wood framing. But, the scope of the original proposal was not otherwise limited to wood framing (i.e., requirements in Table 1405.18.1 of the original proposal are applicable to both wood and steel framing). The IRC committee approved the original FS156-09/10 proposal, but also expressed concern to "work with industry and bring the needed improvement back to the Final Action."

Steel framing was not addressed in the original proposal only because test data was not available at that time to justify appropriate solutions. Subsequently, the steel industry together with New York State Research and Energy Development Authority (NYSERDA) has conducted a testing program to provide justification to the solutions proposed in this PC. A report on this testing will be made available at the Final Action hearing and, as soon as available, by request to the proponent (Mark Nowak, SFA, mnowak@steelframing.org). These tests provide the necessary performance data for appropriately designing siding connections to steel framing that span through a thickness of foam sheathing.

These proposed provisions for light-frame cold-formed steel construction are not only coordinated with ICC energy code requirements, but they are necessary to ensure that foam insulation requirements as required by the ICC energy code are implemented in a structurally sound manner. Support of this PC is urged.

Inclusion of Additional Siding Weight Categories:

The original proposal was based on a minimum 11 psf siding dead load (for siding attachment requirements over foam sheathing). While various siding manufacturers supported the original proposal (or remained neutral), several expressed the desire to be included, such as the Masonry Veneer Manufacturers Association. Thus, a 25 psf siding weight category and connection requirements have been included in this PC. This also required inclusion of a 3 psf siding weight category such that the lighter weight sidings would not be unduly penalized by basing the table only on heavier siding types.

Simplification, Clarification and Editorial Improvements:

Content from table footnotes moved into tables for visual clarity and ease of access.
Removed confusing wind speed requirements from siding attachment table otherwise intending to address connection requirements for support of siding dead load and limit foam thickness. The text is clarified to more explicitly require that the siding attachment be separately designed to resist other loading conditions, including wind.
Adjusted fastener sizes to be compatible with pneumatic fasteners at request of ISANTA
Various editorial improvements to language, table headings, etc.

Additional technical justification for siding connections over foam sheathing

The FSC has also done additional testing of siding over foam sheathing connection assemblies for attachments to wood framing. These tests add further confirmation of the adequacy of the proposed siding attachment requirements for wood framing and support of siding weight. It also confirms that siding deflections will be limited to less than 0.015" as commonly used as a design basis for wood connections. A report documenting this testing will also be made available at the final action hearing and will be posted at www.foamsheathing.org as soon as available.

Strengthened QC requirements for foam sheathing wind pressure resistance properties

One of the concerns raised at the first code development hearing on FS156 was related to having assurance that foam sheathing products meet the wind pressure performance requirements upon which the proposal (namely Table 1405.18.1) is based. This public comment addresses that concern by clarifying implementation a code-recognized "approved agency" approach that already exists and is commonly used for foam sheathing and other products.

First, 2009 IBC Section 2603.2 gives foam plastic insulation requirements for use of an approved agency and labeling to ensure end use complies with code requirements as follows:

> **2603.2 Labeling and identification.** Packages and containers of foam plastic insulation and foam plastic insulation components delivered to the job site shall bear the *label* of an *approved agency* showing the manufacturer's name, product listing, product identification and information sufficient to determine that the end use will comply with the code requirements.

Second, 2009 IBC Section 2603.5.4 provides an example of product performance criteria (test method and minimum performance indices) which the "approved agency" must consider in meeting the requirements of Section 2603.2:

> **2603.5.4 Flame spread and smoke-developed indexes.** Foam plastic insulation, exterior coatings and facings shall be tested separately in the thickness intended for use, but not to exceed 4 inches (102 mm), and shall each have a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E 84 or UL 723.

Third, the Approved Agency is defined in Sections 202 and 1702.1 of the 2009 IBC as follows:

> **APPROVED AGENCY.** An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been *approved*.

And, the responsibilities of the Approved Agency include:

> **1703.1 Approved agency.** An *approved agency* shall provide all information as necessary for the *building official* to determine that the agency meets the applicable requirements.
>
> **1703.1.1 Independence.** An *approved agency* shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.

1703.5 Labeling. Where materials or assemblies are required by this code to be *labeled*, such materials and assemblies shall be *labeled* by an *approved agency* in accordance with Section 1703. Products and materials required to be labeled shall be labeled in accordance with the procedures set forth in Sections 1703.5.1 through 1703.5.3.

This approach is also used for other materials such as:

2303.1.4 Wood structural panels. Wood structural panels, when used structurally (including those used for siding, roof and wall sheathing, subflooring, diaphragms and built-up members), shall conform to the requirements for their type in DOC PS 1 or PS 2. Each panel or member shall be identified for grade and glue type by the trademarks of an *approved* testing and grading agency. Wood structural panel components shall be designed and fabricated in accordance with the applicable standards listed in Section 2306.1 and identified by the trademarks of an *approved* testing and inspection agency indicating conformance with the applicable standard. In addition, wood structural panels when permanently exposed in outdoor applications shall be of exterior type, except that wood structural panel roof sheathing exposed to the outdoors on the underside is permitted to be interior type bonded with exterior glue, Exposure 1.

Additionally, a Fabricated Item is defined as follows:

FABRICATED ITEM. Structural, load-bearing or lateral load-resisting assemblies consisting of materials assembled prior to installation in a building or structure, or subjected to operations such as heat treatment, thermal cutting, cold working or reforming after manufacture and prior to installation in a building or structure. Materials produced in accordance with standard specifications referenced by this code, such as rolled structural steel shapes, steel-reinforcing bars, masonry units, and wood structural panels or in accordance with a standard, listed in Chapter 35, which provides requirements for quality control done under the supervision of a third-party quality control agency shall not be considered "fabricated items."

The above described "approved agency" process has shown itself effective and this public comment merely clarifies the application of this process to assure the structural properties (wind pressure resistance) of foam sheathing align with the basis of the proposed end-use requirements and limitations. The minimum performance requirements are based on a representative sample of currently manufactured products of each type as reported by the NAHB Research Center, Inc. (report available at www.foamsheathing.org). Support for this PC is urged.

Strengthened Scope Limitations on Foam Sheathing Applications

At the request of the insurance industry, a 110 mph wind speed limit has also been implemented in this proposal for foam sheathing. In addition, wind pressure requirements have been strengthened to require use of negative pressure values in all cases, even when siding is placed over foam sheathing and the siding is separately capable of resisting the full negative design wind pressure.

These provisions are needed for the above reasons, provide improvements for appropriate use of foam sheathing, and provide needed solutions for coordination with the energy code requirements. Again, your approval as modified is urged.

Final Action: AS AM AMPC____ D

FS156-09/10, Part II

IRC R703.3 (New), R703.3.1 (New), Table R703.3.1 (New), R703.3.2 (New), R703.3.2.1 (New),Table R703.3.2.1 (New), R703.3.2.2 (New), Table R703.3.2.2 (New), R703.4, Table R703.4, R703.5.1, R703.6.1, R703.7.4.1, R703.11.2, R703.11.2.1, R703.11.2.2, R703.11.2.3

Proposed Change as Submitted

Proponent: Jay H. Crandell, PE, d/b/a ARES Consulting, representing the Foam Sheathing Coalition

PART II – IRC BUILDING/ENERGY

1. Add new text as follows:

R703.3 Foam plastic sheathing. Foam plastic sheathing used in exterior wall covering assemblies shall comply with this section, Section R316, Chapter 11 and the manufacturer's installation instructions.

R703.3.1 Minimum thickness. The thickness of foam plastic sheathing shall comply with Table R703.3.1.

Exception: Where foam plastic sheathing is applied directly over or behind wall sheathing or other solid substrate capable of separately resisting the required wind pressure, the limitations of Table R703.3.1 shall not apply.

TABLE R703.3.1
REQUIREMENTS FOR FOAM PLASTIC SHEATHING
IN EXTERIOR WALL COVERING ASSEMBLIES[1,2]

Foam Plastic	Foam Sheathing	Maximum Wind Speed (mph) – Exposure B[4]

Sheathing Material[3]	**Thickness (in)[3]**	**Walls with Interior Finish[5]**		**Walls without Interior Finish**	
		16”oc framing	**24”oc framing**	**16”oc framing**	**24”oc framing**
Siding Attached Directly Over Foam Plastic Sheathing per Section R703.3.2.1					
EPS	¾” 1” ≥1-1/2”	110 130 130	NP 100 130	90 125 130	NP NP 125
Polyiso-cyanurate	½” (faced) ¾” (faced) 1” (faced) ≥1-1/2” (faced)	130 130 130 130	90 120 130 130	115 130 130 130	NP 100 110 115
XPS	½” (faced) ¾” 1” ≥1-1/2”	125 110 130 130	85 NP 95 130	105 90 120 130	NP NP NP 115
Siding Offset from Foam Sheathing per Section R703.3.2.2					
	¾” 1” ≥1-1/2”	EPS	NP 85 130	NP 105 130	NP NP 105
Polyiso-cyanurate	½” (faced) ¾” (faced) 1” (faced) ≥1-1/2” (faced)	120 130 130 130	NP 100 110 120	100 130 130 130	NP 85 95 100
XPS	½” (faced) ¾” 1” ≥1-1/2”	110 95 125 130	NP NP 85 120	90 NP 105 130	NP NP NP 100
EPS	¾” 1” ≥1-1/2”	95 125 130	NP 85 130	NP 105 130	NP NP 105

For SI: 1 inch = 25.4 mm, 1 mile per hour = 1.609 km/h
NP = not permitted

1. Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m).
2. Foam plastic sheathing panels shall be permitted to be oriented parallel or perpendicular to framing members.
3. Foam plastic sheathing shall meet or exceed the following material standards: Expanded Polystyrene (EPS) – ASTM C578 (Type II, min.1.35 lb/ft^3 density), Polyisocyanurate – ASTM C1289 (Type 1, min.), and extruded polystyrene (XPS) – ASTM C578 (Type X, min. 1.30 lb/ft^3 density). Where a “faced” product is indicated, a facer shall be provided on both faces of the foam plastic sheathing. Where facing is not indicated in the table, faced and unfaced foam plastic sheathing shall be permitted. For all foam plastic sheathing products, approved manufacturer data shall be permitted in lieu of the table requirements.
4. Multiply tabulated maximum wind speed by 0.85 for wind exposure C or by 0.78 for wind exposure D.
5. Interior finish shall be minimum 1/2-inch (12.7 mm) thick gypsum wall board or an approved product with equivalent or greater out-of-plane bending strength and stiffness.

R703.3.2 Siding attachment over foam sheathing. Siding shall be attached over foam sheathing in accordance with Section R703.3.2.1, Section R703.3.2.2, or an approved design. In no case shall the siding material be used in a manner that exceeds its application limits.

Exception: Where the siding manufacturer has provided installation instructions for application over foam sheathing, those requirements shall apply.

R703.3.2.1 Direct siding attachment. Siding installed directly over foam sheathing without separation by an air space shall comply with Table R703.3.2.1 in regard to nail diameter, penetration, and nail spacing for the applicable foam sheathing thickness and wind speed condition. The siding fastener and siding installation shall otherwise comply with Section R703.4 and Table R703.4.

Exceptions:

1. For vinyl siding, refer to Section R703.11.2.
2. For exterior insulation and finish systems, refer to Section R703.9.
3. For adhered veneer, refer to Section R703.12.

TABLE R703.3.2.1
FASTENING REQUIREMENTS FOR DIRECT SIDING
ATTACHMENT OVER FOAM PLASTIC SHEATHING[1,2]

Minimum Nail Diameter[3] (inches)	Nail Spacing along Stud[4] (inches)	Maximum Foam Sheathing Thickness[5] (inches)	16"oc WALL FRAMING Maximum Wind Speed (mph)			24"oc WALL FRAMING Maximum Wind Speed (mph)		
			Exposure B	Exposure C	Exposure D	Exposure B	Exposure C	Exposure D
0.113	6	2	140	120	110	120	100	90
	8	2	130	110	100	100	85	DR
	12	1	100	85	DR	85	DR	DR
0.120	6	3	140	120	110	120	100	90
	8	2	130	110	100	110	90	85
	12	1.5	110	90	85	90	DR	DR
0.135	6	3	140	120	110	130	110	100
	8	3	140	120	110	110	90	85
	12	2	110	90	85	90	DR	DR

For SI: 1 inch = 25.4 mm; 1 mph = 1.609 km/h
DR = design required

1. Maximum wind speed values are based on a minimum 1-1/4 inch (31.8 mm) penetration of a smooth shank nail fastener into wood framing of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS.
2. Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m).
3. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths to provide a minimum 1-1/4 inch (31.8 mm) penetration into wood framing. Specified nails in accordance with Section R703.4 or the siding manufacturer's installation instructions shall meet all other requirements in ASTM F1667 or be otherwise approved for the intended application.
4. 'Nail spacing along stud' refers to spacing of siding fasteners in the vertical direction. A minimum of one fastener shall be applied at each intersection of an individual siding member with a wall stud.
5. Maximum foam sheathing thickness values are based on a maximum 24-inch (0.6 m) stud spacing and a maximum siding dead load of 11 psf (0.53 kPa) based on 7/8-inch (22 mm) thick Portland cement plaster, For Seismic Design Category D2, the maximum siding dead load shall be 8 psf.

Fastener Type	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring[4] (inches)	Maximum Thickness of Foam Sheathing[5] (inches)	16"oc FURRING Maximum Wind Speed (mph)			24"oc FURRING Maximum Wind Speed (mph)		
				Exposure B	Exposure C	Exposure D	Exposure B	Exposure C	Exposure D
0.120" diameter smooth shank nail	1-1/4	8	2	130	110	100	110	90	85
		12	1.5	110	90	85	90	DR	DR
		16	1	90	DR	DR	DR	DR	DR
0.135" diameter smooth shank nail	1-1/4	8	3	130	110	100	110	90	85
		12	2	110	90	85	90	DR	DR
		16	1.5	100	85	DR	DR	DR	DR
#8 wood screw	1	12	3	140	120	110	140	120	110
		16	2	140	120	110	140	120	110
¼" lag screw[6]	1-1/2	24	3	140	120	110	140	120	110

R703.3.2.2 Offset siding attachment. When an airspace separates the siding from direct contact with the foam plastic sheathing, the siding shall be attached in accordance with Section R703.4 and Table R703.4 to minimum 1x3 wood furring strips placed over the foam sheathing. Furring shall be attached through the foam sheathing to wall framing in accordance with Table R703.3.2.2. When placed horizontally, wood furring strips shall be preservative treated wood or naturally durable wood and fasteners shall be corrosion resistant in accordance with Section R317.

> **Exception:** Furring strips shall not be required over foam plastic sheathing located behind anchored stone and masonry veneer installed in accordance with Section R703.7. Veneer ties shall be installed in accordance with Section R703.7.4.1.

TABLE R703.3.2.2
FASTENING REQUIREMENTS FOR WOOD FURRING
OVER FOAM PLASTIC SHEATHING[1,2,3]

For SI: 1" = 25.4 mm; 1 mph = 1.609 km/h
DR = design required

1. Furring strips shall be spaced a maximum of 24"oc in a vertical or horizontal orientation. Table values are based on minimum ¾-inch (19.1 mm) thick furring strip and wood studs of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater per AFPA/NDS.
2. Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m).

3. Where minimum required siding fastener penetration exceeds ¾ inch (19.1 mm), a minimum 2x furring strip shall be used unless approved deformed shank siding nails or siding screws are used to provide equivalent withdrawal strength.
4. In a vertical orientation, furring strips shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, furring strips shall be fastened at each stud intersection with a number of fasteners equivalent to the required fastener spacing. In no case shall fasteners be spaced more than 24 inches (0.6 m) apart.
5. Maximum foam sheathing thickness values are based on a maximum 24-inch (0.6 m) stud spacing and a maximum siding dead load of 11 psf (0.53 kPa) based on 7/8-inch (22 mm) thick Portland cement plaster. For Seismic Design Category D2, the maximum siding dead load shall be 8 psf.
6. Lag screws shall be installed with a standard cut washer and shall be pre-drilled in accordance with AF&PA NDS-05. Approved self-drilling screws of equal or greater shear and withdrawal strength shall be permitted without pre-drilling.

(Renumber subsequent sections)

2. Revise as follows:

R703.4 Attachments. Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other *approved* aluminum, stainless steel, zinc-coated or other *approved* corrosion-resistive fasteners. Additional requirements in accordance with Section R703.3.2 shall apply when siding is installed over foam sheathing. Where the basic wind speed per Figure R301.2(4) is 110 miles per hour (49 m/s) or higher, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

TABLE R703.4
WEATHER–RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL		NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b,c,d]					
					Wood or wood structural panel sheathing	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[aa]	Direct to studs	Number or spacing of fasteners
Horizontal aluminum[e]	Without insulation	0.019[f]	Lap	Yes	0.120 nail 1½” long	0.120 nail 2” long	0.120 nail 2” long	0.120 nail[y]	Not allowed	Same as stud spacing
		0.024	Yes	Yes	0.120 nail 1½” long	0.120 nail 2” long	0.120 nail 2” long	0.120 nail[y]	Not allowed	
	With insulation	0.019	Yes	Yes	0.120 nail 1½” long	0.120 nail 2½” long	0.120 nail 2½” long	0.120 nail[y]	0.120 nail 1½” long	
Anchored veneer; brick, concrete, masonry or stone		2	Section R703	Yes	See Section R703 and Figure R703.7[g]					
Adhered veneer; concrete, stone or masonry[w]		–	Section R703	Yes Note w	See Section R703.6.1[g] or in accordance with the manufacturer's instructions					
Hardboard[k] Panel siding-vertical		7/16	–	Yes	Note m	Note m	Note m	Note m	Note m	6” Panel edges 12” inter. Sup.”
Hardboard[k] Lap-siding horizontal		7/16	Note p	Yes	Note o	Note o	Note o	Note o	Note o	Same as stud spacing 2 per bearing
Steel[h]		29 ga.	Lap	Yes	0.113 nail and 1¼” Staple-1¾”	0.113 nail and 2¾”Staple 2 ½‘”	0.113 nail and 2½” Staple-2¼”	0.113 nail[v] Staple[v]	Not allowed	Same as stud spacing
Partcleboard panels		3/8-1/2	–	Yes	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	6d box nail (2” x 0.099”)	box nail[v]	6d box nail (2”x0.099), 3/8 not allowed	6” panel edge, 12”inter. sup.
		3/8	–	Yes	6d box nail (2” x 0.099”)	8d box nail (2” x 0.099”)	8d box nail (2” x 0.099”)	box nail[v]	6d box nail (2” x0.099”)	
Wood structural panel siding[i] (exterior grade)		3/8	Note p	Yes	0.099 nail-2”	0.113 nail-2½”	0.113 nail-2½”	0.113 nail[v]	0.099 nail-2”	6” panel edge. 12” inter.sup.
Wood structural panel lapsiding		3/8-1/2	Note p Note x	Yes	0.099 nail-2”	0.113 nail-2½”	0.113 nail-2½”	0.113 nail[x]	0.099 nail-2”	8” along bottom edge
Vinyl siding[l]		0.035	Lap	Yes	0.120 nail (shank) with a 0.313 head or 16 gauge	0.120 nail (shank) with a 0.313 head or 16 gauge staple with	0.120 nail (shank) with a 0.313 head or 16 gauge	0.120 nail (shank) with a 0.313 head per Section	Not allowed	16 inches on center or specified by the manufacturer instructions

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b,c,d]					
				Wood or wood structural panel sheathing	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[aa]	Direct to studs	Number or spacing of fasteners
				staple with 3/8 to 1/2-inch crown[y,z]	3/8 to 1/2-inch crown[y]	staple with 3/8 to 1/2-inch crown[y]	R[z03.11.2]		or test report
Wood[j] rustic, drop	3/8 Min	Lap	Yes	Fastener penetration into sud-1”				0.113 nail-2 ½” Staple-2”	Face nailing up to 6” widths, 1 nail per bearing, 8” widths and over, 2 nails per bearing
Shiplap	19/32 Average	Lap	Yes						
Bevel	7/16	Lap	Yes						
Butt tip	3/16	Lap	Yes						
Fiber cement panel siding[q]	5/16	Note q	Yes Note u	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r]	6d common corrosion-resistant (12” x 0.113”) nail[r]	6d common corrosion-resistant nail[r]	6” o.c. on edges, 12” o.c. on intermed. Studs
Fiber cement lap siding[s]	5/16	Note s	Yes Note u	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r]	6d common corrosion-resistant nail[r]	6d common corrosion-resistant (12” x 0.113”) nail[r]	6d common corrosion-resistant nail or 11 gage roofing nail[r]	Note t

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.
b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.
c. Staples shall have a minimum crown width of 7/16-inch outside diameter and be manufactured of minimum 16 gage wire.
d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where for fiberboard, or gypsum, or foam plastic sheathing backing is used
e. Aluminum nails shall be used to attach aluminum siding.
f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.
g. All attachments shall be coated with a corrosion-resistant coating.
h. Shall be of approved type.
i. Three-eighths-inch plywood shall not be applied directly to studs spaced more than 16 inches on center when long dimension is parallel to studs. Plywood 1/2-inch or thinner shall not be applied directly to studs spaced more than 24 inches on center. The stud spacing shall not exceed the panel span rating provided by the manufacturer unless the panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing.
j. Wood board sidings applied vertically shall be nailed to horizontal nailing strips or blocking set 24 inches on center. Nails shall penetrate 1 1/2 inches into studs, studs and wood sheathing combined or blocking. For application over foam sheathing, refer to Section R703.3.2.2.
k. Hardboard siding shall comply with CPA/ANSI A135.6.
l. Vinyl siding shall comply with ASTM D 3679.
m. Minimum shank diameter of 0.092 inch, minimum head diameter of 0.225 inch, and nail length must accommodate sheathing and penetrate framing 1 1/2 inches. For application over foam sheathing, minimum shank diameter and penetration into framing shall comply with Section R703.3.2.
n. When used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.
o. Minimum shank diameter of 0.099 inch, minimum head diameter of 0.240 inch, and nail length must accommodate sheathing and penetrate framing 1 1/2 inches. For application over foam sheathing, minimum shank diameter and penetration into framing shall comply with Section R703.3.2.
p. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.
q. See Section R703.10.1.
r. Fasteners shall comply with the nominal dimensions in ASTM F 1667. For application over foam sheathing, refer to Section R703.3.2
s. See Section R703.10.2.
t. Face nailing: one 6dcommonnail through the overlapping planks at each stud. Concealed nailing: one 11 gage 11/2 inch long galv. roofing nail through the top edge of each plank at each stud.
u. See Section R703.2 exceptions.
v. Minimum nail length must accommodate sheathing and penetrate framing 11/2 inches. For application over foam sheathing, refer to Section R703.3.2
w. Adhered masonry veneer shall comply with the requirements of Section R703.6.3 and shall comply with the requirements in Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS-402.
x. Vertical joints, if staggered shall be permitted to be away from studs if applied over wood structural panel sheathing.
y. Minimum fastener length must accommodate sheathing and penetrate framing .75 inches or in accordance with the manufacturer’s installation instructions. For application over foam sheathing, fastener penetration into framing shall comply with Section R703.3.2.

z. Where approved by the manufacturer's instructions or test report siding shall be permitted to be installed with fasteners penetrating not less than .75 inches throughwood orwood structural sheathing with or without penetration into the framing.
aa. Refer to Section R703.3 for additional requirements.
bb. For siding application over foam sheathing, fastener spacing shall comply with the more stringent requirement of this table or Section R703.3.2.

R703.5.1 Application. Wood shakes or shingles shall be applied either single-course or double-course over nominal 1/2-inch (13 mm) wood-based sheathing or to furring strips over nominal 1/2-inch (13 mm) nonwood sheathing.

> **Exception:** Wood shakes or shingles over foam plastic sheathing, shall be applied to wood furring strips in accordance with Section R703.3.2.2.

A ~~permeable~~ water-resistive barrier shall be provided in accordance with Section R703.2 ~~over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51mm) and vertical overlaps of not less than 6 inches (152 mm)~~. Where furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25mmby 76 mm or 25mm by 102 mm), and shall be fastened horizontally to the studs with 7d or 8d box nails. For application over foam plastic sheathing, furring strips shall be fastened in accordance with Section R703.3.2.2. and Furring strips shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.5.2. The spacing between adjacent shingles to allow for expansion shall not exceed 1/4 inch (6 mm), and between adjacent shakes, it shall not exceed 1/2 inch (13 mm). The offset spacing between joints in adjacent courses shall be a minimum of 11/2 inches (38 mm).

R703.6.1 Lath. All lath and lath attachments shall be of corrosion-resistant materials. Expanded metal or woven wire lath shall be attached with 1 1/2-inch-long (38 mm), 11 gage nails having a 7/16-inch (11.1 mm) head, or 7/8-inch-long (22.2 mm), 16 gage staples, spaced at no more than 6 inches (152 mm), or as otherwise *approved*. For application of maximum 7/8-inch-thick Portland cement plaster over foam plastic sheathing, nail length and shank diameter shall comply with Section R703.3.2.

R703.7.4.1 Size and spacing. Veneer ties, if strand wire, shall not be less in thickness than No. 9 U.S. gage [(0.148 in.) (4 mm)] wire and shall have a hook embedded in the mortar joint, or if sheet metal, shall be not less than No. 22 U.S. gage by [(0.0299 in.)(0.76 mm)] 7/8 inch (22 mm) corrugated. Each tie shall be spaced not more than 24 inches (610 mm) on center horizontally and vertically and shall support not more than 2.67 square feet (0.25 m2) of wall area. For application over foam plastic sheathing, corrugated metal ties shall be fastened through the foam plastic sheathing using a 10d common nail with a minimum penetration of 1 1/2 inches (38 mm) into wood framing for a maximum wind condition of 90 miles per hour (40 m/s) in wind exposure B. For a basic wind speed not exceeding 110 miles per hour (49 m/s) in any wind exposure and in Seismic Design Categories C, D_0, D_1, and D_2, a #8 wood screw with a minimum 1 inch (25.4 mm) penetration into wood wall framing shall be used in each tie. Alternatively, an approved fastener with equivalent withdrawal strength shall be permitted.

> **Exception:** In Seismic Design Category D_0, D_1 or D_2 or townhouses in Seismic Design Category C or in wind areas of more than 30 pounds per square foot pressure (1.44 kPa), each tie shall support not more than 2 square feet (0.2 m2) of wall area.

R703.11.2 Foam plastic sheathing. Vinyl siding used with foam plastic sheathing shall be installed in accordance with Section R703.11.2.1, R703.11.2.2, or R703.11.2.3.

> **Exception:** Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other *approved* backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Section R703.11.1.

R703.11.2.1 Basic wind speed not exceeding 90 miles per hour and Exposure Category B. Where the basic wind speed does not exceed 90 miles per hour (40 m/s), the Exposure Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 11/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing minimum thickness shall comply with Section R703.3.1 and shall not exceed a maximum thickness of 1.5 inches (38mm) for a 0.120-inch diameter nail or 2.0 inches (51 mm) for a 0.135-inch diameter nail. ~~shall be 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C578, 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C1289, or 1-inch-thick (25 mm)(nominal) expanded polystyrene per ASTM C578.~~ Vinyl siding shall be permitted to be installed on furring strips in accordance with Section R703.2.2 using the siding manufacturer's installation instructions when foam plastic sheathing thickness complies with Section R703.3.1.

R703.11.2.2 Basic wind speed exceeding 90 miles per hour or Exposure Categories C and D. Where the basic wind speed exceeds 90 miles per hour (40 m/s) or the Exposure Category is C or D, or all conditions of Section R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Tables R301.2(2) adjusted for height and exposure using Section R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and minimum ½-inch-thick gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.
2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.

   Exception: The above adjustments shall not apply when vinyl siding is attached to wood furring strips installed over the foam plastic sheathing in accordance with Section R703.3.2.2 and such installation is in accordance with the vinyl siding manufacturer's installation instructions.

R703.11.2.3 Manufacturer specification. Where the vinyl siding manufacturer's product specifications provide an *approved* design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.

Reason:
Part II- As with a related IBC proposal, this proposal is a comprehensive clarification and upgrading of requirements for foam sheathing and siding installation over foam sheathing. It primarily addresses adequate foam sheathing thickness and siding attachment over foam sheathing to resist design wind loads within the scope of the IRC (e.g., up to 110 mph, Exposure D). It also provides siding connections through foam sheathing that provide adequate support to resist the dead load of siding installed over foam sheathing. As a whole, these provisions are necessary to ensure appropriate use of foam sheathing and siding materials together on exterior wall assemblies in a way that best compliments existing exterior wall covering provisions in Section R703 of the code. A detailed explanation of the test data and analysis justifying the proposed requirements can be found at www.foamsheathing.org.

In support of proposed new Section R703.3.1, the wind pressure resistance of foam sheathing used in this proposal is based on certified full-scale (4'x8' panel) testing conducted at the NAHB Research Center, Inc. Samples included specimens from various manufacturers representing the industry at large. The design wind speed data (without rounding or capping values) is shown in the table below for informational purposes. The values in the proposed table have been rounded to the nearest 5 mph increment and capped at 130 mph (Exposure B) as this corresponds to a maximum wind speed of 110 mph in exposure C, which is essentially the scope limit of the IRC. This proposal is needed to avoid potential exclusion of foam sheathing products due to the incompleteness of current code requirements which can negatively affect other concerns such as energy conservation code requirements and green building interests. Most importantly, these requirements will ensure that foam sheathing is used appropriately to prevent building envelope damage, particularly in higher wind conditions and with thinner material used on more widely spaced studs (e.g., 24"oc center on gable roof ends which typically have no interior finish). These requirements also agree reasonably well with the generally successful use of foam sheathing on typical wall assemblies (e.g., 16"oc framing or 24"oc framing with interior finish) on many homes in lower wind regions of the U.S.

TABLE R703.3.1- Part A (Actual design values based on test data – not rounded or capped as in the proposal)
MAXIMUM WIND SPEED (mph – 3 SECOND GUST) PERMITTED
FOR FOAM PLASTIC SHEATHING
WITH DIRECTLY ATTACHED SIDING PER SECTION R703.3.2.1

Foam Sheathing Material[3]	Foam Sheathing Nominal Thickness (in)	Maximum Wind Speed (mph) – Exposure B[4]			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16"oc framing	24"oc framing	16"oc framing	24"oc framing
EPS	¾" (unfaced)	110	73	92	61
	1" (unfaced)	147	98	123	82
	1-1/2" (unfaced)	222	148	186	124
Polyiso-cyanurate	½" (faced)	136	91	114	76
	¾" (faced)	177	118	148	99
	1" (faced)	193	129	162	108
	1-1/2" (faced)	207	138	173	116
XPS	½" (faced)	125	84	105	70
	¾" (unfaced)	109	73	91	61
	1" (unfaced)	145	97	121	81
	1-1/2" (unfaced)	208	139	174	116

Design value based on the minimum tested uniform pressure capacity for each sheathing type and thickness category divided by a safety factor of 1.5 and ASCE 7-05 positive pressure design loads for wall corner zone and a 10 sqft wind effective area (negative pressure is resisted by the foam sheathing and siding assembly). Because the 1.5 safety factor is applied to a minimum test value (not the average), these requirements are more stringent than safety margins required for other building envelop components such as doors and windows which are also important to envelope integrity. This "minimum test value" basis also serves to better control safety margins with regard to variability in material properties or performance.

TABLE R703.3.1 – Part B (Actual design values based on test data – not rounded or capped as in the proposal)
MAXIMUM WIND SPEED (mph – 3 SECOND GUST) PERMITTED
FOR FOAM PLASTIC SHEATHING
WITH FURRED SIDING PER SECTION R703.3.2.2[1]

Foam Plastic Sheathing Material[2]	Foam Sheathing Nominal Thickness (in)[2]	Maximum Wind Speed (mph) – Exposure B[3,4]			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16"oc framing	24"oc framing	16"oc framing	24"oc framing
EPS	¾"	95	63	80	53
	1"	127	85	106	71
	≥1-1/2"	192	128	161	107
Polyiso-cyanurate	½" (faced)	118	78	98	66
	¾" (faced)	153	102	128	85
	1" (faced)	167	112	140	93
	≥1-1/2" (faced)	179	120	150	100
XPS	½" (faced)	108	72	91	61
	¾"	94	63	79	53
	1"	126	84	105	70
	≥1-1/2"	180	120	151	101

Design value based on the minimum tested uniform pressure capacity for each sheathing type and thickness category divided by a safety factor of 1.5 and ASCE 7-05 negative pressure design loads for wall corner zone and a 10 sqft wind effective area. Because the siding is spaced away from foam sheathing in this wall covering assembly condition, it does not contribute to foam sheathing resistance. Thus, the foam sheathing must independently resist the negative wind pressure load. The furring strips provide adequate bearing at connection to secure the foam sheathing as well as the siding material.

In support of proposed new Section R703.3.2, the generalized connection requirements for siding over foam sheathing are based on an analysis using the AF&PA NDS-2005 connection design provisions in consideration of withdrawal to resist wind pressure and shear strength to resist siding dead load. To account for the "gap" in the connection caused by the presence of foam sheathing, the provisions of AF&PA TR12 were used to downgrade connection strength based on the thickness of foam sheathing (i.e., width of gap in the connection). The design shear strength was based on calculated ultimate capacity divided by a safety factor of 2 while conservatively ignoring any benefit of the foam material filling the gap in the siding or furring connection to wall framing. Wind loads were based on application of the full ASCE 7-05 components and cladding wind pressure applied to the exterior wall covering while conservatively ignoring any distribution of wind pressure to other wall layers. In addition, the wind pressures were based on the most stringent wall corner zone condition and an effective wind area of 10 sqft.

Changes to other parts of Section R703, including changes to Table R703.4 and various siding attachment requirements, are made in coordination with the above improvements.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: ASTM standards within this proposed are currently referenced in the I-codes.

ICCFILENAME: CRANDELL-FS1-1404.12

Public Hearing Results

PART II- IRC B/E

Committee Action: **Approved as Submitted**

Committee Reason: This is a needed addition to the code and will provide an efficient method to provide energy savings. The committee is concerned that this needs improvement but this is a good start. The proponent should work with industry and bring the needed improvement back to the Final Action.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jay H. Crandell, PE, ARES Consulting, representing Foam Sheathing Coalition; Mark Nowak, representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R703.3 Foam plastic sheathing. Foam plastic sheathing used in exterior wall covering assemblies shall comply with this section, Section R316, Chapter 11 and the manufacturer's installation instructions. Light frame wood and cold-formed steel braced wall lines including foam plastic sheathing shall be braced with approved materials in accordance with Chapter 6. Where lateral buckling restraint of light-frame wood and cold-formed steel studs also is required in Chapter 6, foam sheathing shall not be permitted to provide the required lateral buckling restraint. When used in exterior wall covering assemblies in accordance with Table 703.3.1 of Section R703.3.1, foam sheathing shall be identified by the trademarks of an *approved* testing and inspection agency in accordance with Section 316.2 indicating compliance with the wind pressure resistance requirements of Table R703.3.1 where not already addressed in the applicable material standards. The use of foam plastic sheathing in accordance with this section shall not be permitted where the basic wind speed exceeds 110 mph.

~~**R703.3.1 Minimum thickness.** The thickness of foam plastic sheathing shall comply with Table R703.3.1.~~

Exceptions:

1. Where foam plastic sheathing is covered with ~~applied directly over or behind~~ wall sheathing or other solid material ~~substrate~~ capable of separately resisting the required wind pressure, the limitations of Section R703.3.1 and the basic wind speed limit of 110 mph ~~Table 703.3.1~~ shall not apply.
2. Where foam plastic sheathing is covered with cladding and applied directly over wall sheathing or other solid material, all capable of separately resisting the full design wind pressure, the limitations of Section R703.3.1 and the basic wind speed limit of 110 mph shall not apply.

R703.3.1 Minimum thickness. The thickness of foam plastic sheathing shall comply with Table R703.3.1. The components and cladding design wind pressure determined in accordance with Table R301.2(2) shall not exceed the allowable wind pressure value in accordance with Table R703.3.1.

~~**TABLE R703.3.1**~~
~~**REQUIREMENTS FOR FOAM PLASTIC SHEATHING**~~
~~**IN EXTERIOR WALL COVERING ASSEMBLIES[1,2]**~~

~~**Foam Plastic Sheathing Material[3]**~~	~~**Foam Sheathing Thickness (in)[3]**~~	~~**Maximum Wind Speed (mph) – Exposure B[4]**~~			
		~~**Walls with Interior Finish[5]**~~		~~**Walls without Interior Finish**~~	
		~~**16"oc framing**~~	~~**24"oc framing**~~	~~**16"oc framing**~~	~~**24"oc framing**~~
~~**Siding Attached Directly Over Foam Plastic Sheathing per Section R703.3.2.1**~~					
~~EPS~~	~~¾"~~ ~~1"~~ ~~≥1-1/2"~~	~~110~~ ~~130~~ ~~130~~	~~NP~~ ~~100~~ ~~130~~	~~90~~ ~~125~~ ~~130~~	~~NP~~ ~~NP~~ ~~125~~
~~Polyiso-cyanurate~~	~~½" (faced)~~ ~~¾" (faced)~~ ~~1" (faced)~~ ~~≥1-1/2" (faced)~~	~~130~~ ~~130~~ ~~130~~ ~~130~~	~~90~~ ~~120~~ ~~130~~ ~~130~~	~~115~~ ~~130~~ ~~130~~ ~~130~~	~~NP~~ ~~100~~ ~~110~~ ~~115~~
~~XPS~~	~~½" (faced)~~ ~~¾"~~ ~~1"~~ ~~≥1-1/2"~~	~~125~~ ~~110~~ ~~130~~ ~~130~~	~~85~~ ~~NP~~ ~~95~~ ~~130~~	~~105~~ ~~90~~ ~~120~~ ~~130~~	~~NP~~ ~~NP~~ ~~NP~~ ~~115~~
~~**Siding Offset from Foam Sheathing per Section R703.3.2.2**~~					
	~~¾"~~ ~~1"~~ ~~≥1-1/2"~~	~~EPS~~	~~NP~~ ~~85~~ ~~130~~	~~NP~~ ~~105~~ ~~130~~	~~NP~~ ~~NP~~ ~~105~~

~~Foam Plastic Sheathing Material~~[3]	~~Foam Sheathing Thickness (in)~~[3]	~~Maximum Wind Speed (mph) – Exposure B~~[4]			
		~~Walls with Interior Finish~~[5]		~~Walls without Interior Finish~~	
		~~16"oc framing~~	~~24"oc framing~~	~~16"oc framing~~	~~24"oc framing~~
~~Polyiso-cyanurate~~	~~½" (faced)~~ ~~¾" (faced)~~ ~~1" (faced)~~ ~~≥1-1/2" (faced)~~	~~120~~ ~~130~~ ~~130~~ ~~130~~	~~NP~~ ~~100~~ ~~110~~ ~~120~~	~~100~~ ~~130~~ ~~130~~ ~~130~~	~~NP~~ ~~85~~ ~~95~~ ~~100~~
~~XPS~~	~~½" (faced)~~ ~~¾"~~ ~~1"~~ ~~≥1-1/2"~~	~~110~~ ~~95~~ ~~125~~ ~~130~~	~~NP~~ ~~NP~~ ~~85~~ ~~120~~	~~90~~ ~~NP~~ ~~105~~ ~~130~~	~~NP~~ ~~NP~~ ~~NP~~ ~~100~~
~~EPS~~	~~¾"~~ ~~1"~~ ~~≥1-1/2"~~	~~95~~ ~~125~~ ~~130~~	~~NP~~ ~~85~~ ~~130~~	~~NP~~ ~~105~~ ~~130~~	~~NP~~ ~~NP~~ ~~105~~

~~For SI: 1 inch = 25.4 mm, 1 mile per hour = 1.609 km/h~~

~~NP = not permitted~~

1. ~~Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m).~~
2. ~~Foam plastic sheathing panels shall be permitted to be oriented parallel or perpendicular to framing members.~~
3. ~~Foam plastic sheathing shall meet or exceed the following material standards: Expanded Polystyrene (EPS) – ASTM C578 (Type II, min.1.35 lb/ft^3 density), Polyisocyanurate – ASTM C1289 (Type 1, min.), and extruded polystyrene (XPS) – ASTM C578 (Type X, min. 1.30 lb/ft^3 density). Where a "faced" product is indicated, a facer shall be provided on both faces of the foam plastic sheathing. Where facing is not indicated in the table, faced and unfaced foam plastic sheathing shall be permitted. For all foam plastic sheathing products, approved manufacturer data shall be permitted in lieu of the table requirements.~~
4. ~~Multiply tabulated maximum wind speed by 0.85 for wind exposure C or by 0.78 for wind exposure D.~~
5. ~~Interior finish shall be minimum 1/2-inch (12.7 mm) thick gypsum wall board or an approved product with equivalent or greater out-of-plane bending strength and stiffness.~~

TABLE R703.3.1
ALLOWABLE WIND PRESSURE VALUE (PSF) FOR FOAM PLASTIC SHEATHING IN EXTERIOR WALL COVERING ASSEMBLIES[1]

Foam Plastic Sheathing Material[2]	**Foam Sheathing Thickness (in)**	**Allowable (ASD) Components and Cladding Design Wind Pressure (psf) (basic wind speed not to exceed 110 mph per Section R703.3)**			
		Walls with Interior Finish[3]		Walls without Interior Finish	
		16"oc framing	24"oc framing	16"oc framing	24"oc framing
EPS	¾" 1" ≥1-1/2"	21.8 38.8 89.0	NP 19.4 39.5	15.3 27.2 62.3	NP 13.6 27.7
Polyiso-cyanurate	½" (faced) ¾" (faced) 1" (faced) ≥1-1/2" (faced)	33.3 56.4 67.5 77.4	14.8 25.1 30.0 34.4	23.3 39.5 47.2 54.1	10.4 17.6 21.0 24.1
XPS	½" (faced) ¾" 1" ≥1-1/2"	28.3 21.4 38.0 78.2	12.6 NP 29.0 34.7	19.8 15.0 26.6 54.7	NP NP 20.3 24.3

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa.

NP = not permitted (allowable design wind pressure less than 10 psf)

1. Foam plastic sheathing panels shall be permitted to be oriented parallel or perpendicular to framing members.
2. Foam plastic sheathing shall meet or exceed the following material standards: Expanded Polystyrene (EPS) – ASTM C578 (Type II, min.1.35 lb/ft^3 density), Polyisocyanurate – ASTM C1289 (Type 1, min.), and extruded polystyrene (XPS) – ASTM C578 (Type X, min. 1.30 lb/ft^3 density). Where a "faced" product is indicated, a facer shall be provided on both faces of the foam plastic sheathing. Where facing is not indicated in the table, faced and unfaced foam plastic sheathing shall be permitted. For all foam plastic sheathing products, approved manufacturer data shall be permitted in lieu of the table requirements.
3. Interior finish shall be minimum 1/2-inch (12.7 mm) thick gypsum wall board or an approved product with equivalent or greater out-of-plane bending strength and stiffness.

R703.3.2 Siding attachment over foam sheathing. Siding shall be attached over foam sheathing in accordance with Section R703.3.2.1, Section R703.3.2.2, or an approved design. In no case shall the siding material be used in a manner that exceeds its application limits.

Exception: Where the siding manufacturer has provided installation instructions for application over foam sheathing, those requirements shall apply.

R703.3.2.1 Direct siding attachment. Siding installed directly over foam sheathing without separation by an air space shall comply with Table R703.3.2.1 in regard to minimum fastening requirements ~~nail diameter, penetration, and nail spacing~~ and maximum foam sheathing thickness limitations to support siding dead load ~~for the applicable foam sheathing thickness and wind speed condition~~. The siding fastener and siding installation shall otherwise comply with Section 703.4 and Table R703.4 and in no case shall result in a less stringent fastening requirement than required by Section R703.4 or the manufacturer's installation instructions for the specific siding material used.

Exception~~s~~:

~~1.~~ ~~For adhered masonry veneer, refer to Section 1405.10.~~
~~2.~~ ~~For vinyl siding, refer to Section 1405.14.~~
~~3.~~ For exterior insulation and finish systems, refer to Section 1408.

~~**TABLE R703.3.2.1**~~

~~FASTENING REQUIREMENTS FOR DIRECT SIDING ATTACHMENT OVER FOAM PLASTIC SHEATHING[1,2]~~

Minimum Nail Diameter[3] (inches)	Nail Spacing along Stud[4] (inches)	Maximum Foam Sheathing Thickness[5] (inches)	16"oc WALL FRAMING Maximum Wind Speed (mph) Exposure B	Exposure C	Exposure D	24"oc WALL FRAMING Maximum Wind Speed (mph) Exposure B	Exposure C	Exposure D
0.113	6	2	140	120	110	120	100	90
	8	2	130	110	100	100	85	DR
	12	1	100	85	DR	85	DR	DR
0.120	6	3	140	120	110	120	100	90
	8	2	130	110	100	110	90	85
	12	1.5	110	90	85	90	DR	DR
0.135	6	3	140	120	110	130	110	100
	8	3	140	120	110	110	90	85
	12	2	110	90	85	90	DR	DR

~~For SI: 1 inch = 25.4 mm; 1 mph = 1.609 km/h~~

~~DR = design required~~

1. ~~Maximum wind speed values are based on a minimum 1-1/4 inch (31.8 mm) penetration of a smooth shank nail fastener into wood framing of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS.~~
2. ~~Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m).~~
3. ~~Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths to provide a minimum 1-1/4 inch (31.8 mm) penetration into wood framing. Specified nails in accordance with Section R703.4 or the siding manufacturer's installation instructions shall meet all other requirements in ASTM F1667 or be otherwise approved for the intended application.~~
4. ~~'Nail spacing along stud' refers to spacing of siding fasteners in the vertical direction. A minimum of one fastener shall be applied at each intersection of an individual siding member with a wall stud.~~
5. ~~Maximum foam sheathing thickness values are based on a maximum 24-inch (0.6 m) stud spacing and a maximum siding dead load of 11 psf (0.53 kPa) based on 7/8-inch (22 mm) thick Portland cement plaster, For Seismic Design Category D2, the maximum siding dead load shall be 8 psf.~~

TABLE R703.3.2.1
SIDING MINIMUM FASTENING REQUIREMENTS
FOR DIRECT SIDING ATTACHMENT OVER FOAM PLASTIC SHEATHING
TO SUPPORT SIDING WEIGHT[1]

Siding Fastener Through Foam Sheathing into:	Siding Fastener Type and Minimum Size[2]	Siding Fastener Vertical Spacing (inches)	Maximum Foam Sheathing Thickness (inches) 16"oc Fastener Horizontal Spacing Siding Weight: 3 psf	11 psf	25 psf	24"oc Fastener Horizontal Spacing Siding Weight: 3 psf	11 psf	25 psf
Wood Framing (minimum 1-1/4 inch penetration)	0.113" diameter nail	6	4	3	1	4	2	0.75
		8	4	2	0.75	4	1.5	DR
		12	4	1.5	DR	3	0.75	DR
	0.120" diameter nail	6	4	3	1.5	4	2	0.75
		8	4	2	1	4	1.5	0.5
		12	4	1.5	0.5	3	1	DR
	0.131" diameter nail	6	4	4	1.5	4	3	1
		8	4	3	1	4	2	0.75
		12	4	2	0.75	4	1	DR
Steel Framing (minimum penetration of steel thickness + 3 threads)	#8 screw into 33 mil steel or thicker	6	3	3	1.5	3	2	DR
		8	3	2	0.5	3	1.5	DR
		12	3	1.5	DR	3	0.75	DR
	#10 screw into 33 mil steel	6	4	3	2	4	3	0.5
		8	4	3	1	4	2	DR
		12	4	2	DR	3	1	DR
	#10 screw into 43 mil steel or thicker	6	4	4	3	4	4	2
		8	4	4	2	4	3	1.5
		12	4	3	1.5	4	3	DR

For SI: 1 inch = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa.

DR = design required

1. Tabulated requirements are based on wood framing of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS and minimum 33 ksi steel for 33mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
2. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Self-drilling tapping screw fasteners for connection of siding to steel framing shall comply with the requirements of AISI S230. Specified fasteners in accordance with Section R703.4 or the siding manufacturer's approved installation instructions shall meet all other requirements in ASTM F1667, AISI S230 or be otherwise approved for the intended application.

R703.3.2.2 Offset siding attachment. When an airspace separates the siding from direct contact with the foam plastic sheathing, the siding shall be attached in accordance with Section R703.4 and Table R703.4 to minimum 1x3 wood or minimum 33 mil steel hat channel furring ~~strips~~ placed over the foam sheathing. Furring shall be attached through the foam sheathing to wall framing in accordance with Table R703.3.2.2 in regard to minimum fastening requirements and maximum foam sheathing thickness limitations to support siding dead load. The components and cladding design wind pressure determined in accordance with Table R301.2(2) shall not exceed the allowable design wind pressure value in accordance with Table R703.3.2.2. For 25 psf siding weight in accordance with Table R703.3.2.2, the Seismic Design Category shall not exceed D_0 for 16"oc furring or C for 24”oc furring. When placed horizontally, wood furring ~~strips~~ shall be preservative treated wood or naturally durable wood and fasteners shall be corrosion resistant in accordance with Section R317. Steel hat channel furring shall have a minimum G60 galvanized coating.

> **Exception:** Furring ~~strips~~ shall not be required over foam plastic sheathing located behind anchored stone and masonry veneer installed in accordance with Section R703.7. Veneer ties shall be installed in accordance with Section R703.7.4.1.

~~TABLE R703.3.2.2~~
~~FASTENING REQUIREMENTS FOR WOOD FURRING~~
~~OVER FOAM PLASTIC SHEATHING~~[~~1,2,3~~]

~~Fastener Type~~	~~Minimum Penetration into Wall Framing (inches)~~	~~Fastener Spacing in Furring~~[~~4~~] ~~(inches)~~	~~Maximum Thickness of Foam Sheathing~~[~~5~~] ~~(inches)~~	~~16”oc FURRING~~ ~~Maximum Wind Speed (mph)~~			~~24”oc FURRING~~ ~~Maximum Wind Speed (mph)~~		
				~~Exposure B~~	~~Exposure C~~	~~Exposure D~~	~~Exposure B~~	~~Exposure C~~	~~Exposure D~~
~~0.120” diameter smooth shank nail~~	~~1-1/4~~	~~8~~	~~2~~	~~130~~	~~110~~	~~100~~	~~110~~	~~90~~	~~85~~
		~~12~~	~~1.5~~	~~110~~	~~90~~	~~85~~	~~90~~	~~DR~~	~~DR~~
		~~16~~	~~1~~	~~90~~	~~DR~~	~~DR~~	~~DR~~	~~DR~~	~~DR~~
~~0.135” diameter smooth shank nail~~	~~1-1/4~~	~~8~~	~~3~~	~~130~~	~~110~~	~~100~~	~~110~~	~~90~~	~~85~~
		~~12~~	~~2~~	~~110~~	~~90~~	~~85~~	~~90~~	~~DR~~	~~DR~~
		~~16~~	~~1.5~~	~~100~~	~~85~~	~~DR~~	~~DR~~	~~DR~~	~~DR~~
~~#8 wood screw~~	~~1~~	~~12~~	~~3~~	~~140~~	~~120~~	~~110~~	~~140~~	~~120~~	~~110~~
		~~16~~	~~2~~	~~140~~	~~120~~	~~110~~	~~140~~	~~120~~	~~110~~
~~¼” lag screw~~[~~6~~]	~~1-1/2~~	~~24~~	~~3~~	~~140~~	~~120~~	~~110~~	~~140~~	~~120~~	~~110~~

~~For SI: 1” = 25.4 mm; 1 mph = 1.609 km/h~~
~~DR = design required~~

1. ~~Furring strips shall be spaced a maximum of 24”oc in a vertical or horizontal orientation. Table values are based on minimum ¾-inch (19.1 mm) thick furring strip and wood studs of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater per AFPA/NDS.~~
2. ~~Tabulated maximum wind speed values are based on a mean roof height of 30-feet (9.1 m). Multiply maximum wind speed by 0.95 for a mean roof height of 45 feet (13.7 m).~~
3. ~~Where minimum required siding fastener penetration exceeds ¾ inch (19.1 mm), a minimum 2x furring strip shall be used unless approved deformed shank siding nails or siding screws are used to provide equivalent withdrawal strength.~~
4. ~~In a vertical orientation, furring strips shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, furring strips shall be fastened at each stud intersection with a number of fasteners equivalent to the required fastener spacing. In no case shall fasteners be spaced more than 24 inches (0.6 m) apart.~~
5. ~~Maximum foam sheathing thickness values are based on a maximum 24-inch (0.6 m) stud spacing and a maximum siding dead load of 11 psf (0.53 kPa) based on 7/8-inch (22 mm) thick Portland cement plaster. For Seismic Design Category D2, the maximum siding dead load shall be 8 psf.~~
6. ~~Lag screws shall be installed with a standard cut washer and shall be pre-drilled in accordance with AF&PA NDS-05. Approved self-drilling screws of equal or greater shear and withdrawal strength shall be permitted without pre-drilling.~~

TABLE R703.3.2.2
FURRING MINIMUM FASTENING REQUIREMENTS
FOR APPLICATION OVER FOAM PLASTIC SHEATHING
TO SUPPORT SIDING WEIGHT[1,2]

Furring Material	Framing Member	Fastener Type and Minimum Size	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing (inches) 16”oc Furring[4] Siding Weight:			Maximum Thickness of Foam Sheathing (inches) 24”oc Furring[4] Siding Weight:			Allowable Design Wind Pressure (psf)	
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf	16”oc Furring	24”oc Furring
Minimum 1x Wood Furring[3]	Minimum 2x Wood Stud	Nail (0.120” shank; 0.271” head)	1-1/4	8	4	4	1.5	4	2	1	42.6	28.4
				12	4	2	1	4	1.5	0.5	28.4	18.9
				16	4	2	0.5	4	1	DR	21.3	14.2
		Nail (0.131” shank; 0.281” head)	1-1/4	8	4	4	2	4	3	1	46.5	31.0
				12	4	3	1	4	2	0.75	31.0	20.7
				16	4	2	0.75	4	1.5	DR	23.3	15.5
		#8 wood screw[5]	1	12	4	4	1.5	4	3	1	98.9	66.0
				16	4	3	1	4	2	0.5	74.2	49.5
				24	4	2	0.5	4	1	DR	35.1	23.4
		¼” lag screw[5]	1-1/2	12	4	4	3	4	4	1.5	140.4	93.6
				16	4	4	2	4	3	1	79.0	52.7
				24	4	3	1	4	2	0.5	35.1	23.4
Minimum 33mil Steel Hat Channel	33 mil Steel Stud	#8 screw (0.285” head)	Steel thickness +3 threads	12	3	1.5	DR	3	0.5	DR	52.9	35.3
				16	3	1	DR	2	DR	DR	39.7	26.5
				24	2	DR	DR	2	DR	DR	26.5	17.6
		#10 screw	Steel	12	4	2	DR	4	1	DR	62.9	41.9

or Minimum 1x Wood Furring[3]		(0.333" head)	thickness +3 threads	16	4	1.5	DR	3	DR	DR	47.1	31.4
				24	3	DR	DR	2	DR	DR	31.4	21.0
	43 mil or thicker Steel Stud	#8 screw (0.285" head)	Steel thickness +3 threads	12	3	1.5	DR	3	0.5	DR	69.0	46.0
				16	3	1	DR	2	DR	DR	51.8	34.5
				24	2	DR	DR	2	DR	DR	34.5	23.0
		#10 screw (0.333" head)	Steel thickness +3 threads	12	4	3	1.5	4	3	DR	81.9	54.6
				16	4	3	0.5	4	2	DR	61.5	41.0
				24	4	2	DR	4	0.5	DR	35.1	23.4

For SI: 1" = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa. DR = design required

1. Table values are based on: (1) minimum ¾-inch (19.1 mm) thick wood furring and wood studs of Spruce-Pine-Fir or any softwood species with a specific gravity of 0.42 or greater per AFPA/NDS, (2) minimum 33 mil steel hat channel furring of 33 ksi steel, and (3) steel framing of indicated nominal steel thickness and minimum 33 ksi steel for 33mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker. Steel hat channel shall have a minimum 7/8-inch (22.2 mm) depth.
2. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Self-drilling tapping screw fasteners for connection of siding to steel framing shall comply with the requirements of AISI S230. Specified fasteners in accordance with Section R703.4 or the siding manufacturer's approved installation instructions shall meet all other requirements in ASTM F1667 or AISI S230 or be otherwise approved for the intended application.
3. Where the required siding fastener penetration into wood material exceeds ¾ inch (19.1 mm) and is not more than 1-1/2 inches (38.1 mm), a minimum 2x wood furring shall be used unless approved deformed shank siding nails or siding screws are used to provide equivalent withdrawal strength allowing connection to 1x wood furring.
4. Furring shall be spaced a maximum of 24"oc in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, furring strips shall be fastened at each stud intersection with a number of fasteners equivalent to the required fastener spacing. In no case shall fasteners be spaced more than 24 inches (0.6 m) apart.
5. Lag screws shall be installed with a standard cut washer. Lag screws and wood screws shall be pre-drilled in accordance with AF&PA/NDS. Approved self-drilling screws of equal or greater shear and withdrawal strength shall be permitted without pre-drilling.

(Portion of proposal not shown, remain unchanged.)

Commenter's Reason: While the original proposal was approved as submitted, IRC CDC recommended further refinements at Final Action. Every effort has been made to follow-up with the various interests and to respond with improvements to the original proposal, even though approved as submitted. The improvements in this PC are also coordinated with a complimentary PC on FS156-09/10 Part1 (IBC). These refinements are coordinated in this one PC for reasons addressed separately as follows:

Inclusion of Steel Framing

Tables R703.2.1 and R703.2.2 now include siding connections for use with light-frame cold-formed steel siding in addition to light-frame wood as requested at the first hearing. These are needed to provide siding connection solutions applicable to light-frame cold-formed steel construction to ensure coordination with IRC Ch11 and IECC energy code requirements for this type of construction. The Steel Framing Alliance (SFA), American Iron and Steel Institute (AISI), and the Foam Sheathing Coalition (FSC) have worked together toward this end.

The original proposal included connection solutions for attachment of siding over foam sheathing only for wood framing. But, the scope of the original proposal was not otherwise limited to wood framing (i.e., requirements in Table 1405.18.1 of the original proposal are applicable to both wood and steel framing). The IRC committee approved the original FS156-09/10 proposal, but also expressed concern to "work with industry and bring the needed improvement back to the Final Action."

Steel framing was not addressed in the original proposal only because test data was not available at that time to justify appropriate solutions. Subsequently, the steel industry together with New York State Research and Energy Development Authority (NYSERDA) has conducted a testing program to provide justification to the solutions proposed in this PC. A report on this testing will be made available at the Final Action hearing and, as soon as available, by request to the proponent (Mark Nowak, SFA, mnowak@steelframing.org). These tests provide the necessary performance data for appropriately designing siding connections to steel framing that span through a thickness of foam sheathing.

These proposed provisions for light-frame cold-formed steel construction are not only coordinated with ICC energy code requirements, but they are necessary to ensure that foam insulation requirements as required by the ICC energy code are implemented in a structurally sound manner. Support of this PC is urged.

Inclusion of Additional Siding Weight Categories:

The original proposal was based on a minimum 11 psf siding dead load (for siding attachment requirements over foam sheathing). While various siding manufacturers supported the original proposal (or remained neutral), several expressed the desire to be included, such as the Masonry Veneer Manufacturers Association. Thus, a 25 psf siding weight category and connection requirements have been included in this PC. This also required inclusion of a 3 psf siding weight category such that the lighter weight sidings would not be unduly penalized by basing the table only on heavier siding types.

Simplification, Clarification and Editorial Improvements:

Content from table footnotes moved into tables for visual clarity and ease of access.
Removed confusing wind speed requirements from siding attachment table otherwise intending to provide minimum connections for support of siding dead load only and limit foam thickness accordingly. The text is clarified to more explicitly require that the siding attachment be separately designed to resist wind loads.
Adjusted fastener sizes to be compatible with pneumatic fasteners at request of ISANTA
Various editorial improvements to language, table headings, etc.

Additional technical justification for siding and furring connections over foam sheathing

The FSC has also funded additional testing of siding over foam sheathing connection assemblies for attachments to wood framing. These tests add further confirmation of the adequacy of the proposed siding attachment requirements for wood framing. It also confirms that siding deflections will be limited to less than 0.015" as commonly used as a design basis for wood connections. A report documenting this testing will also be made available at the final action hearing and will be posted at www.foamsheathing.org as soon as available.

Strengthened QC requirements for foam sheathing wind pressure resistance properties

One of the concerns raised at the first code development hearing on FS156 was related to having assurance that foam sheathing products meet the wind pressure performance requirements upon which the proposal (namely Table R703.3.1) is based. This public comment addresses that concern by clarifying implementation a code-recognized "approved agency" approach that already exists and is commonly used for foam sheathing and other products. The "approved agency" process has shown itself effective and this public comment merely clarifies the application of this process to assure the structural properties (wind pressure resistance) of foam sheathing align with the basis of the proposed end-use requirements and limitations. The minimum performance requirements are based on a representative sample of currently manufactured products of each type as reported by the NAHB Research Center, Inc. (report available at www.foamsheathing.org).

Strengthened Scope Limitations on Foam Sheathing Applications

At the request of the insurance industry, a 110 mph wind speed limit has also been implemented in this proposal for foam sheathing. In addition, wind pressure requirements have been strengthened to require use of negative pressure values in all cases, even when siding is placed over foam sheathing and the siding is separately capable of resisting the full negative design wind pressure.

These provisions are needed for the above reasons, provide improvements for appropriate use of foam sheathing, and provide needed solutions for coordination with the energy code requirements. Again, your approval as modified is urged.

Public Comment 2:

Kimdolyn Boone representing DuPont Building Innovations, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R703.5.1 Application. Wood shakes or shingles shall be applied either single-course or double-course over nominal 1/2-inch (13 mm) wood-based sheathing or to furring strips over nominal 1/2-inch (13 mm) nonwood sheathing.

> **Exception:** Wood shakes or shingles over foam plastic sheathing, shall be applied to wood furring strips in accordance with Section R703.3.2.2.

A permeable water-resistive barrier shall be provided in accordance with Section R703.2. Where furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25mmby 76 mm or 25mm by 102 mm), and shall be fastened horizontally to the studs with 7d or 8d box nails. For application over foam plastic sheathing, furring strips shall be fastened in accordance with Section R703.3.2.2. and Furring strips shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.5.2. The spacing between adjacent shingles to allow for expansion shall not exceed 1/4 inch (6 mm), and between adjacent shakes, it shall not exceed 1/2 inch (13 mm). The offset spacing between joints in adjacent courses shall be a minimum of 11/2 inches (38 mm).

(Portions of proposal not shown, remain unchanged.)

Commenter's Reason: The purpose of this public comment is to re-insert the word "permeable" which is already in the 2009 code and was removed by the original proposal.

In the technical hearings the committee approved this proposal but also noted that the proposal requires work. This public comment addresses one of the flaws with the original proposal. We look forward to combining this public comment with other public comments from the industry that address other flaws.

It is not appropriate to remove the descriptor "permeable". The removal of the word "permeable" changes the water-resistive barrier requirement because the "permeable" designation is specific to shingle/shake cladding and is not included in Section 703.2.   Reducing the water-resistive barrier permeability may result in the reduction in the wall structure's ability to dry and thus be detrimental to building performance. The proponent provided no information to support the removable of the word "permeable".

This proponent also proposed or supported modifications to remove "permeable" from other agenda items (FS150 part 1 and RB134) at the technical hearings. All of these modifications/proposals were disapproved by the technical committee. As stated in the Report of Hearings, the FS156 proposal listed in the monograph did not strike this word; it was stricken in the errata (which was not published to the ICC website). The permeability requirement was not a topic of discussion in the public hearing on this item.

Public Comment 3:

John Ingargiola, Federal Emergency Management Agency, requests Disapproval.

FEMA is opposed to requirements for foam plastic sheathing in exterior wall coverings as shown in code change proposal FS156. A number of technical concerns were expressed by FEMA at the Baltimore hearings and these concerns and others are summarized herein. In many cases, recommendations are provided to the proponent of FS156 so that FEMA concerns can be addressed and a revised proposal can be supported. The following are among concerns with requirements of FS156:

A) Wall sheathing applications under FS156 extend far beyond results from tests raising questions over safe application of the requirements. For siding applied directly over foam plastic sheathing, several installation details are used in the tests which are not included as construction requirements or limitations for use of foam sheathing. These include the following: (i) foam sheathing attached to all framing at 12" on center with 7/16" head x 0.120" shank diameter galvanized roofing nails, (ii) all foam sheathing edges backed with and nailed to framing, and (iii) no adjoining foam sheathing panel edge joints over a common stud. Also, FS156 broadly permits use of foam sheathing in thicknesses greater than 1-1/2" yet the maximum thickness tested in negative pressure assembly tests was ½". Additional product testing is recommended to ensure that failure mechanisms are properly addressed for each product based on code required construction methods.

B) Table R703.3.2.1 Fastening Requirements for Direct Siding Attachment Over Foam Plastic Sheathing does not identify fastener head size for use to attach siding. Negative pressure tests utilized siding nails with 3/8" diameter head; however, a smaller head size is permitted to be used per other requirements of the code. Therefore, the strength of the overall system based on tests may be in excess of strength for actual applications where smaller head sizes are permitted.

C) The Factor of Safety of 1.5 used to adjust test pressures to allowable pressures is too small relative to that provided by structural sheathing. The factor of safety of 1.5 for vinyl siding wind ratings has previously been identified as an area of concern in a FEMA Mitigation Assessment Team Report (Hurricane Ike) due to observed failures of siding. An increased safety factor for applications where the foam sheathing and siding are assumed to act as a composite structural element to resist wind is needed to ensure the integrity of the building envelop and to protect against a "through wall" wind pressure failure of the building envelope should either the siding of foam sheathing fail. In some cases, interior gypsum wallboard failure may precipitate a "through wall" failure given the system approach used to establish vinyl siding and foam sheathing requirements in the IRC (e.g. interior gypsum wallboard considered to resist a portion of wind pressures). A safety factor of 3 is commonly associated with structural wall sheathing applications based on the average factor of safety for nail withdrawal. If a safety factor of 3 were to be used rather than 1.5, tabulated wind speeds for many of the products would be reduced by approximately 30%.

D) There is no assurance that the structural properties of the foam sheathing used in the tests, which are necessary to ensure resistance to wind pressures, are representative of structural characteristics of foam sheathing permitted under FS156. FS156 broadly permits applications for foam sheathing including those with and without proprietary "facers" that contribute to the strength of the product. It is recommended that a mechanism for "fingerprinting" structural characteristics of foam sheathing products used in wind resistance tests be established and monitored as part of a product standard to ensure wind resistance performance is maintained in wall sheathing applications. These characteristics include bending capacity, bending stiffness, and nail head pull through.

E) The testing and analysis does not represent the effect of fluctuating positive and negative pressures expected in real wind events. The allowable pressure rating of 1-1/2" EPS foam sheathing (e.g. 89 psf or wind speed of 222 mph) appears high relative to wood structural panel products used in wall sheathing applications. For example 19/32" wood structural panel has an allowable pressure capacity of 90 psf in accordance with the *Special Design Provisions for Wind and Seismic* (SDPWS). The similarity in allowable pressure ratings is due in part to differences in safety levels, differences in test methods, and differences in analysis methods between foam sheathing and commonly used structural products for wall sheathing applications.

Public Comment 4:

Edward L. Keith, PE, representing APA – The Engineered Wood Association, requests Disapproval.

Request that the body overturn the committee's recommendation for approval as submitted and disapprove the code change proposal.

The intent of the original code change proposal is to prescriptively permit the use of non-structural foam insulation as a structural wall sheathing for all wall locations that are not required as wall bracing. This proposal would permit the use of non-structural foam sheathing in areas with a design wind speed of 130 mph. This proposal is seriously flawed by ignoring the life-safety consideration mandated by the IRC, not to mention the increased risk for property damage.

Provisions of Section R301.2.1, reproduced below, clearly require the wall sheathing to be designed for the loads normal to the wall surface (important provisions are underlined for clarity).

> ***R301.2.1 Wind limitations.*** *Buildings and portions thereof shall be limited by wind speed, as defined in Table R301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be determined from Figure R301.2(4). Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. <u>Where loads for wall coverings</u>, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors <u>are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings</u>, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors…*

This proposal takes the advantage of a loop hole in the IRC found in Section R301.1: The loop hole permits prescriptive portions to be deemed-to-comply with the intent of the code, as seen below:

> ***R301.1 Applications.*** *…Buildings and structures constructed as prescribed by this code are deemed to comply with the requirements of this section*.

The intent of this provision is to permit methods with a proven <u>history</u> of adequate performance not to be required to meet the engineering requirements of the code. It is disingenuous to use these provisions to permit systems with known performance issues to be exempt from the structural requirements of the code.

Thunderstorms in the Midwest (Evansville, Indiana and Southwest Missouri, areas of nominal 85 mph wind speed) have left countless houses stripped of siding and foam wall sheathing. In most cases the actual wind loads were well below the maximum design wind speed. In some cases only the wall sections containing the wall bracing panels were left to protect the interior of the home (see photos below). Additional photos are available in the Spring and Summer issues of the 2008 Wood Design Focus.

Figure 1. – Foam and vinyl wall covering failure.
(Storm damage – Southern IN, 2005)

Figure 2 – Foam and vinyl wall covering failure while wall bracing panel remains.
(Storm damage, Springfield, MO, 2006)

Please note that the legacy codes, the ICC, as well as their corresponding product evaluation organizations have long required all structural products to meet all of the below 3 requirements:

1. They must be manufactured to proprietary or consensus based structural standards. These standards describe the minimum physical properties, testing criteria, and durability requirements that must be met by the material for its intended end use.
2. An established quality control program must be in place and supported by the manufacturer to insure that the minimum standards are being met by the production facility.
3. An approved third-party quality assurance inspection agency must be under contract to monitor the manufacturer's QC program and issue trademark stamps.

These requirements are designed to protect the public from unsafe construction. While foam insulation boards are manufactured to <u>insulation standards</u>, these products meet none of the structural requirements specified for all other structural products. Unlike wood structural panels or structural fiberboard sheathing, foam insulation is not manufactured to consensus-based structural product manufacturing standards. As such, the structural performance of foam sheathing is undefined and uncontrolled. Furthermore, the quality control and quality assurance programs adopted by the foam sheathing manufacturers are limited to the control of insulation characteristics of the products, but not the structural performance. The use of non-structural sheathing for structural applications is a serious life-safety issue.

Sections R612.5 and R612.6 require the same level of protection for windows and doors as is required for wood structural panels and structural fiberboard products:

__R612.5 Performance.__ Exterior windows and doors shall be designed to resist the design wind loads specified in Table R301.2(2) adjusted for height and exposure per Table R301.2(3).

__R612.6 Testing and labeling.__ Exterior windows and sliding doors shall be tested by an approved independent laboratory, and bear a label identifying manufacturer, performance characteristics and approved inspection agency to indicate compliance with AMA/WDMA/CSA 101/I.S.2/A440…

It is interesting to note that these requirements for windows and doors will be maintained in place while the walls are prescriptively permitted to be protected only by non-structural foam insulation that has none of the historic manufacturing safeguards in place. We used to hope that our windows and doors were as strong as our walls in a storm; this proposal effectively reverses this expectation!

We urge overturning of the committee due to the serious flaw of the proposal in ignoring the important life-safety issue.

Public Comment 5:

Dennis Pitts representing American Wood Council, American Forest & Paper Association, requests Disapproval.

While some limited testing of rigid foam sheathing has been conducted, these products are not structural materials. Structural properties and requirements have not been quantified, quality control requirements to have not been specified, and product labeling to ensure proper selection and structural performance do not exist. To date, these products rely on the contribution of other construction elements to resist racking and out-of-plane loads. At the IBC Structural Committee hearings during discussion of FS156 Part I, a number of issues of concern were identified by various groups and the proponent of Part I asked for it to be denied. These same issues were raised at the IRC Committee hearings during the discussion of Part II, but the proponent chose to ignore them, as did a majority of the IRC Committee members. In review, the following points were made:

1. The various foam sheathing insulation board products on the market are proprietary products manufactured and qualified under various material specifications; Expanded Polystyrene (EPS) – ASTM C578 (Type II), Polyisocyanurate – ASTM C1289 (Type 1), and Extruded Polystyrene (XPS) – ASTM C578 (Type X). These material specifications ensure that the product meets minimum density, thermal, and consistency requirements; however, these material specifications are not product standards and do not reference testing or state structural requirements needed to determine and regulate these products in structural applications.
2. Testing provided by the Foam Sheathing Coalition in support of this change and verified by others suggests that a significant portion of the out-of-plane bending capacity of the foam sheathing board results from the proprietary facers that are applied to the insulation. These facers are neither identified nor required. Since there are no product standards to regulate these products, the manufacturer can use any facer material to qualify the board but use anything else or leave the facer off completely if so chosen. As a result, any claims as to the capacity of any specific product would be limited to a single manufacturer and, potentially, to a single run of the product.
3. Fastener requirements outlined in the proposal are unreasonable. For example, Table 1405.18.2.1 recommends the use of a 0.120" nail, penetrating at least 1.25" into the wood framing, to attach 3" thick foam sheathing. This would require a nail that is at least 4.25" long to be driven through the foam and hit the 1.5" thick framing member… nearly 50% longer than the standard length of this size nail. In addition, without high-strength proprietary nails, a nail of this length would likely bend or buckle before penetrating the wood member… but without detection because it would buckle within the 3" foam.
4. Installation provisions, verified by limited negative load (suction) testing, require that the exterior covering, such as vinyl siding, be used to hold the foam sheathing on to the exterior wall. In this application, the exterior covering becomes the "structural element" of the building envelope. Efforts have been made to show that the exterior covering and foam sheathing act as a system to resist the wind loads; however, the suitability of this design approach is questionable because the survival of the entire wall envelope is dependant on the exterior covering (e.g. vinyl siding). Dynamic loading effects caused by wind turbulence are ignored in the proposed change. Fluctuating positive and negative pressures will play a greater role in the loss of flexible coverings than negative pressures alone as utilized in testing.

Based on these concerns, we strongly recommend that the ICC membership reconsider the IRC Committee's recommendation and follow the IBC Structural Committee's recommendation and deny this change. Until such time as a product standard for these products is developed that addresses structural requirements, product changes, proprietary facers, structural quality control, and product labeling, these products should continue to be reviewed and evaluated by one of the Evaluation Services as an alternative material and used as an alternative means of meeting the requirements of the code.

Final Action: AS AM AMPC____ D

FS166-09/10
2603.4.1.5, 2603.6

<u>Proposed Change as Submitted</u>

Proponent: Tony Crimi, AC Consulting Solutions Inc., representing North American Insulation Manufacturers Association

Revise as follows:

2603.4.1.5 Roofing. Foam plastic insulation under a roof assembly or roof covering <u>having a smoke-developed index of not more than 450, and</u> ~~that is~~ installed in accordance with the code and the manufacturer's instructions shall be separated from the interior of the building by wood structural panel sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints or other approved type of edge support, or an equivalent material. A thermal barrier is not required for foam plastic insulation that is a part of a Class A,B or C roof-covering assembly, provided the assembly with the foam plastic insulation satisfactorily passes FM 4450 or UL 1256.

2603.6 Roofing. Foam plastic insulation meeting the requirements of Sections 2603.2, 2603.3 and 2603.4 <u>and having a smoke-developed index of not more than 450,</u> shall be permitted as part of a roof-covering assembly, provided the assembly with the foam plastic insulation is a Class A, B or C roofing assembly where tested in accordance with ASTM E 108 or UL 790.

Reason: Fires in roofing materials can occur during installation or maintenance of roofing, during the normal course of operations, or during maintenance and installation of building equipment. While ASTM E108 and UL 790 are a means of evaluating fire spread, they do not measure smoke production.

Although roofing materials are installed on the exterior of a building, the smoke from burning roof insulations can be a hazard to both firefighters and the environment. Combustible smoke and off-gassing from combustible insulating materials pose a serious risk to building occupants and firefighters. Excessive quantities of smoke emanating from burning roofing materials also prevent effective firefighting operations, potentially delay response times or the effectiveness of fire fighting operations. There are also documented cases of fires starting in roofing materials causing sprinklers inside the building to activate and cause additional property damage.

Even when a fire is contained within the building, sufficient heat can be generated through a metal roof deck to cause smoldering combustion and smoke release. While a smoke developed index of 450 is consistent with some interior applications, it still represents a limit which most foam plastic insulations can conform with.

Several foam plastic insulation products have direct-to-steel-deck approvals from both FM and UL. FM approval for Class 1 roof systems based on passing FM 4450 and UL 1256. Both of these tests are specifically referenced in the IBC. The International Building Code (IBC) already waives the requirements for a thermal barrier for foam plastic roof insulation used in roof deck construction that complies with FM 4450 or UL 1256. Some minimum smoke developed rating should be maintained.

Cost Impact: This proposal should not increase the cost of construction.

ICCFILENAME: CRIMI FS9 AND FS10

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The committee felt that Section 2603.3 already has this requirement and therefore this proposal is redundant.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, AC Consulting Solutions Inc, representing North American Insulation Manufacturers' Association (NAIMA), requests Approval as Submitted.

Commenter's Reason: Fires in roofing materials can occur during installation or maintenance of roofing, during the normal course of operations, or during maintenance and installation of building equipment. While ASTM E108 and UL 790 are a means of evaluating fire spread, they do not measure smoke production. In this case, contrary to the published committee reason, smoke development ratings for roofing insulations and coverings are clearly exempted in 2603.3 Exception #3, and in 2603.6.

Although roofing materials are installed on the exterior of a building, the smoke from burning roof insulations can be a hazard to both firefighters and the environment. Air intakes are often installed through the roofing. In the event of a fire on the roof, smoke will be drawn back into the building through these intakes. Similarly, occupants of adjacent buildings and neighborhoods can also be affected by smoke emanating from combustible roof insulations. Emissions from fires in roofing materials have a serious impact on the environment. Not only are the combustion gases toxic at the site of the fire, but during a fire, very large quantities of particulates are also released into the environment. The particles consist among others of soot, tar, unburned materials, and inorganic debris.

In addition to the reasons include with the original Proposal, it should also be acknowledged that rooftop Occupancies are becoming increasingly popular. The existing provisions for rooftop structures in Chapter 15 are largely prescriptive and do not envision facilities such as restaurant seating, gardens, or performances on rooftops.

Final Action: AS AM AMPC____ D

FS167-09/10
2603.4.1.5, 2603.4.1.5.1, 2603.4.1.5.2

Proposed Change as Submitted

Proponent: Mike Ennis, Single Ply Roofing Industry (SPRI), representing the Single Ply Roofing Industry (SPRI)

Revise as follows:

2603.4.1.5 Roofing. Foam plastic insulation under a roof assembly or roof covering shall comply with Sections 2603.4.1.5.1 and 2603.4.1.5.2 as applicable.

2603.4.1.5.1 Wood roof decks. A thermal barrier is not required for foam plastic insulation that is part of a Class A, B or C roof-covering assembly, provided the assembly ~~under a roof assembly or roof covering that~~ is installed in accordance with the code and the manufacturer's instructions and is ~~shall be~~ separated from the interior of the building by wood structural panel sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints or other approved type of edge support, or an equivalent material.

2603.4.1.5.2 Any roof deck. A thermal barrier is not required for foam plastic insulation that is part of a Class A, B or C roof-covering assembly, provided the assembly with the foam plastic insulation satisfactorily passes FM 4450 or UL 1256.

Reason: The proposed wording is offered to clarify when the two exceptions for a thermal barrier in Section 2603.4.1.5 are applicable. The first sentence in the current version 2603.4.1.5 is only applicable when a wood roof deck is used. The second sentence is applicable for any type of roof deck. The proposed wording provides clarification without changing the intent.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: ENNIS-FS2-2603.4.1.5

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the current language was clearer than the proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, representing Single Ply Roofing Industry (SPRI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2603.4.1.5 Roofing. A thermal barrier is not required for foam plastic insulation under a roof assembly or roof covering if either of the following conditions are met: ~~shall comply with Sections 2603.4.1.5.1 and 2603.4.1.5.2 as applicable.~~

~~**2603.4.1.5.1 Wood roof decks.**~~ 1. A thermal barrier is not required for foam plastic insulation that is part of a Class A, B or C roof-covering assembly, provided the assembly is installed in accordance with the code and the manufacturer's instructions and is separated from the interior of the building by wood structural panel sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints or other approved type of edge support, or an equivalent material.

~~**2603.4.1.5.2 Any roof deck.**~~ 2. A thermal barrier is not required for foam plastic insulation that is part of a Class A, B or C roof-covering assembly, provided the assembly with the foam plastic insulation satisfactorily passes FM 4450 or UL 1256.

Commenter's Reason: The original code change proposal was submitted to provide clarification to the thermal barrier exception language for roofing contained in Section 2603.4.1.5 Roofing. This section provides two separate conditions for which the thermal barrier is not required. The first is a construction option. Roof decks constructed with minimum 0.47" thick structural wood panel sheathing, with edges supported by blocking, tongue and groove joints or other approved types of edge support do not require a thermal barrier. The second option offered in this Section is a testing option. If the roof assembly has passed UL1256 or FM4450, then a thermal barrier is not required. In the current Section 2603.4.1.5 these options are contained in the same paragraph and it is not clear that they are two separate options. During the code change hearings the Committee felt the proposed wording was more confusing than the current wording. This modification is offered to provide additional clarification.

Final Action: AS AM AMPC____ D

FS180-09/10

2606.5, 2609.1.1 (New), 2610.1.1 (New)

Proposed Change as Submitted

Proponent: J. Nigel Ellis, representing Ellis Fall Safety Solutions, LLC

1. Revise as follows:

2606.5 Structural requirements. Light-transmitting plastic materials in their assembly shall be of adequate strength and durability to withstand the loads indicated in Chapter 16. Technical data shall be submitted to establish stresses, maximum unsupported spans and such other information for the various thicknesses and forms used as deemed necessary by the *building official*. Every skylight shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides. Skylight screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 lbs applied perpendicularly at any one area on the screen. They shall also be of such construction and mounting that under ordinary loads or impacts, they will not deflect downward sufficiently to break the glass below them. The construction shall be of grillwork with openings not more than 4 inches long or of slatwork with openings not more than 2 inches wide with length unrestricted.

2. Add new text as follows:

2609.1 General. Light-transmitting plastic roof panels shall comply with this section and Section 2606. Light-transmitting plastic roof panels shall not be installed in Groups H, I-2 and I-3. In all other groups, light-transmitting plastic roof panels shall comply with any one of the following conditions:

1. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. The roof construction is not required to have a fire-resistance rating by Table 601.
3. The roof panels meet the requirements for roof coverings in accordance with Chapter 15.

2609.1.1 Guarding. Light-transmitting roof panels and assemblies shall be guarded as required by Section 2606.5.

3. Add new text as follows:

2610.1 Light-transmitting plastic glazing of skylight assemblies. Skylight assemblies glazed with light-transmitting plastic shall conform to the provisions of this section and Section 2606. Unit skylights glazed with light-transmitting plastic shall also comply with Section 2405.5.

> **Exception:** Skylights in which the light-transmitting plastic conforms to the required roof-covering class in accordance with Section 1505.

2610.1.1 Guarding. Unit skylight assemblies shall be guarded as required by Section 2606.5.

Reason: The proposed wording is verbatim Federal OSHA standard from 1971 and needs to be reflected in the building code because Chapter 16 loading is inadequate for human falls onto skylights and skylight manufacturers are not the only users of the skylights they produce. In other words some building owners may not be employers who maintain the roof skylights and therefore need the protection from the manufacturers in each installation going forward with the inclusion or design integration of a necessary hazard control.

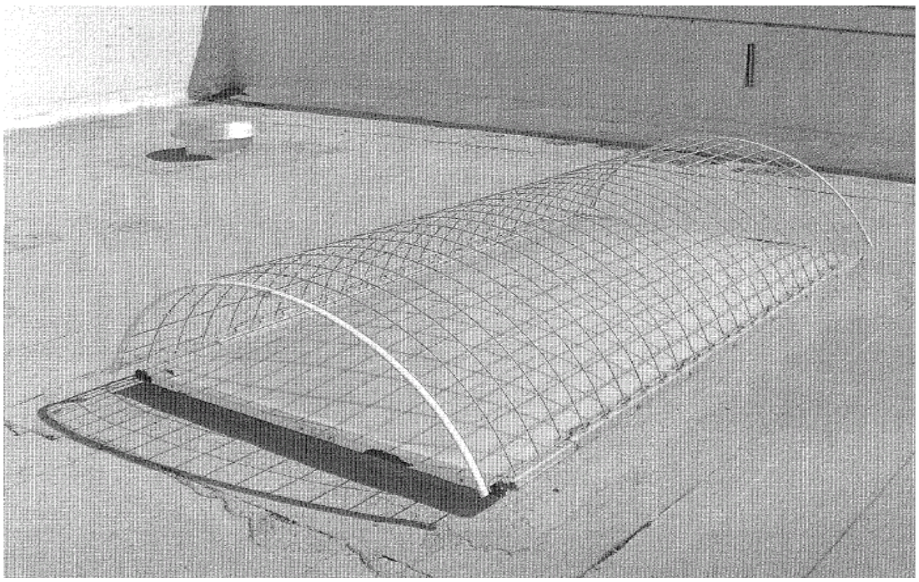
Fatalities from falls through skylights which category for inclusion includes light-transmitting panels and smoke vents are documented by the Bureau of Labor Statistics which in 2006 accounted for 36 deaths in non-government buildings in the USA www.bls.gov. Skylights have their own fatal fall category as opposed to roof or floor openings that also have their own listing. The Federal requirement for General Industry is 29CFR1910.23(a)(4) and (e)(8) which became mandatory in 1971 for employers.

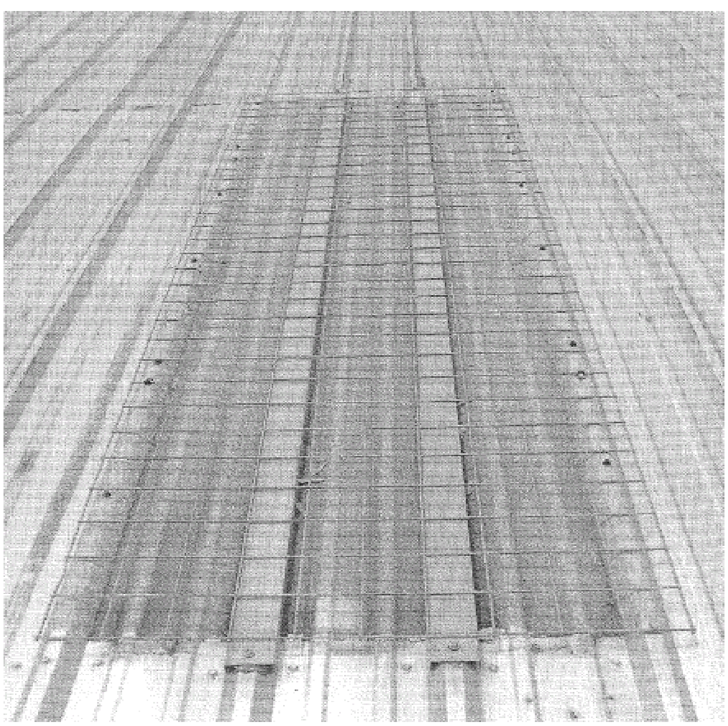
There are also similar requirements in the 1926.500-503 Construction regulations that equate skylights with open holes and require the use of adequate covers. The ANSI A1264.1 and A10.18 are similarly worded but all are aimed ineffectively at employers with exposed employees but not exposed independent contractors who visit dozens of building roofs each month without a feasible protection method e.g. HVAC, Laborers, roofers, Window Cleaners etc.).

However after 38 years not even 1% of skylights have the required screen protection. Ref Plasteco President Key Sandow. Skylight manufacturers do not mark their skylights clearly in the same way that auto glazers do, so that manufacturers may never know their skylight ever failed to support a falling worker. Instead, the blame falls on the injured person for not knowing to stay away from or be careful around skylights. My experience is that workers do not know the degree of danger stepping close to skylights until it is too late nor do their employers.

Plastic skylights may survive impacts from falling or tripping by the trades (of which there may be 25 or more) when new but almost all suffer from uv light degradation over the years. An alternative that also takes care of controlling intruders is under-skylight grills especially for opening smoke vents and similar skylights and corrosive conditions and sometimes both to reduce fall distances to 4 ft or less per OSHA General Industry requirements. Skylights are maintained today by sealing leaks with silicone, fiberglass or equivalent and appear in “good” condition on maintenance company reports to the building owner if they do not presently leak despite the fact that they have cracks after a few years in the sun and are patched regularly. There is no common lifetime for plastic skylights that may now be 50+ years old and users do not currently replace a skylight unless a leak cannot be stemmed.

The request is to include the federal requirement in the IBC Building Code and carry the responsibility to architects, engineers and building owners and managers to protect the work trades that maintain the roof systems in those buildings by including adequate protection in specifications. No building owner expects that a skylight will have a disastrously weak strength that a worker can step onto and through as the years progress eventually almost as easily as pushing a finger through. The OSHA interpretation by John Miles in 1984 does not anticipate the degradation that occurs with almost all synthetic-related skylights nor the dynamic force of a slip, trip and/or fall by a passing worker. Use of personal fall arrest is a last resort but no system is legal without a 5,000 lbs anchorage point which is simply unavailable on a roof unless designed by a structural engineer and regularly recertified (OSHA 1926.500-503 and ANSI Z359-2007 The Fall Protection Code) and building owners do not contract or pay for 5000 lbs anchors in their roofs or confirm roof strengths with any contractors at this time (ref: 1926.501(a)(2) adequate surface strength requirements). Examples of skylight screens follow:





Cost Impact: Approx. $300 including a 4’x8’ skylight screen and installation

ICCFILENAME: ELLIS-FS1-2606.5

Public Hearing Results

This code change was heard by the IBC Structural Code Development Committee.

Committee Action: Disapproved

Committee Reason: As worded, the proposal would require guards or screens at all skylights and that is considered unnecessary. The requirement should also apply to skylights that are not glass, yet the proposed text specifically refers to the glass below the guard. In addition the area of the screen over which the 200 pound force should be applied in not specified. A consensus test standard is being worked on currently that should resolve this.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

J. Niegel Ellis, Ellis Fall Safety Solutions LLC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2606.5 Structural requirements. Light-transmitting plastic materials in their assembly shall be of adequate strength and durability to withstand the loads indicated in Chapter 16. Technical data shall be submitted to establish stresses, maximum unsupported spans and such other information for the various thicknesses and forms used as deemed necessary by the *building official*. Every plastic unit skylight shall be guarded by a standard metal skylight screen ~~or a fixed standard railing on all exposed sides~~ or equivalent. Skylights and their screens or equivalent barriers shall be of such construction and mounting that they are each capable of withstanding a load of at least 200 lbs falling 48 inches or of equivalent energy applied perpendicularly at any ~~one~~ area on the skylight or screen that represents a falling body part. ~~They shall also be of such construction and mounting that under ordinary loads or impacts, they will not deflect downward sufficiently to break the glass below them. The construction shall be of grillwork with openings not more than 4 inches long or of slatwork with openings not more than 2 inches wide with length unrestricted.~~

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: The proposed wording is Federal OSHA standard from 1971 amended based on Committee recommendations at the ICC Baltimore meeting and should be reflected in the building code because Chapter

16 loading is inadequate for human falls onto skylights and skylight manufacturers are not the only users of the skylights they produce. In other words some building owners may not be employers who maintain the roof skylights and therefore need the protection from the manufacturers in each installation going forward with the inclusion or design integration of a necessary hazard control.

Fatalities from falls through skylights which category for inclusion includes light-transmitting panels and smoke vents are documented by the Bureau of Labor Statistics which in 2006 accounted for 36 deaths in non-government buildings in the USA www.bls.gov and 22 in 2007. Skylights have their own fatal fall category as opposed to roof or floor openings that also have their own listing. The Federal requirement for General Industry is 29CFR1910.23(a)(4) and (e)(8) which became mandatory in 1971 for employers. However hazard prevention is the goal that we seek.

There are also similar requirements in the 1926.500-503 Construction regulations that equate skylights with open holes and require the use of adequate covers. The ANSI A1264.1 and A10.18 are similarly worded but all are aimed ineffectively at employers with exposed employees but not exposed independent contractors who visit dozens of building roofs each month without a feasible protection method e.g. HVAC, Laborers, roofers, Window Cleaners etc.).

However after 38 years not even 1% of plastic skylights have the required screen protection. Ref: Plasteco President Key Sandow. Skylight manufacturers do not mark their skylights clearly in the same way that auto glazers do, so that manufacturers may never know their skylight ever failed to support a falling worker. Instead, the blame falls on the injured person for not knowing to stay away from or be careful around skylights. My experience is that workers do not know the degree of danger stepping close to skylights until it is too late nor do their employers.

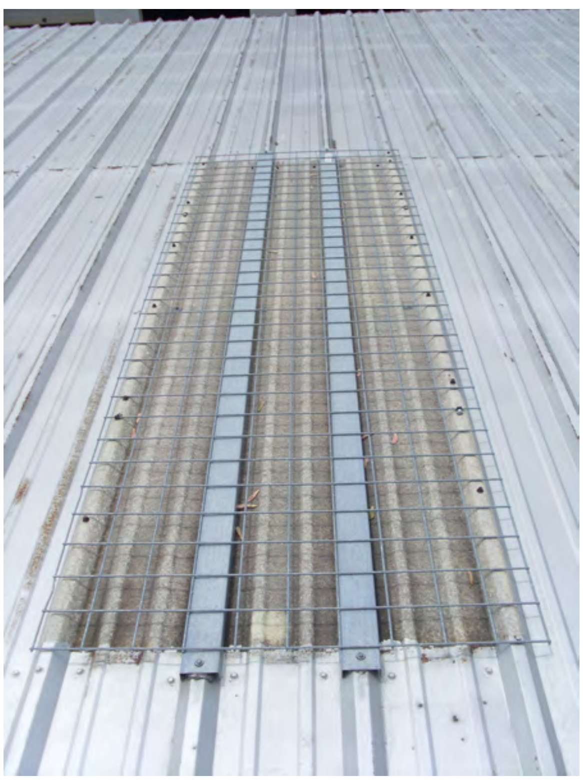
Plastic skylights may survive impacts from falling or tripping by the trades (of which there may be 28 or more) when new but almost all suffer from progressive uv light degradation over a few years where even sitting and leaning against a skylight is often sufficient to cause breakage like an egg shell due to stress crack crazing . An alternative that also takes care of controlling intruders is under-skylight grills especially for opening smoke vents and similar skylights and corrosive conditions and sometimes both to reduce fall distances to 4 ft or less per OSHA General Industry requirements. Skylights are maintained t-day by sealing leaks with silicone, fiberglass or equivalent and appear in "good" condition on maintenance company reports to the building owner if they do not presently leak despite the fact that they have cracks after a few years in the sun and are patched regularly. There is no common lifetime for plastic skylights that may now be 50+ years old and users do not currently replace a skylight unless a leak cannot be stemmed.

The request is to include the amended federal requirement in the IBC Building Code and carry the responsibility to architects, engineers and building owners and managers to protect their work force and the work trades that maintain the roof systems in those buildings by including adequate protection in specifications. No building owner expects that a skylight will have a disastrously weak strength that a worker can step or trip onto and through as the years progress eventually almost as easily as pushing a finger through the light. The OSHA interpretation by John Miles in 1984 does not anticipate the degradation that occurs with almost all synthetic-related skylights nor the dynamic force of a slip, trip and/or fall by a passing worker. Use of personal fall arrest is a last resort but no such system is legal without a 5,000 lbs anchorage point which is simply unavailable on a roof unless designed by a structural engineer and regularly recertified (OSHA 1926.500-503 and ANSI Z359-2007 the Fall Protection Code) and building owners typically do not contract or pay for 5000 lbs anchors in their roofs or confirm roof strengths with any contractors at this time (ref: 1926.501(a)(2) for adequate surface strength requirements).

Note: Glazed skylight already must have screens under the glass under some circumstances; see IBC 2405.3, so the precedent is already set for much more stable and safe skylighting, Plastic skylights will always degrade and hence they and their screen or equivalent protection should be available to building users as soon as possible. The ASTM E06.51.25 standards committee is working to finalize the estimated size of body parts to give further testing guidance. Examples of skylight screens a. and b. follow:

a.

b. I cannot upload a. and b. so I will forward to Dave Bowman separately (same as previous two pictures from 09/10)



Cost Impact: a. Approx. $400 including a 4'x8' domed skylight screen and installation with security screws/bolts (b. alt. 10'x3' approx. light transmitting panel screen)

Final Action: AS AM AMPC____ D

FS181-09/10
2610.2

Proposed Change as Submitted

Proponent: Ennis, representing the Single Ply Roofing Industry (SPRI))

Revise as follows:

2610.2 Mounting. The light-transmitting plastic shall be mounted above the plane of the roof on a curb constructed in accordance with the requirements for the type of construction classification, but at least 4 inches (102 mm) above the plane of the roof. ~~Edges of the light-transmitting plastic skylights or domes shall be protected by metal or other approved noncombustible material, or the~~ The light transmitting plastic dome or skylight shall be shown to be able to resist ignition where exposed at the edge to a flame from a Class B brand as described in ASTM E 108 or UL 790.

Exceptions:

1. Curbs shall not be required for skylights used on roofs having a minimum slope of three units vertical in 12 units horizontal (25-percent slope) in occupancies in Group R-3 and on buildings with a nonclassified roof covering.
2. ~~The metal or noncombustible edge material is not required where nonclassified roof coverings are permitted.~~

Reason: The flames of the Class B brand can extend above the noncombustible edge and contact the dome, allowing for the possibility of catching fire and test failure. ASTM E108 tests have been conducted on products with non-combustible edge material in which the flame extended beyond the noncombustible edge material and contacted the dome. This could result in ignition of the dome depending upon the type of material used for the dome. Testing per ASTM E108 or UL790 with a Class B brand should be the accepted requirement.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: ENNIS-F3-2610.2 AND ENNIS-F5-2610.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt there was a lack of data to indicate that a plastic skylight with metal edge protection is a fire exposure problem.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis representing Single Ply Roofing Industry (SPRI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2610.2 Mounting. The light-transmitting plastic shall be mounted above the plane of the roof on a curb constructed in accordance with the requirements for the type of construction classification, but at least 4 inches (102 mm) above the plane of the roof. The light transmitting plastic dome or skylight shall be shown to be able to resist ignition where exposed at the edge to a flame from a Class B brand as described in ASTM E 108 or UL 790.

Exceptions:

1. Curbs shall not be required for skylights used on roofs having a minimum slope of three units vertical in 12 units horizontal (25-percent slope) in occupancies in Group R-3 and on buildings with a nonclassified roof covering.
2. Class B brand testing is not required where nonclassified roof coverings are permitted.

Commenter's Reason: The original code change proposal was submitted to delete the exception for fire testing of light-transmitting plastic skylights in cases where the edges of the skylight were protected by metal or other approved non-combustible material. This proposal was submitted because test experience has shown that non-combustible edge material will not prevent the flames of the burning brand from igniting the plastic dome.

The proposed revision is being submitted to address the following comments from the code change hearings:

1) The Committee felt there was a lack of data to indicate that a plastic skylight with metal edge protection is a fire exposure problem.
   Manufacturers have conducted Class B brand testing in accordance with ASTM E108 and UL790 and have observed flames extending above the non-combustible edge material and contacting the plastic dome. Video evidence of this occurrence can be viewed at the following web link: http://www.spri.org/publications/policy.htm
2) The Committee felt it was inappropriate to require fire testing of skylights where non-classified roof coverings are permitted.
   In the current code language, there is an exception that allows the use of skylights without non-combustible edge materials where non-classified roof coverings are permitted. In the original proposal this exception was deleted. In the proposed revision an exception to testing skylights is provided where non-classified roof coverings are permitted.

Final Action: AS AM AMPC____ D

FS193-09/10
711.5.2, 711.5.3, 711.5.4 (New), 711.7

Proposed Change as Submitted

Proponent: Mike Ashley, C.B.O., representing: Alliance for Fire & Smoke Containment & Control (AFSCC)

Revise as follows:

711.5.2 Smoke and draft control doors. Where required elsewhere in ~~the~~ this code to comply with this section, doors in smoke partitions shall meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.015424 $m^3/(s \bullet m^2)$) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature test and the elevated temperature exposure test. Installation of smoke doors shall be in accordance with NFPA 105.

711.5.3 Self- or automatic-closing doors. Where required elsewhere in ~~the~~ this code to comply with this section, doors in smoke partitions shall be self-closing or automatic-closing by smoke detection in accordance with Section 715.4.8.3.

711.5.4 Latching of doors. Where required elsewhere in this code to comply with this section, doors in smoke partitions shall be provided with latches as required for fire doors in accordance with Section 715.4.8.1.

711.7 Ducts and air transfer openings. The space around a duct penetrating a smoke partition shall be filled with an approved material to limit the free passage of smoke. Air transfer openings in smoke partitions shall be provided with a smoke damper complying with Section 716.3.2.2. Where required elsewhere in this code to comply with this section, ducts penetrating a smoke partition shall be provided with smoke dampers as required for corridors in accordance with Section 716.5.4.1.

> **Exception:** Where the installation of a *smoke damper* will interfere with the operation of a required smoke control system in accordance with Section 909, *approved* alternative protection shall be utilized.

Reason: The purpose of this proposed code change is to clarify the application of these sections we're revising, as well as a new Section 711.5.4 which addresses latching requirements for doors that may be installed in smoke partitions under certain conditions. The intent of Sections 711.5.2 and 711.5.3 is to provide a set of criteria for the smoke and draft control doors that might be required elsewhere in the code for smoke partitions depending upon the specific application, without mandating that all doors in smoke partitions meet these requirements where they may not be necessary for the specific application.

A case in point is Section 708.14.1 which was revised during the last code development cycle to include references to Sections 711.5.2 and 711.5.3 in Exception 5 regarding how the doors in the smoke partition are to be protected where the smoke partition substitutes for the 1-hour fire-resistive enclosure for elevator lobbies in sprinklered buildings. It should also be noted that a direct reference to Section 716.5.1 for the protection of duct penetrations of those smoke partitions was also provided in Exception 5. Since that may occur more often than not where certain applications for smoke partitions are prescribed in the future, we decided to incorporate that provision into Section 711.7 in a similar manner to that in Sections 711.5.2 and 711.5.3. We have also provided a reference to Section 715.4.8.1 in our proposed new Section 711.5.4 Latching of Doors in smoke partitions. This is also similar in style to Sections 711.5.2 and 711.5.3 but specifically relates to a latch being required for doors in smoke partitions when prescribed elsewhere in the code, again, such as is the case for Exception 5 to Section 708.14.1.

We believe this will make the code easier to understand, apply, and enforce so that one does not get into a loop when referred back to one of these sections that states "where required elsewhere in this code" and then try to determine how that is intended to apply. So by adding the phrase "to comply with this section," when another section of the code specifies compliance with any of these sections, it will be clear that it is intended to apply to that situation. We believe that with the new Section 711.5.4 and the proposed revisions to Section 711.7, the majority of the situations where opening protectives may be required by other provisions of the code for specific applications of smoke partitions in the future will be covered.

This will eliminate the need to reference other sections throughout the code to implement these requirements. In this way, someone referencing the provisions in smoke partitions will find the various options that are available for protecting openings in such smoke partitions in one location.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ASHLEY-FS2-711.5.2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that this proposal appropriately clarifies the intent and application of the requirements for smoke and draft control doors.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David S. Collins, FAIA, The Preview Group Inc, representing The American Institute of Architects, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

711.5.2 Smoke and draft control doors. Where ~~required elsewhere in this code to comply with this section~~ smoke partitions are permitted by the exceptions to Section 708.14.1 of this code, doors in such smoke partitions shall meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.015424 m3/(s • m2)) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature test and the elevated temperature exposure test. Installation of smoke doors shall be in accordance with NFPA 105.

711.5.3 Self- or automatic-closing doors. Where ~~required elsewhere in this code to comply with this section~~ smoke partitions are permitted by the exception to Section 708.14.1 of this code, doors in such smoke partitions shall be self-closing or automatic-closing ~~by smoke detection in accordance with Section 715.4.8.3~~. by the actuation of smoke detectors installed in accordance with Section 907.3 or by loss of power to the smoke detector or hold-open device. Doors that are automatic-closing by smoke detection shall not have more than a 10-second delay before the door starts to close after the smoke detector is actuated.

711.5.4 Latching of doors. Where ~~required elsewhere in this code to comply with this section~~ smoke partitions are permitted by exception number 5 to Section 708.14.1 of this code, doors in such smoke partitions ~~shall be provided with latches as required for fire doors in accordance with Section 715.4.8.1.~~ shall be provided with an active latch bolt that will secure the door when it is closed.

711.7 Ducts and air transfer openings. Ducts and air transfer openings shall comply with this section.

711.7.1 Annular space. The space around a duct penetrating a smoke partition shall be filled with an approved material to limit the free passage of smoke.

711.7.1 Air transfer openings. Air transfer openings in smoke partitions shall be provided with a smoke damper complying with Section 716.3.2.2.

711.7.2 Ducts. Where ~~required elsewhere in this code to comply with this section,~~ smoke partitions are permitted by the exception 5 to Section 708.14.1 ducts penetrating a smoke partition that is also a corridor wall shall be provided with smoke dampers ~~as required for corridors~~ in accordance with Section 716.5.4.1.

Commenter's Reason: The provision for latching doors is new and, similar to the charging language in this section of the code, many of the smoke partition sections indicate that they apply only "where required elsewhere in this code." This leaves the door open for inappropriate application and confusion by the users of the code. It would be simpler and clearer to indicate specifically when latching of doors or dampers in ductwork are required to conform to these sections.

The only places that the 2009 I-Codes that requires smoke partitions is where it is permitted as an alternate to a smoke barrier for elevator lobbies:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 709 for fire partitions , doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

5.Smoke partitions shall be permitted in lieu of fire partitions to separate the elevator lobby at each floor where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 711 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 711.5.2, 711.5.3, and 715.4.8 and duct penetrations of the smoke partitions shall be protected as required for corridors in accordance with Section 716.5.4.1.

The exception describes the requirements for smoke and draft control doors (711.5.2), self- or automatic-closing doors (711.5.3) and door closing for fire doors (715.4.8) as well conforming with the requirements for ductwork if the partition is also a corridor (716.5.4.1). By making these changes, the application of the code is much clearer and the code user isn't burdened with finding a hidden section somewhere in the code that may require these features. By including the specific requirements for the smoke partition, additional confusion in design and enforcement will be avoided.

Final Action: AS AM AMPC____ D

FS195-09/10, Part I
712.9

Proposed Change as Submitted

Proponent: John L. Williams, CBO representing Washington State Department of Health, Construction Review Services

PART I- IBC FIRE SAFETY

Delete without substitution:

~~**712.9 Smoke barrier.** Where horizontal assemblies are required to resist the movement of smoke by other sections of this code in accordance with the definition for smoke barrier, penetrations and joints in such horizontal assemblies shall be protected as required for smoke barriers in accordance with Sections 713.5 and 714.6. Regardless of the number of stories connected by elevator shaft enclosures, doors located in elevator shaft enclosures that penetrate the horizontal assembly shall be protected by enclosed elevator lobbies complying with Section 708.14.1. Openings through horizontal assemblies shall be protected by shaft enclosures complying with Section 708. Horizontal assemblies shall not be allowed to have unprotected vertical openings.~~

Reason: These two sections are new to the 2009 code. They add cost and complicate the design process with no significant benefit. These sections are targeted toward I-2 occupancies, which are required to divide each floor into smoke compartments. There was no evidence provided by the author of this section that smoke transfer between floors in a sprinklered, compartmented building poses a significant hazard. If there was a significant transmission of smoke from one of the smoke compartments on the floor below, the occupants on the higher floor have another smoke compartment to horizontally evacuate to.

The addition of elevator lobbies and enclosing doors could also hamper the horizontal evacuation process. The added number of doors that a patient must be pushed through to get to the adjacent smoke compartment slows the evacuation time.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WILLIAMS-FS1-712.9

Public Hearing Results

PART I- IBC FIRE SAFETY
Committee Action: **Disapproved**

Committee Reason: The committee felt these sections should remain as the definition of smoke compartment indicates that smoke compartments are enclosed by smoke barriers on all sides, including the top and bottom. Also, this action is consistent with the committee's action on FS196-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Williams representing Washington State Department of Health, Construction Review Services, requests Approval as Submitted.

Commenter's Reason: These two new sections were added in the previous code cycle with the intent to coordinate and clarify the application of the definition of a "smoke compartment." Since the 2000 version of the IBC, a smoke compartment is defined as a space enclosed by smoke barriers, including the top and bottom. The code has given clear instructions on how to deal with vertical smoke barriers, but has been silent on the construction of horizontal smoke barriers. If coordination was the goal, and equally viable solution would be to modify the smoke compartment definition and remove the reference to "top and bottom."

I believe that the previous code's silence regarding the horizontal component of a smoke compartment were intentional. Floors, elevator shafts, stair doors were not intended to meet the requirements of a smoke barrier. The IBC has always required Group I-2 occupancies to be separated into at least two smoke compartments. If smoke migrates vertically from one smoke compartment to the floor above, it will likely be contained by a smoke compartment on that upper floor.

Smoke compartments exist in three types of facilities: Healthcare facilities (Group I-2), prisons (Group I-3) and ambulatory health care facilities (Group B, new to the 2009 code). The facilities operate on a defend-in-place concept. Staff are available to aid in the relocation of incapacitated or restrained occupants to a safer area. All of these occupancies are incredibly fire safe due to the amount of precautions taken in the IBC. The 2009 NFPA report "Structure Fires in Medical, Mental Health and Substance Abuse Facilities" states that during 2003-2006 there have been an annual average of 3,750 fires in these facilities. This resulted in a yearly average of 1 civilian death and 57 injuries. The 2006 NFPA report "U.S. fires in selected occupancies – Prisons and Jails" reports and a yearly average of 1,360 structure fires from 1999-2002. This resulted in no loss of civilian life and 19 injuries.

The NFPA report on healthcare facilities lists a selection of published incidents. Many of these incidents note that there was vertical migration of smoke to upper floors, but they also state that the staff evacuated patients to a safe area. None of these cases implicate vertical smoke migration as a cause of death. For example:

> Illinois Hospital fire: "Some smoke also migrated to the third floor through a loose fitting on a pneumatic tube delivery system. The hospital staff quickly moved patients out of the affected area." No casualties.
> Ohio hospital fire: "Before the fire department's arrival, hospital staff had already accounted for all other nearby patients and moved them from the affected area without injury. Fire damage was confined to the bedding and the mattress, and smoke damage was limited to the wing of origin." One casualty in the room of fire origin.

More recent hospital fire reports also support this concept:

> 2009 New York hospital fire: 600 patients were relocated from the east wings to the west wings of a 12 story hospital building. No casualties.
> 2010 South Carolina hospital fire: Two wings were evacuated to another part of the hospital. No casualties.

These facility types have been safe without the horizontal smoke barrier requirements. In the 2009 codes, we've added retroactive fire sprinkler requirements to hospitals to make them even safer. Existing fire safety systems within hospitals perform well. These new sections that were presented as coordination changes actually added significant requirements to the code without justification. Please approve the original change as submitted.

Final Action: AS AM AMPC____ D

FS195-09/10, Part II
407.4.3

Proposed Change as Submitted

Proponent: John L. Williams, CBO representing Washington State Department of Health, Construction Review Services

PART II- IBC GENERAL

Delete without substitution:

~~**407.4.3 Horizontal assemblies.** Horizontal assemblies supporting smoke barriers required by this section shall be designed to resist the movement of smoke and shall comply with Section 712.9.~~

Reason: These two sections are new to the 2009 code. They add cost and complicate the design process with no significant benefit. These sections are targeted toward I-2 occupancies, which are required to divide each floor into smoke compartments. There was no evidence provided by the author of this section that smoke transfer between floors in a sprinklered, compartmented building poses a significant hazard. If there was a significant transmission of smoke from one of the smoke compartments on the floor below, the occupants on the higher floor have another smoke compartment to horizontally evacuate to.

The addition of elevator lobbies and enclosing doors could also hamper the horizontal evacuation process. The added number of doors that a patient must be pushed through to get to the adjacent smoke compartment slows the evacuation time.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WILLIAMS-FS1-712.9

Public Hearing Results

PART II- IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The committee felt these sections should remain as the definition of smoke compartment indicates that smoke compartments are enclosed by smoke barriers on all sides, including the top and bottom. Also, this action is consistent with the committee's action on FS196-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Williams representing Washington State Department of Health, Construction Review Services, requests Approval as Submitted.

Commenter's Reason: These two new sections were added in the previous code cycle with the intent to coordinate and clarify the application of the definition of a "smoke compartment." Since the 2000 version of the IBC, a smoke compartment is defined as a space enclosed by smoke barriers, including the top and bottom. The code has given clear instructions on how to deal with vertical smoke barriers, but has been silent on the construction of horizontal smoke barriers. If coordination was the goal, and equally viable solution would be to modify the smoke compartment definition and remove the reference to "top and bottom."

I believe that the previous code's silence regarding the horizontal component of a smoke compartment were intentional. Floors, elevator shafts, stair doors were not intended to meet the requirements of a smoke barrier. The IBC has always required Group I-2 occupancies to be separated into at least two smoke compartments. If smoke migrates vertically from one smoke compartment to the floor above, it will likely be contained by a smoke compartment on that upper floor.

Smoke compartments exist in three types of facilities: Healthcare facilities (Group I-2), prisons (Group I-3) and ambulatory health care facilities (Group B, new to the 2009 code). The facilities operate on a defend-in-place concept. Staff are available to aid in the relocation of incapacitated or restrained occupants to a safer area. All of these occupancies are incredibly fire safe due to the amount of precautions taken in the IBC. The 2009 NFPA report "Structure Fires in Medical, Mental Health and Substance Abuse Facilities" states that during 2003-2006 there have been an annual average of 3,750 fires in these facilities. This resulted in a yearly average of 1 civilian death and 57 injuries. The 2006 NFPA report "U.S. fires in selected occupancies – Prisons and Jails" reports and a yearly average of 1,360 structure fires from 1999-2002. This resulted in no loss of civilian life and 19 injuries.

The NFPA report on healthcare facilities lists a selection of published incidents. Many of these incidents note that there was vertical migration of smoke to upper floors, but they also state that the staff evacuated patients to a safe area. None of these cases implicate vertical smoke migration as a cause of death. For example:

> Illinois Hospital fire: "Some smoke also migrated to the third floor through a loose fitting on a pneumatic tube delivery system. The hospital staff quickly moved patients out of the affected area." No casualties.
> Ohio hospital fire: "Before the fire department's arrival, hospital staff had already accounted for all other nearby patients and moved them from the affected area without injury. Fire damage was confined to the bedding and the mattress, and smoke damage was limited to the wing of origin." One casualty in the room of fire origin.

More recent hospital fire reports also support this concept:

> 2009 New York hospital fire: 600 patients were relocated from the east wings to the west wings of a 12 story hospital building. No casualties.
> 2010 South Carolina hospital fire: Two wings were evacuated to another part of the hospital. No casualties.

These facility types have been safe without the horizontal smoke barrier requirements. In the 2009 codes, we've added retroactive fire sprinkler requirements to hospitals to make them even safer. Existing fire safety systems within hospitals perform well. These new sections that were presented as coordination changes actually added significant requirements to the code without justification. Please approve the original change as submitted.

Final Action: AS AM AMPC____ D

FS196-09/10
708.14.1

<u>Proposed Change as Submitted</u>

Proponent: John L. Williams, CBO representing Washington State Department of Health, Construction Review Services

Revise as follows:

708.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 709 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 716.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the street floor, provided the entire street floor is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 708.2 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   - 4.1. Group I-2 occupancies,
   - 4.2. Group I-3 occupancies, and
   - 4.3. High-rise buildings.
5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 711 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 711.5.2, 711.5.3, and 715.4.8 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 716.5.4.1.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 708.14.2.
7. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.3.
8. <u>Enclosed elevator lobbies are not required on floors in I-2 occupancies that are subdivided as required by Section 407.4.</u>

Reason: Elevator lobbies serve no purpose on floors of these types of facilities that “protect in place”. Floors that contain patient sleeping are required to be subdivided into smoke compartments by section 407.4 so that bed ridden patients can be moved from one compartment to another. A small elevator lobby would be no where near the size needed to accommodate bed ridden patients. It is inappropriate to evacuate bed ridden patients from a facility unless there is some catastrophic failure way beyond the intent of the code. This protect in place concept is the reason that these facilities are limited in size based on construction type and required to be sprinklered and fully detected for early detection and response. Additionally, these facilities are required to provided quarterly training and fire alarm drills.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WILLIAMS-FS2-707.14

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The reference to 407.4 is not appropriate as this section eventually requires enclosed elevator lobbies; further correlation is required. Further, the proposal seems redundant with exception #4. Lastly, removing the lobby enclosure for these buildings would inhibit the ability to defend a fire in place.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Williams representing Washington State Department of Health, Construction Review Services, requests Approval as Submitted.

Commenter's Reason: The committee questioned whether the reference to section 407.4 was appropriate, because it would eventually require smoke barriers. References to require elevator lobbies at Group I-2 and any floors containing smoke compartments are all recent additions to the 2009 version of the code. I am also proposing remove the requirement in 407.4 as part of FS 195.

The committee was concerned that the proposal seems redundant with exception #4. Exception #4 deals with sprinklered buildings, not buildings with smoke compartmentation. All existing hospitals will be sprinklered (per the new retroactive sprinkler provisions in the IFC) but not all hospitals have smoke compartments. Smoke compartments provide a function similar to that of an elevator lobby by compartmentalizing the floor and limiting the spread of smoke. They are an adequate trade-off for this occupancy.

The final concern was that the lack of lobbies would inhibit a facilities ability to defend in place. This is simply not supported by the recent fire data, please see my public comment for FS 195. Facilities today are successfully providing a defend in place strategy without elevator lobbies. Please support this change as submitted.

Final Action: AS AM AMPC____ D

INTERNATIONAL WILDLAND-URBAN INTERFACE CODE

WUIC1-09/10
403.4.1

Proposed Change as Submitted

Proponent: Lawrence Brown, CBO, National Association of Home Builders

Revise as follows:

403.4.1 Sign construction. All road identification signs and supports shall be of noncombustible materials. Signs shall be 6 inch (152 mm) minimum in height. ~~have minimum 4-inch-high (102 mm) reflective~~ Letters shall be 4 inch (102 mm) minimum in height with a 1/2 inch (~~12.7~~ 13 mm) minimum stroke. Letters shall be of the reflecting type and be on a contrasting background color. ~~6-inch-high (152 mm) sign~~. Road identification signage shall be mounted ~~at a height of~~ 7 feet (2134 mm) in height measured from the road surface to the bottom of the sign.

Reason: This is an editorial change related to format of text, and to provide clarity as to the intent of the provision. The term "background color" adds clarity as to *contrasting* with the reflective letters. The term "minimum" is added to height for mounting the sign. Without the term "minimum" the height is absolute at 7 feet (cannot be more or less).

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: BROWN-WUIC1-403.4.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee did not feel that the proposal accomplished its stated objectives, especially with respect to sign mounting height.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence Brown, CBO, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

403.4.1 Sign construction. All road identification signs and supports shall be of noncombustible materials. Sign faces shall be 6 inch (152 mm) minimum in height. Letters on the signs shall be 4 inch (102 mm) minimum in height with a 1/2 inch (13 mm) minimum stroke. Letters shall be of the reflecting type and be on a contrasting background color. Road identification signage shall be mounted 7 feet (2134 mm) minimum in height measured vertically from the bottom of the sign to the elevation of the near edge of the road surface ~~to the bottom of the sign~~.

Commenter's Reason: The original proposal was mostly an editorial/correlation change dealing with the use of the terms "height", "width", and "depth" throughout all I-Codes. The terms "high", "long" and "deep" are not terms used to describe dimensions and measurements. This correlation is in the process of being made in all I-Codes. The other proposed modifications to the text were to provide clarity as to the intent of the provision. In addition to having over 20 years experience in code enforcement, I also have a background of over 35 years of experience in the sign business. The original proposal added the term "background color" to add clarity as to the need for the sign face background color to be *contrasting* with the reflective letters. The term "minimum" is added to height for the letters mounting the sign. Without the term "minimum" the height is absolute at 7 feet (cannot be more or less). Adding the term "minimum" also correlates this provision with the federal **Manual on Uniform Traffic Control Devices:** MUTCD-2003 (The Federal Highway Administration, Office of Transportation Operations, Room 3408, 400 7th Street, S.W., Washington, DC 20590). This is shown below from a part of the MUTCD requirements:

Section 2A.18 Mounting Height

The minimum height, measured vertically from the bottom of the sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way, of signs installed at the side of the road in business, commercial, or residential areas where parking or pedestrian movements are likely to occur, or where the view of the sign might be obstructed, shall be 7 feet (see Figure 2A-2).

Final Action: AS AM AMPC____ D

WUIC3-09/10

503.2, Chapter 7

Proposed Change as Submitted

Proponent: John Scott, Roxul, Inc.

1. Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the following:

1. Extended ASTM E 84 testing. Materials that, when tested in accordance with the test procedures set forth in ASTM E 84 or UL 723, for a test period of 30 minutes, comply with the following:
   - 1.1. Flame spread. Material shall exhibit a flame spread index not exceeding 25 and shall show no evidence of progressive combustion following the extended 30 minute test.
   - 1.2. Flame front. Material shall exhibit a flame front that does not progress more than 10 $^1/_2$ feet (3200 mm) beyond the centerline of the burner at any time during the extended 30 minute test.
   - 1.3. Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in the following standards, as applicable to the materials and the conditions of use:
     - 1.3.1. MethodA"Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D 2898, for fire-retardant-treated wood, wood-plastic composite and plastic lumber materials.
     - 1.3.2. ASTMD7032 for wood-plastic composite materials.
     - 1.3.3. ASTM D 6662 for plastic lumber materials.
   - 1.4. Identification. All materials shall bear identification showing the fire test results.
2. Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.
3. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the *International Building Code*.
4. Fire-retardant-treated wood roof coverings. Roof assemblies containing fire-retardant-treated wood shingles and shakes which comply with the requirements of Section 1505.6 of the *International Building Code* and classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.
5. Roof Insulation. Roof insulations that comply with the requirements for Class NC (noncombustible core) in accordance with the requirements of FM 4470.

2. Add new standard to Chapter 7 as follows:

FM Factory Mutual Global Research
Standards Laboratories Department
1301 Atwood Avenue, P.O. Box 7500
Johnston, RI 02919

4470 (2009) Approval Standard for Class 1 Roof Covers .

Reason: To introduce a new type of Ignition-resistant building material into the IWUIC, based upon testing and conformance with the newest edition (2009) of FM 4470 Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet,Built-Up Roof (BUR) and Liquid Applied Roof Assemblies.

The 2009 edition of FM Approval Standard 4470 has introduced a new category of roofing insulation defined as Class "NC" non-combustible core.

In order for a roof insulation material to be classified as "NC", the roof insulation must meet the following stringent criterion:

1. ASTM D482, Standard Test Method for Ash from Petroleum Products

2. ASTM E2058, Standard Test Methods for Measurement of Synthetic Polymer Material Flammability Using a Fire Propagation Apparatus (FPA)
3. ISO 1716:2002 Reaction to Fire Tests for Building Products - Determination of the Heat of Combustion

The first test acceptance criteria used by FM for these materials is very stringent, and includes a minimum total solids content of 90% per ASTM D 482.

In addition, during the ASTM E2058 test, no visible flaming of the insulation is permitted for the full 15 minute duration, and the test is extended beyond 15 minutes in duration if there is any evidence of the sample still exhibiting mass loss and/or visible vapors being emitted. The test is continued until the mass loss and/or visible vapors have also ceased.

The third test method is ISO Standard 1716 which is used for determination of the Heat of Combustion of building materials. The insulation core must have a maximum heat of combustion of 2.0 kJ/g (860 BTU/lb).

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: FM 4470 (1992) is currently referenced in the IBC.

ICCFILENAME: SCOTT-WUIC1-503.2.DOC

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard FM 4470 (1986) indicated that it is currently referenced in the IBC.

Committee Action: Disapproved

Committee Reason: The committee did not feel that there is sufficient loss history to justify the proposal and felt that it would be inappropriate to approve a change that would eliminate a wide variety of products that are currently acceptable.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Scott, representing Roxul Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the following:

1 through 4 *(No change to text)*
5. Noncombustible Roof Insulation. Noncombustible roof insulations shall ~~that~~ comply with the requirements for Class NC (noncombustible core) in accordance with the requirements of FM 4470.

(Portions of proposal not shown, remain unchanged)

Commenter's Reason: This revised proposal introduces a new type of Ignition-resistant building material into the IWUIC, based upon testing and conformance with the newest edition (2009) of FM 4470 Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet,Built-Up Roof (BUR) and Liquid Applied Roof Assemblies. It does not preclude the use of other roof insulation materials.

The report on the Baltimore hearings indicated that the committee did not feel that there is sufficient loss history to justify the proposal and felt that it would be inappropriate to approve a change that would eliminate a wide variety of products that are currently in use. We believe that this proposal does not does not preclude the use of other roof insulation materials. It merely recognizes that in order for a roof insulation to be considered non-combustible, it needs to comply with the new FM 4470 standard.

There is a long history of losses connected with fires in roofing materials and roof coverings. According to NFPA statistics, an average of 4,200 fires starting with exterior roof coverings, surfaces or finishes made of sawn wood occurred per year during the five year period from 1994 through 1998. These fires caused an average of five civilian deaths, 23 civilian injuries and an estimated $7.0 million in direct property damage per year. During this time period, these fires accounted for 0.7% of the 567,100 total reported structure fires, 0.1% of the 3,744 civilian structure fire deaths, 0.1% of the 21,293 civilian structure fire injuries, and 1.1% of the $7.2 billion in direct property damage. These totals exclude from the analysis fires where the roof covering was recorded as composed of hardboard, plywood, fiberboard or wood pulp, as these products are considered more likely to refer to decking or framing, rather than to shingles and covering. Also excluded are fires where the roof covering was recorded as growing wood, felled but unsawn wood, wood shavings, or unclassified or unknown-type wood. More importantly, this analysis excludes fires that begin with some other fuel but grow and spread primarily through secondary involvement of wooden roof coverings. Such fires cannot be identified in existing national databases.[1]

The IWUIC is designed to go beyond the local Building and Fire Codes to provide minimum regulations intended to mitigate the risk to life and structures from intrusion of fire from wildland fire exposures and fire exposures from adjacent structures, and mitigate structure fires from spreading to wildlands. The extent of this regulation is intended to be tiered commensurate with the relative level of hazard present, which differs from the convention Urban or Rural building environments.

During a wildland/urban interface fire, the roof is the most vulnerable part of a building. One of the biggest dangers lies in the sparks or firebrands such a fire produces, which often blow onto the roof and set it ablaze before the fire itself even approaches the building. Over the years, roof coverings such as wood shingle and wood shake have contributed to some major fire losses. In 1991, for example, a conflagration near Oakland and Berkeley, California, resulted in a major wildland/urban interface fire that killed 25 people, injured 150, and destroyed nearly 2,450 single family dwellings and 437 apartment and condominium units. The fire burned more than 1,600 acres and did an estimated $1.5 billion in damage.[2]

Still another more recent incident occurred on the afternoon of November 1, 2006, at Eastern Guilford High School in Gibsonville, North Carolina. Students had to be evacuated as a fire spread through the building's roof, causing ceilings to collapse into the rooms below. Thick smoke churned ominously into the sky as the fire grew. The fire department in the neighboring community of Whitsett was located just five miles (eight kilometers) away and arrived in minutes, but the speed of the fire and the manner in which it spread made saving the school impossible. All students and staff safely escaped and much of the school's contents were salvageable, but the school, which Alan Purdue, Guilford County Emergency Services chief, says was valued at $41 million, was a total loss. Guilford County Schools administrators say they recovered $17 million in insurance payments [3]

In part, the Objective of the IWUIC is Section 101.3 states: "This code shall supplement the jurisdiction's building and fire codes, if such codes have been adopted, to provide for special regulations to mitigate the fire- and life-safety hazards of the wildland-urban interface areas."

The current requirements for roof insulation in the IWUIC are based on typical IBC and IFC requirements. While the IWUIC has very stringent expectations for Class 1 Ignition Resistant Construction, the definitions in Section 202 of "Noncombustible Roof Coverings" really only applies to the weathering membrane on the exterior surface of the roof (i.e. such as shingles, sheets, and tiles), rather than the potentially high fuel loads coming from the combustible insulation materials beneath them. Consequently, there is a need to further strengthen the requirements for roof insulations in the IWUIC to recognize the fire- and life-safety hazards of the wildland-urban interface areas.

[1] Marty Ahrens, NFPA Report, Wood Shingle or Wood Shake Roof Fires, Statistical Analysis, July 2001
[2] Jenna Padula, NFPA Journal®. Copyright National Fire Protection Association Mar/Apr 1999.
[3] *Lisa Nadile,* NFPA Journal®, Copyright National Fire Protection Association *September/October 2009*

Final Action: AS AM AMPC____ D

WUIC5-09/10
504.2.1 (New), Chapter 7

<u>Proposed Change as Submitted</u>

Proponent: John Scott, Roxul, Inc.

1. Revise as follows:

<u>**504.2.1 Roof insulation.** Roof insulations that comply with the requirements for Class NC (noncombustible core) in accordance with the requirements of FM 4470.</u>

(Renumber subsequent section)

2. Add new standard to Chapter 7 as follows:

<u>**FM**</u>	<u>Factory Mutual Global Research</u> <u>Standards Laboratories Department</u> <u>1301 Atwood Avenue, P.O. Box 7500</u> <u>Johnston, RI 02919</u>
<u>4470 (2009)</u>	<u>Approval Standard for Class 1 Roof Covers</u> .

Reason: To introduce a new Class of Ignition-resistant building material into the IWUIC, based upon testing and conformance with the newest edition (2009) of FM 4470 Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet,Built-Up Roof (BUR) and Liquid Applied Roof Assemblies.

The IWUIC has very stringent expectations for Class 1 Ignition Resistant Construction. While the definitions in Section 202 addresses "Noncombustible Roof Coverings", this really only applies to the weathering membrane on the exterior surface of the roof (i.e. such as shingles, sheets, and tiles), rather than the potentially high fuel loads coming from some combustible insulation materials beneath them. Consequently, there is a need to further restrict the use of combustible roof insulations where required.

The 2009 edition of FM Approval Standard 4470 has introduced a new category of roofing insulation defined as Class "NC" non-combustible core.

In order for a roof insulation material to be classified as "NC", the roof insulation must meet the following stringent criterion:

1. ASTM D482, Standard Test Method for Ash from Petroleum Products
2. ASTM E2058, Standard Test Methods for Measurement of Synthetic Polymer Material Flammability Using a Fire Propagation Apparatus (FPA)
3. ISO 1716:2002 Reaction to Fire Tests for Building Products - Determination of the Heat of Combustion

The first test acceptance criteria used by FM for these materials is very stringent, and includes a minimum total solids content of 90% per ASTM D 482.

In addition, during the ASTM E2058 test, no visible flaming of the insulation is permitted for the full 15 minute duration, and the test is extended beyond 15 minutes in duration if there is any evidence of the sample still exhibiting mass loss and/or visible vapors being emitted. The test is continued until the mass loss and/or visible vapors have also ceased.

The third test method is ISO Standard 1716 which is used for determination of the Heat of Combustion of building materials. The insulation core must have a maximum heat of combustion of 2.0 kJ/g (860 BTU/lb).

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: FM 4470 (1992) is currently referenced in the IBC.

ICCFILENAME: SCOTT-WUIC2-504.2.1.DOC

Public Hearing Results

Note: This code change was contained in the errata posted on the ICC website on October 19, 2009. Please go to http://www.iccsafe.org/cs/codes/Pages/09-10ProposedChanges.aspx.

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard FM 4470 (1986) indicated that it is currently referenced in the IBC.

Committee Action: Disapproved

Committee Reason: The proposal is inconsistent with Section 504.2 which regulates roof assemblies, not the individual components of an assembly. The proposal could also exclude the use of other materials that are currently acceptable. Disapproval is also consistent with the action taken on code change WUIC3-09/10.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Scott, representing Roxul Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

504.3 **~~504.2.1~~ Roof insulation.** Roof insulations for Class 1 ignition-resistant construction shall ~~that~~ comply with the requirements for Class NC (noncombustible core) insulation in accordance with ~~the requirements of~~ FM 4470.

(Renumber subsequent sections)

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason: In order to address the Committees concerns, the proposal has been revised to make it consistent with Section 504 of the IWUIC by adding a new article within 504. This revised proposal introduces a new type of Ignition-resistant building material into the IWUIC, based upon testing and conformance with the newest edition (2009) of FM 4470 Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet,Built-Up Roof (BUR) and Liquid Applied Roof Assemblies.

The IWUIC is designed to go beyond the local Building and Fire Codes to provide minimum regulations intended to mitigate the risk to life and structures from intrusion of fire from wildland fire exposures and fire exposures from adjacent structures, and mitigate structure fires from spreading to wildlands. The extent of this regulation is intended to be tiered commensurate with the relative level of hazard present, which differs from the convention Urban or Rural building environments.

In part, the Objective of the IWUIC is Section 101.3 states: "This code shall supplement the jurisdiction's building and fire codes, if such codes have been adopted, to provide for special regulations to mitigate the fire- and life-safety hazards of the wildland-urban interface areas."

The current requirements for roof insulation do not in the IWUIC are based on typical IBC and IFC requirements. While the IWUIC has very stringent expectations for Class 1 Ignition Resistant Construction, the definitions in Section 202 of "Noncombustible Roof Coverings" really only applies to the weathering membrane on the exterior surface of the roof (i.e. such as shingles, sheets, and tiles), rather than the potentially high fuel loads coming from the combustible insulation materials beneath them. Consequently, there is a need to further strengthen the requirements for roof insulations in the IWUIC to recognize the fire- and life-safety hazards of the wildland-urban interface areas."

Unfortunately, there is an abundance of loss history to justify the need to enhance the current IWUIC requirements for fire connected with roofing materials and roof coverings. According to NFPA statistics, an average of 4,200 fires starting with exterior roof coverings, surfaces or finishes made of sawn wood occurred per year during the five year period from 1994 through 1998. These fires caused an average of five civilian deaths, 23 civilian injuries and an estimated $7.0 million in direct property damage per year. During this time period, these fires accounted for 0.7% of the 567,100 total reported structure fires, 0.1% of the 3,744 civilian structure fire deaths, 0.1% of the 21,293 civilian structure fire injuries, and 1.1% of the $7.2 billion in direct property damage. These totals exclude from the analysis fires where the roof covering was recorded as composed of hardboard, plywood, fiberboard or wood pulp, as these products are considered more likely to refer to decking or framing, rather than to shingles and covering. Also excluded are fires where the roof covering was recorded as growing wood, felled but unsawn wood, wood shavings, or unclassified or unknown-type wood. More importantly, this analysis excludes fires that begin with some other fuel but grow and spread primarily through secondary involvement of wooden roof coverings. Such fires cannot be identified in existing national databases.[1]

[1] Marty Ahrens, NFPA Report, Wood Shingle or Wood Shake Roof Fires, Statistical Analysis, July 2001

Final Action: AS AM AMPC____ D

INTERNATIONAL FIRE CODE

F2-09/10
202 (New)

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, Joint Fire Service Review Committee

Add new definition as follows:

SECTION 202
GENERAL DEFINITIONS

<u>**FIRE HAZARD.** Any thing or act which increases or could cause an increase of the hazard or threat of fire to a greater degree than that customarily recognized as normal by persons in the public service regularly engaged in preventing, suppressing or extinguishing fire or any thing or act which could obstruct, delay, hinder or interfere with the operation of the fire department or the safety of occupants in the event of fire.</u>

Reason: The definition of "Fire Hazard" is not currently found in the IFC. The term is used 31 times in the IFC and is found in the following Chapters: 1, 2, 3, 4, 6, 9, 10, 19, 20, 21, 23, 24, 26, 33, 34 and Appendix E. However, the term is not defined in the code. The inclusion of this definition will further clarify the intent of an otherwise ambiguous term.

A similar proposal was discussed in the last code change cycle. Comments were received and have been addressed as follows:

1. "Why not use the standard Webster definition?" – the Webster Dictionary does not define "Fire Hazard"
2. "Is it better to leave as an undefined term." – The definition of "Fire Hazard" is not currently found in the IFC. The term appears in the IFC 31 times. The term is commonly used in the IFC, so it must have some intended value. For a situation to be a fire hazard it must either increase the potential of ignition, or increase the intensity of fire once it does ignite, or obstruct/hinder fire department operations, or obstruct/hinder occupant egress.
3. "What is difference of fire risk and fire hazard?" – Fire risk occurs in all locations and all situations of work, business, and just plain life. The level of fire risk varies in all situations. However when something occurs to raise or affect the normally expected level of fire risk, the potential of ignition increases and this situation then becomes classified as a fire hazard. As specified in the definition, if the situation creates an increase in the potential for fire (fire risk), it is a fire hazard.
4. "This definition would create a conflict with IFC 906.3." – This is incorrect, the words "fire hazard" are used in this section, however, they do not stand alone. The words are used as part of the term "Class A Fire Hazards". To state that the defined term "fire hazard" must be used in defining "Class A Fire Hazard" is incorrect, and is out of context. This is not the same term. The term "Class A Fire Hazard" is a specific and defined term dealing with Class A materials. This makes as little sense as assuming that Chapter 15 Flammable Finishes only applies to flammable liquids. In case you are wondering…Chapter 15 includes flammable liquids, along with combustible liquids and combustible powders, etc.

The definition of "fire hazard", although a somewhat objective definition, is needed to be able to point back to some code reference when the term is used in the code in those 31 locations.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal contains vague language, would limit who is deemed capable of recognizing a fire hazard and could result in inconsistent enforcement.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202
GENERAL DEFINITIONS

FIRE HAZARD. ~~Any thing or act which increases or could cause an increase of the hazard or threat of fire to a greater degree than that customarily recognized as normal by persons in the public service regularly engaged in preventing, suppressing or extinguishing fire or any thing or act which could obstruct, delay, hinder or interfere with the operation of the fire department or the safety of occupants in the event of fire.~~ The potential for harm associated with fire.

Commenter's Reason: The technical committee was concerned about the vague language in the original proposal. It was also concerned that the proposed definition might limit who is deemed to be capable of recognizing a fire hazard and could result in inconsistent enforcement. The revised language in the comment is taken from the ASTM definition for fire hazard and does not discuss who would enforce the concept since that is not necessary in the definition. The issue in the definition should be "what is fire hazard" and nothing else. The definition need not address who recognizes the existence of fire hazard, or who acts on it or whose job it is to notify; all of those actions should be discussed (as they currently are) in the body of the code and not in the section on definitions.

Final Action: AS AM AMPC____ D

F6-09/10
315

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, Joint Fire Service Review Committee and Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

Revise as follows:

SECTION 315
~~MISCELLANEOUS COMBUSTIBLE MATERIALS~~ GENERAL STORAGE

315.1 General. Storage~~, use and handling of miscellaneous combustible materials~~ shall be in accordance with this section.

315.2 Permit required. A permit for miscellaneous combustible storage shall be ~~obtained in accordance with~~ required as set forth in Section 105.6.

~~315.2~~ 315.3 Storage in buildings. Storage of ~~combustible~~ materials in buildings shall be orderly and stacks shall be stable. Storage of combustible materials shall be separated from heaters or heating devices by distance or shielding so that ignition cannot occur.

(Renumber subsequent sections)

Reason: This proposal will modify this section covering storage in buildings in several different ways.

This proposal is intended to clarify that this section contains requirements which apply to storage in general, not just storage of combustible materials. Specifically, Section 315.2.1 requires that a separation be maintained between the top of storage and ceilings or sprinklers. This requirement applies to all storage, whether combustible or not, and providing a clearance from sprinklers and ceilings is critical whether the materials are combustible or not.

The first sentence of Section 315.1 is revised to delete the reference to "use and handling". As stated in the title of the section, this section applies to "storage". Sections 315.1 and 315.2 deal with storage and there are no requirements for use or handling.

The second sentence of Section 315.1 is separated and creates a new Section 315.2 dealing with permits. This follows standard format throughout the rest of the IFC. The new Section 315.2 is also revised to specify that a permit is required only for storage of combustible materials. Even though this section regulates storage of both combustible and noncombustible materials, only combustible materials are required to obtain a permit when the storage exceeds 2500 cubic feet. The quantity limit is specified in the permit requirements in Section 105.6.29.

Section 315.2 is renumbered to 315.3 and revised to specify that the first sentence applies to ALL storage, and the second sentence applies to combustible storage. This will then state that all storage, whether combustible or not, is regulated and should be orderly. This means that the stored materials, whether combustible or not, are orderly, and that the stacks of stored materials need to be stable. These requirements allow for aisles being maintained, and the reduction of injury or blocking of exit during a seismic event or even when materials are hit with a hose stream during fire operations.

Hazards specific to 'combustible' materials have been more clearly identified. The second sentence in 315.3 is revised to specify that only combustible materials need to be separated from ignition sources. It is not necessary to separate non-combustible materials from ignition sources because there is no hazard.

Cost Impact: The code change proposal will increase the cost of construction**.**

ICCFILENAME: LARIVIERE-F3-315.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement and felt that the proposal provides needed improvements to clarify the storage requirements.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

315.1 General. Storage shall be in accordance with this section.

315.2 Permit required. A permit for miscellaneous combustible storage shall be required as set forth in Section 105.6.

315.3 Storage in buildings. Storage of materials in buildings shall be orderly ~~and stacks shall be stable~~. Storage of combustible materials shall be separated from heaters or heating devices by distance or shielding so that ignition cannot occur.

(Renumber subsequent sections)

Commenter's Reason: The modification seeks to delete language that is unclear and unenforceable. What criteria would be used to determine if a stack of stored materials is 'stable'?

Final Action: AS AM AMPC____ D

F7-09/10
316.4 (New)

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, Joint Fire Service Review Committee

Add new text as follows:

316.4 Obstructions on roofs. Installing or maintaining wires, cables, ropes, aerial antennas, or other suspended obstructions installed or maintained on the roofs of buildings having a roof slope of less than 30 degrees, shall be located to provide a vertical clearance of not less than 7 feet (2133 mm) between the roof surface and such obstruction.

Exception: Obstructions shall be permitted to be installed less than 7 feet (2133 mm) high provided they are protected in a manner to prevent injury to firefighters working on the roof.

(Renumber subsequent sections)

Reason: This proposal will increase for firefighter safety when performing fire suppression related duties on a rooftop, and will also protect maintenance workers as they are working on a rooftop.

Obstructions below 7 feet from the roof surface may be difficult or impossible to see at night or when obscured by smoke conditions. Many accidents have occurred where an obstruction was not seen and was run into by someone on the roof. In these instances, people have been injured, strangled, entangled, and fallen from rooftops.

This proposal does not prohibit the installation of these items, but it requires that they are identified or protected. For example, protection may be as simple as placing a white 2" diameter plastic pipe around the guy wire used to secure an antenna. Or be constructing an obstruction below the guy wire so that walking under the wire is not possible.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LARIVIERE-F4-316.4.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that while the concept is good, it is proposed for the wrong place. It also felt that the proposal would conflict with the *International Building Code* which regulates the initial installations since the proposed provisions would be retroactive. The committee also felt that the phrase "...protected in a manner to prevent injury..." in the exception was vague and should be portrayed as being subject to the approval of the fire code official.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

David S. Collins, FAIA, The Preview Group Inc, representing The American Institute of Architects, requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

<u>**316.4 Obstructions on roofs.** Wires, cables, ropes, antennas, or other suspended obstructions installed on the roof of a building having a roof slope of less than 30 degrees shall not create an obstruction that is less than 7 feet (2133 mm) high above the surface of the roof.</u>

<u>**Exceptions:**</u>

1. <u>Such obstruction shall be permitted where the wire, cable, rope, antennae or suspended obstruction is encased in a white 2" minimum diameter plastic pipe or an approved equivalent.</u>
2. <u>Such obstruction shall be permitted where there is a solid obstruction below such that accidentally walking into the wire, cable, rope, antennae or suspended obstruction is not possible.</u>

Commenter's Reason: During testimony it was noted that the supporting statement in the proposal contained some specific options for how to overcome the prohibition that were not included in the change itself, making the application of the change more difficult to understand. As part of this comment, included in the exceptions are the items that were suggested by the proponent as options.

In addition, the charging language has been simplified and "aerial antennas" have been removed from the list of prohibited obstructions as they are made up of wires and cables. The real issue is not usually the antennae itself, but the guy wires supporting it which may cause the dangerous obstruction. We agree with the concept of providing protection where such obstructions can be dangerous, and believe that the change provides the needed level of protection.

Public Comment 2:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

316.4 Obstructions on roofs. ~~Installing or maintaining~~ Wires, cables, ropes, aerial antennas, or other suspended obstructions installed ~~or maintained~~ on the roofs of buildings having a roof slope of less than 30 degrees, shall be located to provide a vertical clearance of 7 feet (2133 mm) or more between the roof surface and such obstruction.

Exception: Obstructions may be installed less than 7 feet (2133 mm) high provided they are protected in a manner to prevent injury to firefighters working on the roof.

(Renumber remaining sections…)

Commenter's Reason: The Code Change Proposal was Disapproved at the Code Development Hearing because it was confusing. The revisions in the Public Comment are not intended to regulate "whether" these items are installed on the roof, but if they are installed, they need to be protected.

This proposal does not prohibit the installation of these items, but it requires that they are identified or protected. For example, protection may be as simple as placing a white 2" diameter plastic pipe around the guy wire used to secure an antenna. Or be constructing an obstruction below the guy wire so that walking under the wire is not possible.

Obstructions below 7 feet from the roof surface may be difficult or impossible to see at night or when obscured by smoke conditions. Many accidents have occurred where an obstruction was not seen and was run into by someone on the roof. In these instances, people have been injured, strangled, entangled, and fallen from rooftops.

Final Action: AS AM AMPC____ D

F8-09/10

316.0 (New), 905.3.8 (IBC [F] 905.3.8) (New)

Proposed Change as Submitted

Proponent: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

Add new text as follows:

SECTION 316.0
ROOF GARDENS AND LANDSCAPED ROOFS

316.1 General. Rooftop gardens and landscaped roofs shall be installed and maintained in accordance with this code and Sections 1505.0 and 1507.16 of the *International Building Code.*

316.2 Rooftop garden or landscaped roof size. Rooftop garden or landscaped roof areas shall not exceed 15,625 ft2 (1,450 m^2) in size for any single area with a maximum dimension of 125 ft (39 m) in length or width. A minimum 3 ft (0.9 m) wide clearance shall be provided between adjacent rooftop garden or landscaped roof areas.

316.3 Rooftop structure and equipment clearance. A minimum 3 ft (0.9 m) wide clearance shall be provided between the rooftop garden or landscaped roof and rooftop structures, including but not limited to mechanical and machine rooms, penthouses, skylights, roof vents, solar panels, antenna supports, and building service equipment.

316.4 Vegetation. Vegetation shall be maintained as described in Sections 316.4.1 and 316.4.2

316.4.1 Irrigation. Supplemental irrigation shall be provided as necessary to maintain levels of hydration necessary to keep green roof plants alive and to keep dry foliage to a minimum.

316.4.2 Dead foliage. Dead foliage and biomass shall be removed immediately.

905.3.8 (IBC [F] 905.3.8) Roof gardens and landscaped roofs. Buildings or structures with roof gardens or landscaped roofs that are equipped with a standpipe shall extend the standpipe to the roof level on which the roof garden or landscaped roof is located.

Reason: As rooftop gardens and landscaped roofs gain in acceptance and popularity reasonable requirements need to be added to the codes to address the fuel load that these additions can add to a building or structure.

New Section 316.0 is proposed to be added to the International Fire Code to manage the size of any one area utilized for these improvements, provide for a reasonable 3 foot clearance to structures and equipment that require access for maintenance and fire response purposes and to control fire exposure. A requirement that means for hydration be provided and that dead foliage and biomass be removed immediately.

A new section is proposed for the construction of buildings that have fire standpipe systems for the standpipe to be extended to the roof if a rooftop garden or landscape is proposed.

Cost Impact: These requirements will increase the cost of construction for those buildings where a roof garden or landscaped roof is proposed to be installed on the roof.

Analysis: Code Change S10-09/10 appears on the hearing order of the IBC-Fire Safety Committee and proposes revisions to IBC Table 1505.1 and Section 1507.16 on this topic. Code change F238-09/10 proposes similar requirements.

ICCFILENAME: DAVIDSON-SHUMAN-F9-316.0.DOC

<u>Public Hearing Results</u>

Committee Action: Approved as Modified

Modify the proposal as follows:

SECTION 316.0
ROOF GARDENS AND LANDSCAPED ROOFS

316.1 General. Rooftop gardens and landscaped roofs shall be installed and maintained in accordance with this code and Sections 1505.0 and 1507.16 of the *International Building Code.*

316.2 Rooftop garden or landscaped roof size. Rooftop garden or landscaped roof areas shall not exceed 15,625 ft^2 (1,450 m^2) in size for any single area with a maximum dimension of 125 ft (39 m) in length or width. A minimum ~~3 ft (0.9 m)~~ <u>6 ft (1.8 m)</u> wide clearance <u>consisting of a Class A-rated roof system complying with ASTM E108 or UL790</u> shall be provided between adjacent rooftop garden or landscaped roof areas.

316.3 Rooftop structure and equipment clearance. <u>For all vegetated roofing systems abutting combustible vertical surfaces, a Class A-rated roof system complying with ASTM E108 or UL790 shall be achieved for a</u> ~~A~~ minimum ~~3 ft (0.9 m)~~ <u>6 ft (1.8 m)</u> wide <u>continuous border placed around rooftop structures and all rooftop equipment</u> ~~clearance shall be provided between the rooftop garden or landscaped roof and rooftop structures~~, including, but not limited to, mechanical and machine rooms, penthouses, skylights, roof vents, solar panels, antenna supports, and building service equipment.

316.4 Vegetation. Vegetation shall be maintained as described in Sections 316.4.1 and 316.4.2

316.4.1 Irrigation. Supplemental irrigation shall be provided as necessary to maintain levels of hydration necessary to keep green roof plants alive and to keep dry foliage to a minimum.

316.4.2 Dead foliage. ~~Dead foliage and~~ <u>Excess</u> biomass, <u>such as overgrown vegetation, leaves and other dead and decaying material,</u> shall be removed <u>at regular intervals not less than two times per year</u> ~~immediately~~.

905.3.8 (IBC [F] 905.3.8) Roof gardens and landscaped roofs. Buildings or structures with roof gardens or landscaped roofs that are equipped with a standpipe shall extend the standpipe to the roof level on which the roof garden or landscaped roof is located.

Committee Reason: The committee felt that the proposal provides needed provisions for the regulation of the specified hazards. The modification provides better correlation with Section 1507.16 of the *International Building Code.*

Analysis: IBC code change S10-09/10 related to this topic was Approved as Modified. Code change F238-09/10 proposing similar requirements to this proposal was Disapproved. See the Report of Hearing for these code changes.

Assembly Action: None

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dave Frable, U.S. General Services Administration, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

SECTION 316.0
ROOF GARDENS AND LANDSCAPED ROOFS

316.1 General. Rooftop gardens and landscaped roofs shall be installed and maintained in accordance with this code and Sections 1505.0 and 1507.16 of the *International Building Code.*

~~**316.2 Rooftop garden or landscaped roof size.** Rooftop garden or landscaped roof areas shall not exceed 15,625 ft2 (1,450 m2) in size for any single area with a maximum dimension of 125 ft (39 m) in length or width. A minimum 6 ft (1.8 m) wide clearance consisting of a Class A-rated roof system complying with ASTM E108 or UL790 shall be provided between adjacent rooftop garden or landscaped roof areas.~~

~~**316.3 Rooftop structure and equipment clearance**. For all vegetated roofing systems abutting combustible vertical surfaces, a Class A-rated roof system complying with ASTM E108 or UL790 shall be achieved for a minimum 6 ft (1.8 m) wide continuous border placed around rooftop structures and all rooftop equipment, including, but not limited to, mechanical and machine rooms, penthouses, skylights, roof vents, solar panels, antenna supports, and building service equipment.~~

~~**316.4 Vegetation**. Vegetation shall be maintained as described in Sections 316.4.1 and 316.4.2~~

~~**316.4.1 Irrigation**. Supplemental irrigation shall be provided as necessary to maintain levels of hydration necessary to keep green roof plants alive and to keep dry foliage to a minimum.~~

316.2~~4.2~~ Dead foliage. Excess biomass, such as overgrown vegetation, leaves and other dead and decaying material, shall be removed at regular intervals not less than two times per year.

~~**905.3.8 (IBC [F] 905.3.8) Roof gardens and landscaped roofs**. Buildings or structures with roof gardens or landscaped roofs that are equipped with a standpipe shall extend the standpipe to the roof level on which the roof garden or landscaped roof is located.~~

Commenter's Reason: The intent of the proposed modification is to meet the original main intent of the proponent which was to provide reasonable requirements within the IBC to address roof gardens and landscape roofs. However, based on the actions of the Committee, unreasonable requirements for roof gardens and landscape roofs have now been incorporated into the code without any technical justification or fire loss data provided by either the proponent of the original code change proposal or the Committee during their discussions. It is our belief that incorporating unjustified requirements such as these in the code will only lead to many confrontations between Code Officials and City leaders that are promoting green sustainable designs. For example, the new section currently requires:
(1) a minimum 6 foot wide clearance consisting of a Class A rated roof system between adjacent roof gardens and landscape roof areas.
(2) a minimum 6 foot wide clearance consisting of a Class A roof system continuous around the rooftop structure,
(3) a minimum 6 foot wide clearance consisting of a Class A roof system around all roof top equipment and structures

Please note that the 3 requirements above would require a minimum 6 foot wide clearance around the roof top structure as well as all equipment on the roof without taking into consideration roofs having a small footprint. This requirement alone would eliminate many proposed rooftop garden designs on small rooftops in existing buildings. It also requires that existing roof assemblies (e.g., Class B – effective against moderate fire test exposure (see 1505.3) or Class C – effective against light fire test exposure (see 1505.4)) be upgraded to a Class A roof assembly that is effective against a severe fire test exposure. Again, no technical justification has been provided to justify requiring a minimum 6 foot wide clearance or the costs associated with providing Class A roof assemblies for all roof configurations having roof gardens or landscape roofs.

Public Comment 2:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

This proposal should be disapproved for the following reasons:
1. Neither 'rooftop gardens' nor 'landscaped roofs' are defined terms. This will lead to inconsistent interpretation and application of any code requirements. While the proposal sets maximum area limitations, it includes no minimum area triggers. Combining the lack of definitions and the lack of any minimum area trigger, a single plant in a pot could trigger compliance with this section.
2. There is no technical substantiation provided for the 6' minimum separation distance between the garden/landscaped areas and almost any roof element. As written, section 316.3 is unclear; it appears to be triggered if a roof has any combustible vertical surfaces, but then applies to all the listed roof elements, not just combustible ones. Additionally, a 6' perimeter around each of the listed roof elements would eliminate a significant portion of potential roof garden areas, with no clear explanation of the hazard being mitigated.
3. There is no justification to extend a standpipe to the roof for any building with a rooftop garden/landscaped roof. As written, this would apply to buildings not even required to have a stair that extends to the roof. In any case, a hose connection inside the building at the top floor level is better protected from both the day-to-day environment and the supposed conflagration hazard posed by rooftop plantings.
4. Requiring 'supplemental irrigation', supposedly to be approved by the fire department, makes no sense. As written, it provides no guidance, and will likely lead to interpretations mandating piped irrigation systems.
5. F9 provides adequate criteria for maintaining plant materials that may be provided on rooftops.

Final Action: AS AM AMPC____ D

F10-09/10
401.6 (New)

Proposed Change as Submitted

Proponent: Michael Jacoby, Seven Valleys, PA, representing self

Add new text as follows:

401.6 Geographical locational Information. A site's geographical location being the site's latitude / longitude coordinates centered on the structure, recorded in decimal for accuracy shall be entered as part of a site's official locational records, in plans and documents.

(Renumber subsequent sections)

Reason: By having accurate geographical locational information which is essential for emergency planning and preparedness to protect those within your communities that have families or loved ones with special needs and by using latitude and longitude coordinates centered on a facility at the time of construction that over time this will eliminate the continuing locational problems being found within mapping databases combined with confusion that you may encounter when Out-Of-Area-Assistance is required for emergencies.

Simply put… State Highway Numbers, Road Names and Postal Delivery Addresses even a community for industrial park may change its name but a site's set of latitude and longitude coordinates will always stay constant.

In other words if you've ever driven to a wrong location when using address numbers and road names etc. especially when every second counts you should immediately understand why this proposed change is so important.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: JACOBY-F1-401.6.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that the proposal is a good concept but that it needs revision to center the location on the facility entrance and not the building itself which would be especially important for mutual aid companies. The proposal should also be specific as to how many decimal places the location description should be carried when recording it in records and what datum the location is taken to.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Jacoby, Seven Valleys, PA, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

401.6 Geographical Locational Information. A site's geographical location being the site's set of latitude / longitude coordinates centered on a facility's entrance on the structure shall be done by a professional Registered Land Surveyor licensed by the appropriate governing authority using Datum-World Geodetic System (WGS84) recorded in decimal ~~for accuracy~~ degrees in a numeric format ±1 m so that during inspections the fire code official will be able to verify that this lat/long locational information including the name of the surveyor is entered on the construction prints in the cover title block area and shall be entered as part of a site's official records in plans and documents. The responsibility and cost of having the professional Registered Land Surveyor's lat/long information/data recorded on the official site construction plans will be that of the developer/builder.

Commenter Reason: Having accurate geographical locational information which is essential for emergency planning and preparedness is key to protecting life and property of those within your communities, and… after listening to the committee's comments during the last hearing I agree, if we are going to do this right, lets make sure that the set of coordinates, being the location is centered on a facility's entrance and by using this more exact approach it will better benefit our mutual aid companies when Out-Of-Area-Assistance is required so… revisions were made to make it easier for Fire Code Officials at the same time we can now achieve a higher degree of accuracy than was originally proposed.

Since ICC IFC codes will be used worldwide the World Geodetic System **(WGS84)** will be used having the ability of achieving a geocentric globally consistent within ±1 m

Also by using professional resources **(a Professional Registered Land Surveyor Licensed by the appropriate governing authority)** during construction this entrance point's locational information will be **their** responsibility thus assuring that the accuracy of this very important latitude/longitude locational data is now within tolerance.

In doing so, all that a Fire Code Official will have to do is verified that the **Professional Registered Land Surveyor's NAME with the SET OF COORDINATES required** are recorded on the official site construction plans within the cover sheet title block area, during inspections to be later recorded in records so that it can be quickly located during an emergency.

The responsibility including cost of making sure that the Professional Registered Land Surveyor's **NAME** with their **SET OF COORDINATES** lat/long data /information is on the prints will be that of the developer/builder.

To clarify: When **Professional Registered Land Surveyor** services are used **this will eliminate the need** for a Fire Code Official to purchase or carry a handheld GPS device as originally proposed, unless he or she would like to start double-checking locational coordinate data for **data verification purposes** at existing sites which **is not part of this proposal**, when it is discovered that the site's official coordinate data records being used in other database mapping systems is inaccurate, out-of-date or very misleading that could affect local public safety and planning.

Simply put… State Highway Numbers, Road Names and Postal Delivery Addresses even a community or industrial park may change its name but a site's set of latitude and longitude coordinates will always stay constant.

In other words if you've ever driven to a wrong location when using address numbers and road names etc. especially when every second counts you should immediately understand why this is so important.

BIBLIOGRAPHY

Surveyors Datum information in layman's terms

WGS84 http://en.wikipedia.org/wiki/Datum_(geodesy)

WGS84 http://en.wikipedia.org/wiki/WGS84

Cost Impact: The estimated cost should be from $200-$500 maybe less depending on atmospheric conditions at the time of collecting the lat/long data.

Final Action: AS AM AMPC____ D

F12-09/10
404.3.2

Proposed Change as Submitted

Proponent: Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing the Michael Minger Foundation

Revise as follows:

404.3.2 Fire safety plans. Fire safety plans shall include the following:

1. The procedure for reporting a fire or other emergency.
2. The life safety strategy and procedures for notifying, relocating or evacuating occupants, including occupants who need assistance. <u>Emphasis shall be given to identifying individuals with mobility and cognitive disabilities and integrating their special needs into fire safety plans.</u>
3. Site plans indicating the following:
   - 3.1. The occupancy assembly point.
   - 3.2. The locations of fire hydrants.
   - 3.3. The normal routes of fire department vehicle access.
4. Floor plans identifying the locations of the following:
   - 4.1. Exits.
   - 4.2. Primary evacuation routes.
   - 4.3. Secondary evacuation routes.
   - 4.4. Accessible egress routes.
   - 4.5. Areas of refuge.
   - 4.6. Exterior areas for assisted rescue.
   - 4.7. Manual fire alarm boxes.
   - 4.8. Portable fire extinguishers.
   - 4.9. Occupant-use hose stations.
   - 4.10. Fire alarm annunciators and controls.
5. A list of major fire hazards associated with the normal use and occupancy of the premises, including maintenance and housekeeping procedures.
6. Identification and assignment of personnel responsible for maintenance of systems and equipment installed to prevent or control fires.
7. Identification and assignment of personnel responsible for maintenance, housekeeping and controlling fuel hazard sources.

Reason: Provisions for individuals with mobility disabilities are well established in the physical environment requirements of the IBC's Accessibility chapter. Once the building is constructed with the accessibility features the maintenance codes need to have requirements in place that recognize that movement of these individuals in an emergency has to be defined, planned, and communicated. We are also at a point of recognizing that individuals with cognitive disabilities may need additional education or notice of what to do in fire emergencies. This simple addition to the IFC (and the IPMC coordination if approved here) will prompt property owners and operators to consider the sometimes unique needs of the occupants in their buildings in an emergency. This simple requirement begins the dialog between occupants and building operators to help insure that when an emergency occurs everyone will have the opportunity to move safely to the outside. Proper egress planning lessens the burden of emergency personnel in providing rescue services while the suppression effort is ongoing.

The submittal of this proposal and several others with the ICC is part of the work of the Michael H. Minger Foundation, as a result of a Department of Homeland Security Fire Prevention and Safety Grant to study how colleges and universities respond to and provide for students with physical and learning disabilities in a fire event. The study identified model practices being used by campuses regarding fire safety, housing and evacuation policies and procedures. The proposed changes to the IPMC lay the foundation for uniform fire safety planning in the campus environment in a nationally recognized document while also establishing a clear base for egress planning and performance in all types of occupancies.

The Michael H. Minger Foundation was established in 2005. The purpose of the Foundation is to improve fire safety standards and enhance fire safety systems on college and university campuses and to educate parents and students and raise awareness of the reality and risk of campus fires. This non-profit organization was founded to honor the life of Michael H. Minger, an outstanding young man, who lost his life in a college dormitory fire. The Michael Minger Act in Kentucky established a requirement for fire sprinklers in college housing. A governor's task force focusing on campus safety in Kentucky was lead by Gail Minger, the director of the Michael H. Minger Foundation.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CAHANIN-F2-404.3.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee generally felt that the current text adequately addresses occupants who might need assistance and that some occupants who need assistance might be overlooked by the limited application of the proposed text. It was also felt that it is unclear as to who is responsible to identify the specified special needs occupants and could place an undue burden on institutions to do so. Privacy issues in identifying such individuals was also noted as a concern.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing Michael Minger Foundation, requests Approved as Modified by this public comment.

Modify the proposal as follows:

404.3.2 Fire safety plans. Fire safety plans shall include the following:

1. The procedure for reporting a fire or other emergency.
2. The life safety strategy and procedures for notifying, relocating or evacuating occupants, including occupants who need assistance. Emphasis shall be given to identifying individuals with mobility, <u>sensory</u>, and cognitive disabilities and integrating their special needs into fire safety plans.

3. through 7. *(No change to current text.)*

Commenter's Reason: Provisions for individuals with mobility disabilities are well established in the physical environment requirements of the IBC's Accessibility chapter. Individuals with sensory disabilities such as hearing and site are provided for in notification devices for fire and signage requirements for egress in Means of Egress. Occupants with cognitive disabilities are not addressed in fire safety plans at this time. Once the building is constructed the maintenance codes need to have requirements in place that recognize that movement of <u>all</u> individuals in an emergency has to be defined, planned, and communicated.

We are also at a point of recognizing that individuals with cognitive disabilities may need additional education or notice of what to do in fire emergencies. This simple addition to the IFC will prompt property owners and operators to consider the sometimes unique needs of the occupants in their buildings in an emergency. While there were committee members who thought that this change would add an unfair requirement upon property owners, they failed to recognize that we are only calling attention to the possible existence of groups with disabilities as a consideration. This simple requirement begins the dialog between occupants and building operators to help insure that when an emergency occurs everyone will have the opportunity to move safely to the outside. Proper egress planning lessens the burden of emergency personnel in providing rescue services while the suppression effort is ongoing.

The committee statement says. "It was also felt that it is unclear as to who is responsible to identify the specified special needs occupants and could place an undue burden on institutions to do so. Privacy issues in identifying such individuals was also noted as a concern." The change says simply to consider the needs of these special groups in developing a plan and add provisions during plan development in <u>anticipation</u> of an expressed need in the building. If the plan has specific educational indicators identified in the plan when it is completed the building owners can immediately provide proper access to individuals based upon the plans provisions already in place. It does not require the specific identification of an individual. There are multiple agencies nationally looking at ways to accommodate individuals and encourage their participation and that is not the role of the Fire Prevention Code. This change will only bring the Fire Prevention Code into the mainstream of considering all of the needs of the general public and does in fact make it more inclusive.

The submittal of this proposal and several others with the ICC is part of the work of the Michael H. Minger Foundation, as a result of a Department of Homeland Security Fire Prevention and Safety Grant to study how colleges and universities respond to and provide for students with physical and learning disabilities in a fire event. The study identified model practices being used by campuses regarding fire safety, housing and evacuation policies and procedures. The proposed changes to the IPMC lay the foundation for uniform fire safety planning in the campus environment in a nationally recognized document while also establishing a clear base for egress planning and performance in all types of occupancies.

The Michael H. Minger Foundation was established in 2005. The purpose of the Foundation is to improve fire safety standards and enhance fire safety systems on college and university campuses and to educate parents and students and raise awareness of the reality and risk of campus fires. This non-profit organization was founded to honor the life of Michael H. Minger, an outstanding young man, who lost his life in a college dormitory fire. The Michael Minger Act in Kentucky established a requirement for fire sprinklers in college housing. A governor's task force focusing on campus safety in Kentucky was lead by Gail Minger, the director of the Michael H. Minger Foundation.

Final Action: AS AM AMPC____ D

F13-09/10
404.6 (New)

Proposed Change as Submitted

Proponent: Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing the Michael Minger Foundation

Add new text as follows:

404.6 Posting of evacuation plan. A posted evacuation plan consisting of a floor plan layout indicating the available evacuation routes with identification of key emergency components, such as areas of rescue assistance, shall be provided near the main entry to the floor or building where access by the general public occurs in Group A-3, B and R-2 occupancies .

Reason: Within ANSI A17.1 for elevators there is now a requirement for 'in case of fire use stairs' placards to be posted at elevator call buttons and this proposal is a better detailed extension of that requirement document in that the posted plan will clearly define where the stairs and areas of rescue assistance are located. A companion proposal for a new 404.5.1 requires posting of egress paths from dorm rooms and this new section is an extension into public area notice.

The information provided on the plan will communicate the available means of egress to the occupants. It is also recognized that there is no specific form of education being provided to the general population related to the provisions being provided for accessibility in buildings. The evacuation plan can begin the educational process by identifying building provisions for egress in a public area.

The submittal of this proposal and several others with the ICC is part of the work of the Michael H. Minger Foundation, as a result of a Department of Homeland Security Fire Prevention and Safety Grant to study how colleges and universities respond to and provide for students with physical and learning disabilities in a fire event. The study identified model practices being used by campuses regarding fire safety, housing and evacuation policies and procedures. The proposed changes to the IPMC lay the foundation for uniform fire safety planning in the campus environment in a nationally recognized document while also establishing a clear base for egress planning and performance in all types of occupancies.

The Michael H. Minger Foundation was established in 2005. The purpose of the Foundation is to improve fire safety standards and enhance fire safety systems on college and university campuses and to educate parents and students and raise awareness of the reality and risk of campus fires. This non-profit organization was founded to honor the life of Michael H. Minger, an outstanding young man, who lost his life in a college dormitory fire. The Michael Minger Act in Kentucky established a requirement for fire sprinklers in college housing. A governor's task force focusing on campus safety in Kentucky was lead by Gail Minger, the director of the Michael H. Minger Foundation.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CAHANIN-F1-404.6.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal should be more specific as to the "key emergency components" mentioned and should be more specific as to where the plans should be posted. The proposed text would also conflict with Section 404.2 which already includes Group R-2 college and university buildings and also provides a much higher threshold for Group A and B occupancies.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing Michael Minger Foundation, requests Approved as Modified by this public comment.

Modify the proposal as follows:

~~**404.6 Posting of evacuation plan.**~~ **404.5.1.1 College and university buildings.** A posted evacuation plan consisting of a floor plan layout indicating the available evacuation routes with identification of key emergency components, such as areas of rescue assistance, shall be provided near the main entry to the floor or building where access occurs in Groups A-3~~,~~ and B and in Group R-2 college and university buildings ~~occupancies.~~

Commenter's Reason: Based upon the committee's comments the original proposal has been relocated to become a subpart of fire safety plan distribution consistent with the reference to college and university buildings in 404.2. Section 404.2 only states where a fire safety and evacuation plan is to be prepared and maintained- not who has access to the plan.

The plan distribution requirements in 404.5.1 say tenants and building service personnel receive copies of the fire safety plan. For college and university campus buildings the student may not be either a tenant or campus personnel and needs to be informed and have access to the fire safety plan. A provision for its placement near the main entry to the floor or building provides the owners with a general area of placement for buildings where their lobby area may vary widely in geometry and a more restrictive requirement might be more difficult to enforce. For dormitory sleeping rooms there is a new requirement for the posting of evacuation egress plans on the back of dorm doors and this change complements that change in residence halls.

Within ANSI A17.1 for elevators there is now a requirement for 'in case of fire use stairs' placards to be posted at elevator call buttons and this proposal is a better detailed extension of that requirement document in that the posted plan will clearly define where the stairs and areas of rescue assistance are located.

The information provided on the plan will communicate the available means of egress to the occupants. It is also recognized that there is no specific form of education being provided to the general population related to the provisions being provided for accessibility in buildings. The evacuation plan can begin the educational process by identifying building provisions for egress in a public area. The submittal of this proposal and several others with the ICC is part of the work of the Michael H. Minger Foundation, as a result of a Department of Homeland Security Fire Prevention and Safety Grant to study how colleges and universities respond to and provide for students with physical and learning disabilities in a fire event. The study identified model practices being used by campuses regarding fire safety, housing and evacuation policies and procedures. The proposed changes to the IPMC lay the foundation for uniform fire safety planning in the campus environment in a nationally recognized document while also establishing a clear base for egress planning and performance in all types of occupancies.

The Michael H. Minger Foundation was established in 2005. The purpose of the Foundation is to improve fire safety standards and enhance fire safety systems on college and university campuses and to educate parents and students and raise awareness of the reality and risk of campus fires. This non-profit organization was founded to honor the life of Michael H. Minger, an outstanding young man, who lost his life in a college dormitory fire. The Michael Minger Act in Kentucky established a requirement for fire sprinklers in college housing. A governor's task force focusing on campus safety in Kentucky was lead by Gail Minger, the director of the Michael H. Minger Foundation.

Final Action: AS AM AMPC____ D

F14-09/10

408.4 through 408.4.4 (New), Chapter 47, Appendix K (New)

Proposed Change as Submitted

Proponent: William Winslow, CIH, CFI, CMI, Winslow Partnership, representing self

1. Add new text as follows:

408.4 Group H occupancies and outdoor areas with hazardous materials. Group H occupancies and outdoor areas with hazardous materials shall comply with Sections 408.4.1 through 408.4.4 when such occupancies or facilities are required by 40CFR, Section 68.130 to have a Risk Management Plan (RMP). See Appendix K for further information on chemicals and threshold quantities that require a RMP.

408.4.1 Emergency response plan. An emergency response plan describing procedures for mitigating an unintentional chemical release shall be prepared prior to occupancy. A copy of the plan shall be maintained on-site, and upon request, a copy of the plan shall be provided to the fire code official for approval.

408.4.2 Training. Employees who are designated as emergency responders shall be trained to perform duties assigned in the Emergency Response Plan. Training criteria shall be provided in the Emergency Response Plan.

408.4.3 Equipment. Equipment and supplies specified in the Emergency Response Plan for use in the event of an unintentional chemical release shall be maintained on-site or shall be available for delivery to the site as specified in the plan.

408.4.4 Emergency drill. When required by the fire code official, an annual drill shall be conducted to practice the Emergency Response Plan. The fire code official shall be notified of the date and time of a scheduled drill not less than sixty days prior to the event. When an emergency drill identifies deficiencies in the Emergency Response Plan, the plan shall be updated to correct noted deficiencies.

2. Add new standard to Chapter 47 as follows:

EPA

40 CFR, Part 68 Subparts F and G – 2000	Chemical Accident Prevention Provisions - Regulated Substances for Accidental Release Prevention and Risk Management Plan

3. Add new Appendix K as follows:

(Underlining in the body of the substances tables omitted for clarity)

APPENDIX K
HAZARDOUS MATERIALS AND THRESHOLD QUANTITIES FOR EMERGENCY RESPONSE PLANNING

This appendix is for informational purposes and is not intended for adoption.

SECTION K101
GENERAL

K101.1 Scope. The *International Fire Code*, Section 408.4 establishes requirements for Group H-1, H-2, H-3 and H-4 occupancies and outdoor facilities to have an emergency response plan when threshold quantities for certain chemicals are exceeded. Section 408.4 intends for the emergency response planning requirements, including the list of applicable chemicals and threshold quantities, to:

1. Remain consistent with the U.S. Environmental Protection Agency's (EPA) Risk Management Plan (RMP) filing thresholds specified in Title 40, Section 68.130 of the Code of Federal Regulations, and
2. Remain consistent with the regulations for facilities requiring a RMP, as specified in Section 112(r) of the Clean Air Act.

Table K101(1) and Table K101(2) provide EPA's threshold quantities for regulated chemicals as of January 1, 2009. This information is provided as a reference for application of Section 408.4, but because the list of applicable chemicals and quantities under Federal law may change over time, it is recommended that the source Federal documents be consulted for the most up-to-date information when applying the code.

TABLE K101(1)
LIST OF REGULATED TOXIC SUBSTANCES AND THRESHOLD QUANTITIES FOR ACCIDENTAL RELEASE PREVENTION
(Source: 40CFR, Part 68, Sec. 68.130; Revised as of July 1, 2000)

(The font for the 2 tables was left as submitted due to technical difficulties in formatting)

Chemical name	CAS No.	Threshold quantity (lbs)
Acrolein [2-Propenal]..........	107-02-8	5,000
Acrylonitrile [2-Propenenitrile].	107-13-1	20,000
Acrylyl chloride [2-Propenoyl chloride].	814-68-6	5,000
Allyl alcohol [2-Propen-l-ol]..	107-18-61	15,000
Allylamine [2-Propen-l-amine]..	107-11-9	10,000
Ammonia (anhydrous)............	7664-41-7	10,000
Ammonia (conc 20% or greater)..	7664-41-7	20,000
Arsenous trichloride...........	7784-34-1	15,000
Arsine.........................	7784-42-1	1,000
Boron trichloride [Borane, trichloro-].	10294-34-5	5,000
Boron trifluoride [Borane, trifluoro-].	7637-07-2	5,000
Boron trifluoride compound with methyl ether (1:1) [Boron, trifluoro [oxybis [metane]]-, T-4-.	353-42-4	15,000
Bromine........................	7726-95-6	10,000
Carbon disulfide...............	75-15-0	20,000
Chlorine.......................	7782-50-5	2,500

Chlorine dioxide [Chlorine oxide (ClO2)].	10049-04-4	1,000
Chloroform [Methane, trichloro-].	67-66-3	20,000
Chloromethyl ether [Methane, oxybis[chloro-].	542-88-1	1,000
Chloromethyl methyl ether [Methane, chloromethoxy-].	107-30-2	5,000
Crotonaldehyde [2-Butenal].....	4170-30-3	20,000
Crotonaldehyde, (E)- [2-Butenal, (E)-].	123-73-9	20,000
Cyanogen chloride.............	506-77-4	10,000
Cyclohexylamine [Cyclohexanamine].	108-91-8	15,000
Diborane......................	19287-45-7	2,500
Dimethyldichlorosilane [Silane, dichlorodimethyl-].	75-78-5	5,000
1,1-Dimethylhydrazine [Hydrazine, 1,1-dimethyl-].	57-14-7	15,000
Epichlorohydrin [Oxirane, (chloromethyl)-].	106-89-8	20,000
Ethylenediamine [1,2-Ethanediamine].	107-15-3	20,000
Ethyleneimine [Aziridine]......	151-56-4	10,000
Ethylene oxide [Oxirane].......	75-21-8	10,000
Fluorine......................	7782-41-4	1,000
Formaldehyde (solution)........	50-00-0	15,000
Furan.........................	110-00-9	5,000
Hydrazine.....................	302-01-2	15,000
Hydrochloric acid (conc 37% or greater).	7647-01-0	15,000
Hydrocyanic acid..............	74-90-8	2,500
Hydrogen chloride (anhydrous) [Hydrochloric acid].	7647-01-0	5,000
Hydrogen fluoride/Hydrofluoric acid (conc 50% or greater) [Hydrofluoric acid].	7664-39-3	1,000
Hydrogen selenide.............	7783-07-5	500
Hydrogen sulfide..............	7783-06-4	10,000
Iron, pentacarbonyl- [Iron carbonyl (Fe(CO)5), (TB-5-11)-].	13463-40-6	2,500
Isobutyronitrile [Propanenitrile, 2-methyl-].	78-82-0	20,000
Isopropyl chloroformate [Carbonochloridic acid, 1-methylethyl ester].	108-23-6	15,000
Methacrylonitrile [2-Propenenitrile, 2-methyl-].	126-98-7	10,000
Methyl chloride [Methane, chloro-].	74-87-3	10,000
Methyl chloroformate [Carbonochloridic acid, methylester].	79-22-1	5,000
Methyl hydrazine [Hydrazine, methyl-].	60-34-4	15,000
Methyl isocyanate [Methane, isocyanato-].	624-83-9	10,000
Methyl mercaptan [Methanethiol]	74-93-1	10,000
Methyl thiocyanate [Thiocyanic acid, methyl ester].	556-64-9	20,000

Methyltrichlorosilane [Silane, trichloromethyl-].	75-79-6	5,000
Nickel carbonyl................	13463-39-3	1,000
Nitric acid (conc 80% or greater).	7697-37-2	15,000
Nitric oxide [Nitrogen oxide (NO)].	10102-43-9	10,000
Oleum (Fuming Sulfuric acid) [Sulfuric acid, mixture with sulfur trioxide] \1\.	8014-95-7	10,000
Peracetic acid [Ethaneperoxoic acid].	79-21-0	10,000
Perchloromethylmercaptan [Methanesulfenyl chloride, trichloro-].	594-42-3	10,000
Phosgene [Carbonic dichloride].	75-44-5	500
Phosphine......................	7803-51-2	5,000
Phosphorus oxychloride [Phosphoryl chloride].	10025-87-3	5,000
Phosphorus trichloride [Phosphorous trichloride].	7719-12-2	15,000
Piperidine.....................	110-89-4	15,000
Propionitrile [Propanenitrile].	107-12-0	10,000
Propyl chloroformate [Carbonochloridic acid, propylester].	109-61-5	15,000
Propyleneimine [Aziridine, 2-methyl-].	75-55-8	10,000
Propylene oxide [Oxirane, methyl-].	75-56-9	10,000
Sulfur dioxide (anhydrous).....	7446-09-5	5,000
Sulfur tetrafluoride [Sulfur fluoride (SF4), (T-4)-].	7783-60-0	2,500
Sulfur trioxide................	7446-11-9	10,000
Tetramethyllead [Plumbane, tetramethyl-].	75-74-1	10,000
Tetranitromethane [Methane, tetranitro-].	509-14-8	10,000
Titanium tetrachloride [Titanium chloride (TiCl4) (T-4)-].	7550-45-0	2,500
Toluene 2,4-diisocyanate [Benzene, 2,4-diisocyanato-1-methyl-] \1\.	584-84-9	10,000
Toluene 2,6-diisocyanate [Benzene, 1,3-diisocyanato-2-methyl-] \1\.	91-08-7	10,000
Toluene diisocyanate (unspecified isomer) [Benzene, 1,3-diisocyanatomethyl-] \1\.	26471-62-5	10,000
Trimethylchlorosilane [Silane, chlorotrimethyl-].	75-77-4	10,000
Vinyl acetate monomer [Acetic acid ethenyl ester].	108-05-4	15,000

TABLE K101(2)

FLAMMABLE SUBSTANCES AND THRESHOLD QUANTITIES FOR ACCIDENTAL RELEASE PREVENTION[1]

(Source: 40CFR, Part 68, Sec. 68.130; Revised as of July 1, 2000)

Chemical name	CAS No.	Threshold quantity (lbs)
Acetaldehyde..................	75-07-0	10,000
Acetylene [Ethyne]............	74-86-2	10,000
Bromotrifluorethylene [Ethene, bromotrifluoro-].	598-73-2	10,000
1,3-Butadiene.................	106-99-0	10,000
Butane........................	106-97-8	10,000
1-Butene......................	106-98-9	10,000
2-Butene......................	107-01-7	10,000
Butene........................	25167-67-3	10,000
2-Butene-cis..................	590-18-1	10,000
2-Butene-trans [2-Butene, (E)].	624-64-6	10,000
Carbon oxysulfide [Carbon oxide sulfide (COS)].	463-58-1	10,000
Chlorine monoxide [Chlorine oxide].	7791-21-1	10,000
2-Chloropropylene [1-Propene, 2-chloro-].	557-98-2	10,000
1-Chloropropylene [1-Propene, 1-chloro-].	590-21-6	10,000
Cyanogen [Ethanedinitrile].....	460-19-5	10,000
Cyclopropane..................	75-19-4	10,000
Dichlorosilane [Silane, dichloro-].	4109-96-0	10,000
Difluoroethane [Ethane, 1,1-difluoro-].	75-37-6	10,000
Dimethylamine [Methanamine, N-methyl-].	124-40-3	10,000
2,2-Dimethylpropane [Propane, 2,2-dimethyl-].	463-82-1	10,000
Ethane........................	74-84-0	10,000
Ethyl acetylene [1-Butyne].....	107-00-6	10,000
Ethylamine [Ethanamine]........	75-04-7	10,000
Ethyl chloride [Ethane, chloro-].	75-00-3	10,000
Ethylene [Ethene]..............	74-85-1	10,000
Ethyl ether [Ethane, 1,1'-oxybis-].	60-29-7	10,000
Ethyl mercaptan [Ethanethiol]..	75-08-1	10,000
Ethyl nitrite [Nitrous acid, ethyl ester].	109-95-5	10,000
Hydrogen......................	1333-74-0	10,000
Isobutane [Propane, 2-methyl]..	75-28-5	10,000
Isopentane [Butane, 2-methyl-].	78-78-4	10,000
Isoprene [1,3-Butadinene, 2-methyl-].	78-79-5	10,000
Isopropylamine [2-Propanamine].	75-31-0	10,000
Isopropyl chloride [Propane, 2-chloro-].	75-29-6	10,000
Methane.......................	74-82-8	10,000
Methylamine [Methanamine]......	74-89-5	10,000
3-Methyl-1-butene.............	563-45-1	10,000
2-Methyl-1-butene.............	563-46-2	10,000
Methyl ether [Methane, oxybis-]	115-10-6	10,000

Methyl formate [Formic acid, methyl ester].	107-31-3	10,000
2-Methylpropene [1-Propene, 2-methyl-].	115-11-7	10,000
1,3-Pentadinene................	504-60-9	10,000
Pentane........................	109-66-0	10,000
1-Pentene......................	109-67-1	10,000
2-Pentene, (E)-................	646-04-8	10,000
2-Pentene, (Z)-................	627-20-3	10,000
Propadiene [1,2-Propadiene]....	463-49-0	10,000
Propane........................	74-98-6	10,000
Propylene [1-Propene]..........	115-07-1	10,000
Propyne [1-Propyne]............	74-99-7	10,000
Silane.........................	7803-62-5	10,000
Tetrafluoroethylene [Ethene, tetrafluoro-].	116-14-3	10,000
Tetramethylsilane [Silane, tetramethyl-].	75-76-3	10,000
Trichlorosilane [Silane, trichloro-].	10025-78-2	10,000
Trifluorochloroethylene [Ethene, chlorotrifluoro-].	79-38-9	10,000
Trimethylamine [Methanamine, N,N-dimethyl-].	75-50-3	10,000
Vinyl acetylene [1-Buten-3-yne]	689-97-4	10,000
Vinyl chloride [Ethene, chloro-].	75-01-4	10,000
Vinyl ethyl ether [Ethene, ethoxy-].	109-92-2	10,000
Vinyl fluoride [Ethene, fluoro-].	75-02-5	10,000
Vinylidene chloride [Ethene, 1,1-dichloro-].	75-35-4	10,000
Vinylidene fluoride [Ethene, 1,1-difluoro-].	75-38-7	10,000
Vinyl methyl ether [Ethene, methoxy-].	107-25-5	10,000

[1]A flammable substance when used as a fuel or held for sale as a fuel at a retail facility is excluded from all provisions of 40CFR, Part 68.

Reason: Dalton, Georgia, April 11, 2006 - A final report issued by the U.S. Chemical Safety and Hazard Investigation Board (CSB) concluded inadequate emergency planning by the facility, city, and county contributed to the severity of a runaway chemical reaction and toxic vapor cloud release at MFG Chemical Inc. One problem is that emergency plans required under CCA 112(r) and other federal regulations do not have to be approved by the FCO and do not require periodic drills. This code change will allow the FCO to require emergency planning, training, and drills that meet the needs of the fire department for facilities with hazardous materials that exceed the threshold quantity for risk management planning found in CCA 112(r). It will also ensure that the FCO has the authority to require the plan be written and implemented before a new facility begins operation. The provision for approval by the FCO is in agreement with NFPA 600, which applies to any organized, private, industrial group of employees having fire-fighting response duties, such as emergency brigades, emergency response teams, fire teams, and plant emergency organizations. Section 1.3.2 of NFPA 600 states, " The authority having jurisdiction shall be permitted to examine and approve organization, operations, training". The 60 day notification of an upcoming drill will provide the time necessary for the fire department to include the drill in its training schedule.

Cost Impact: The code change proposal should not increase cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, 40 CFR, Part 68 Subparts F and G – 2000, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard EPA 40 CFR, Part 68, Subparts F and G - 2000 indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.3.2.

Committee Action: Disapproved

Committee Reason: The committee felt that the proposal would put the fire code official in the position of approving a federally-mandated document which the committee felt was inappropriate. It was also noted as unclear as to what, if any, action the fire code official might need to take upon notification required by Section 408.4.4 and who would be responsible for identifying any deficiencies. The classification of some materials listed in the tables were also noted as not being compatible with the material definitions in the IFC.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

William Winslow, Winslow Partnership, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

408.4 Group H occupancies and outdoor areas with hazardous materials. ~~Group H occupancies and outdoor areas with hazardous materials shall comply with Sections 408.4.1 through 408.4.4 when such occupancies or facilities are required by 40CFR, Section 68.130 to have a Risk Management Plan (RMP). See Appendix K for further information on chemicals and threshold quantities that require a RMP.~~ Facilities with one or more Group H occupancies or with an outdoor area containing hazardous materials in amounts that exceed the maximum allowable quantity per outdoor control area shall comply with Sections 408.4.1 through 408.4.4.

Exceptions:

1. Group H occupancies and outdoor areas where storage and use is limited to materials with a NFPA 704 rating of less than 3.
2. Facilities where the total amount of hazardous materials with an NFPA rating of 3 or 4 in outdoor areas and H occupancies does not exceed a combined weight of 50,000 pounds.
3. Group H-5 occupancies and indoor and outdoor HPM storage rooms and areas shall comply with 408.5.

408.4.1 Emergency response plan. An emergency response plan describing procedures for mitigating an unintentional chemical release shall be prepared prior to occupancy or, for existing facilities, within 90 days of written notification by the fire code official. A copy of the plan shall be maintained on-site, and upon request, a copy of the plan shall be provided to the fire code official for approval.

408.4.2 Training. Employees who are designated as emergency responders shall be trained to perform duties assigned in the Emergency Response Plan. Training criteria shall be provided in the Emergency Response Plan.

408.4.3 Equipment. Equipment and supplies specified in the Emergency Response Plan for use in the event of an unintentional chemical release shall be maintained on-site or shall be available for delivery to the site as specified in the plan.

408.4.4 Emergency drill. When required by the fire code official, an annual drill shall be conducted to practice the Emergency Response Plan. The fire code official shall be notified of the date and time of a scheduled drill not less than 14 days prior to the event. When an emergency drill identifies deficiencies in the Emergency Response Plan, the plan shall be updated to correct noted deficiencies.

EPA

~~40 CFR, Part 68 Subparts F and G – 2000~~	~~Chemical Accident Prevention Provisions - Regulated Substances for Accidental Release Prevention and Risk Management Plan~~

~~APPENDIX K~~

~~HAZARDOUS MATERIALS AND THRESHOLD QUANTITIES FOR EMERGENCY RESPONSE PLANNING~~

(Delete entire Appendix K without substitution)

Commenter's Reason: The purpose of this proposal is to add a requirement in the fire code for emergency response planning and training at facilities with large quantities of NFPA hazard class 3 and 4 materials. We can't require compliance with federal regulations, so we need our own tool. Also, the federal regulations may require an emergency plan, but they don't require training to implement the plan. To minimize the burden on small businesses, there are a number of exceptions, including for facilities where the total amount of hazard class 3 and 4 materials is less than 50,000 pounds (5,000 gallons). I don't think there is any disagreement that it is safer for the fire department to respond to a hazmat incident if the facility's staff has an emergency response plan, which it is trained and equipped to implement. Help improve the safety of hazmat emergency responders by overturning the committee's disapproval of this proposal, and vote for Approval as Modified by this Public Comment.

In the reason given for disapproval, the committee was concerned about the incorporation of federal requirements in the original proposal. As a result, all references to federal requirements were removed. Also the semiconductor industry was concerned about HPM facilities. So, in the exceptions there is a clarification that Group H-5 occupancies <u>and indoor and outdoor HPM storage rooms and areas</u> shall comply with 408.5.

Final Action: AS AM AMPC____ D

F16-09/10
503.2.2.1 (New)

Proposed Change as Submitted

Proponent: Carl D. Wren, Fire Department, City of Austin, TX, representing self

Add new text as follows:

<u>**503.2.2.1 Decrease in width.** The fire code official shall have the authority to approve a decrease in the minimum access width. In evaluating reduced access widths, the fire code official shall consider traffic safety issues, maximum building heights, fixed fire suppression systems, the degree of street interconnections, and the adequacy of turning radii. When necessary to demonstrate compliance, the fire code official may require technical assistance provided by traffic safety professionals as well as fire safety professionals in accordance with Section 104.7.2.</u>

Reason: For a number of years the fire service has been exploring strategic partnerships for reducing the overall risk to our communities from a variety of hazards rather than restricting its efforts to simply reducing deaths and injuries from fire related emergencies. This effort is evident in the objectives of the National Fire Academy Course “Strategies for Community Risk Reduction” and its predecessor course “Strategic Analysis of Community Risk Reduction” as well as in the NFPA “Risk Watch” program. With this general idea of overall risk to the community and a specific consideration of the potential for reducing traffic injuries and fatalities in mind, it may often be advantageous to plan for traffic calming during the site plan or subdivision design phases of a project and for the fire code official to be able to choose to accept a design with narrower but significantly interconnected streets over the potential for the jurisdiction to attempt the installation of traffic calming measures as an afterthought, or over the use of cul-de-sacs or other dead-ends with forced turnaround situations.

While the issue of environmental quality is not a goal or objective directly attributed to the fire code, environmental improvements have been a by-product of code development issues such as handling and storing hazardous materials. The EPA has also weighed in on the issue of authority to consider alternate roadway designs and has cited at least two (2) potential benefits of giving fire officials the clear authority to consider and potentially to approve narrower streets in some circumstances. First, representatives of the EPA have noted their position that interconnected narrower streets support more pedestrian friendly cities or neighborhoods and can therefore result in reduced vehicle miles traveled and an attendant reduction in carbon emissions. Second, they have noted that they support this approach as a way to give opportunity to consider and possibly use low-impact development (LID) techniques or green infrastructure for storm water treatment. They believe this will reduce the quantity and improve the quality of storm water runoff.

Finally, this proposal simply clarifies and makes explicit what the proponent considers to be a currently implied authority under IFC sections 104.8, 104.9 and 503.1.2. It affords an opportunity to give developers credit for reduced fire risks due to fire sprinkler protection and acknowledges that there is a potential for major reductions in traffic casualties for well thought out narrow street configurations. Further information on the potential impact of street widths on traffic related injuries can be obtained through a 1997 study by Peter Swift et al that is currently being peer reviewed.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: While the committee recognizes the issues surrounding the proposal, it felt that having the width reduction highlighted in a specific section as proposed could be used against the fire code official in reviewing site plan documents for adequate fire apparatus access. It was suggested that it might be more effective to revise current Section 503.2.2 to give the fire code official the authority to modify the width of fire apparatus access roads without specifying whether it is to increase or to decrease the width. It was also noted that the proposal includes a "laundry list" of things to consider when modifying the width, albeit an incomplete one. Such a list should be better located in the commentary and expanded to to include, but not be limited to, consideration of building construction type, wildland-urban interface areas, terrain characteristics and the specific characteristics of fire apparatus. The committee also expressed its preference for code change F17-09/10 to establish needed dialogue regarding fire apparatus road design issues versus traffic safety issues.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Page Dougherty representing self, and Carl D. Wren, Austin, TX Fire Department, representing self, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

503.2.2 Authority. The fire chief ~~code official~~ shall have the authority to modify ~~require an increase in~~ the minimum access widths needed ~~where they are inadequate for fire or rescue operations~~. When necessary to demonstrate compliance, the fire code official is authorized to require technical assistance provided by traffic safety professionals as well as fire safety professionals in accordance with Section 104.7.2.

~~**503.2.2.1 Decrease in width.** The fire code official shall have the authority to approve a decrease in the minimum apparatus access width. In evaluating reduced access widths, the fire code official shall consider traffic safety issues, maximum building heights, fixed fire suppression systems, the degree of street interconnections, and the adequacy of turning radii. When necessary to demonstrate compliance, the fire code official may require technical assistance provided by traffic safety professionals as well as fire safety professionals in accordance with Section 104.7.2.~~

Commenter's Reason (Dougherty): Per the direction of the committee in its reasoning as shown in the Report of the Hearings, this modification of the proposal moves the revision concept into Section 503.2.2 and changes the text to a more general term. The proposed change in this public comment generalizes the authority to allow the fire chief the ability to approve an increase or decrease in fire apparatus access roads and fire lanes. The approval may be determined by the conditions of a proposal, based on fire department access needs in the area and any practical conditions that may affect the area such as topography and any special construction conditions or additional fire protection features to offset access issues. This proposal clarifies the intent of the code as it applies to the fire chief's authority in these cases.

This proposal initially was to allow a decrease in the width for fire apparatus access. However, as was pointed out by one committee member pointed out in his reasoning that sometimes the minimums don't work and a larger turn radius or other feature of the intersection needs to be altered to allow fire apparatus access to an area. It should also be noted that fire departments have allowed decreases in access widths based on topographical and other practical difficulties as allowed in the legacy codes.

I urge the membership to support this Public Comment by voting for the item to be approved as modified by the Public Comment

Commenter's Reason (Wren): As the original submitter, I am trying to follow the direction of the committee in their reason statement as recorded in the Report of the Hearings. This modification of the proposal moves the revision concept into Section 503.2.2 and changes the text to be more general in its application. The proposed change in this public comment gives more latitude to the authority having jurisdiction (AHJ), allowing the fire chief the ability to approve an increase or a decrease in width for fire apparatus access roads and fire lanes when building and/or site conditions and installed protection, or a lack of installed protection, warrant the change. The approval may be determined by the specific conditions of a project or building based on fire department access needs in the area and any practical conditions that may affect the area. Conditions that have been traditionally recognized as having the potential to affect access (specifically access distance in 503.1.1) include topography, nonnegotiable grades, building location on the property, and any special construction conditions as well as additional fire protection features proposed in order to offset access issues. This proposal clarifies the intent of the code as it applies to the fire chief's authority in those cases that specifically deal with access width. My comment mirrors a public comment developed by Mr. Page Dougherty.

I urge the membership to support this Public Comment by voting for the item to be approved as modified by the Public Comment.

Public Comment 2:

John Norquist, representing Congress for the New Urbanism, requests Approval as Submitted.

Commenter's Reason: The language proposed in F16 poses no threat to fire code officials. It provides and makes explicit a measure of flexibility not currently present: Fire marshals can approve widths of less than 20 feet clear when factors including – but not limited to those listed in the proposed language – are considered, but are not required to do so. This is not a laundry list, but examples of factors that should be considered. In itself, this language contains the flexibility necessary for appropriate consideration of local conditions and situations.

The key passage, "The fire code official shall have the authority…" is permissive, not prescriptive. Hypothetically, even if it were phrased "The fire code official *has* the authority…" the language remains permissive; one doesn't have to use that authority if he or she determines circumstances won't allow it. If this flexibility were already in the code, this issue would not have arisen.

If such flexibility is already in the code but incomplete, then the language of F16 fills the gap. Good street designs take into account factors like turning radii, hydrant placement and staging area needs. Modern apparatus has evolved to fit wider streets; it can evolve again. A case in point: the Milwaukee, (Wis.) Fire Department demanded that a custom builder manufacture appropriately sized apparatus, and got them.

Final Action: AS AM AMPC____ D

F17-09/10
504.3.1, 502.1

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, Joint Fire Service Review Committee

Add new text as follows:

503.4.1. Traffic calming devices. Traffic calming devices are prohibited unless approved by the *fire code official*.

502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

TRAFFIC CALMING DEVICES. Traffic calming devices are design elements of fire apparatus access roads such as street alignment, installation of barriers, and other physical measures intended to reduce traffic and cut-through volumes, and slow vehicle speeds.

Reason: Many communities are facing increased traffic volumes. Both new and existing streets are experiencing higher vehicular volumes and speeds as drivers attempt to find "short cuts" to ease their commutes. Designers, planning departments and traffic departments are increasingly turning to traffic calming measures to preserve the quality and enjoyment of life for their citizens.

A key interest of all emergency services is to provide timely response to emergencies. Traffic calming devices can unduly delay and result in damage to emergency apparatus. This proposed language will allow fire officials to restrict traffic calming devices to those that will minimize these problems.

Standard emergency medical service response times are based on 4-6 minutes. This time frame is based on the fact that brain damage resulting from cardiac arrest typically occurs within 4-6 minutes. Delaying, or extending, these response times in any fashion places the public at greater risk.

Traffic officials and fire officials both have the responsibility to ensure that public interests are properly considered in their decision-making process. Both sets of officials have detailed regulations to provide for those interests.

This proposal requires approval of traffic calming measures by the fire code official. What it doesn't do is detail how that approval is to be made within various jurisdictions. Each jurisdiction has their own traffic pattern emergency response challenges. The purpose of this proposal is to ensure that the fire department is part of this decision-making process. This proposal requires approval of traffic calming measures in private fire access roads and public roads.

Many traffic calming designs include various road configurations that delay, or even restrict, fire apparatus access. Such items may include "round-abouts", speed humps, narrowing of streets, winding roads rather than straight roads, etc. All of these items slow the response time of any emergency response vehicle whether it be law enforcement, medical services, or fire.

The definition for traffic calming is based on the definition provided by the Institute of Transportation Engineers.

Cost Impact: The code change proposal will not increase the cost of construction**.**

ICCFILENAME: LARIVIERE-F5-504.3.1.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement and felt that approval of this proposal would be an important first step in establishing needed critical dialogue with urban traffic planning officials so that both fire departments and traffic planners come to understand and respect one another's viewpoints and needs regarding the need for traffic calming devices. The committee recognized the need to provide better speed control for increased safety but emphasized that features which impede or, possibly, prevent emergency vehicle response create a serious public safety hazard. The committee also noted that the prohibitive language of this proposal ("Traffic calming devices are *prohibited*…") does not lend itself to the kind of co-operation between agencies that is essential to this discussion and suggested a public comment be submitted to make the language more approval-oriented.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

John Norquist representing Congress for the New Urbanism, requests Disapproval.

Commenter's Reason: F17 overreaches and will create more friction between the fire service and traffic engineers and municipal planners, not less. Nor will it spark constructive dialog. As written, F17 and its definitions of traffic calming are so broad in scope that by making the fire code official the final judge of street and traffic design, and therefore traffic engineering, it effectively turns fire code officials into *de facto* traffic engineers. Do fire code officials have the background and training to do traffic engineering on top of their current duties? Do they want to be traffic engineers? Will they consider the potential liability stemming from a traffic engineering decision made by someone who is not a qualified traffic engineer?

CNU understands that the intent here is to give fire code officials a seat at the street design table. CNU has been actively engaged in pursuing and creating the very kind of dialog sought by the IFC. But F17 will not create that seat in a positive atmosphere because is the equivalent of jumping up on the table. The decision to approve it should be overturned.

Public Comment 2:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

Commenter's Reason: This proposal should be disapproved for the following reasons:

1. "The fire code official shall review and approve all newly proposed traffic calming devices, and shall review and either approve, or require the removal of, every existing traffic calming device in the jurisdiction." This is essentially what the approved language says.
2. Neither the proponents reason statement nor testimony provided any explanation as to how this would be implemented. Rather, the proponents and the committee spoke of how this new code requirement could be used to open a 'dialogue' between the fire service and the traffic planners of a jurisdiction. Code requirements should not ever be written to 'open a dialogue' between agencies of a local jurisdiction. The local fire service would be better served by directly working with their local cohorts from the traffic division, than by creating unrealistic code provisions.
3. The proposed definition of 'Traffic Calming Devices' is so broad as to capture all kinds of elements that would never be appropriate to be regulated outside of the local traffic code. Alignment of streets? The 2012 edition of the IFC will prohibit alignment of streets that calm traffic? That's what the approved language says.
4. If approved as proposed, the 2012 edition of the IFC will likely create thousands of code violations upon adoption in any jurisdiction, and provides no mechanism for how the fire service would assess each proposed and existing 'device', or what criteria would be used to assess each 'device'.

Final Action: AS AM AMPC____ D

F20-09/10, Part I
506.3 (New)

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED ONLY FOR INFORMATIONAL PURPOSES FOLLOWING ALL OF PART I.

Proposed Change as Submitted

Proponent: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

PART I – IFC

Revise section title and add new text as follows:

SECTION 506
KEY BOXES AND FIRE SERVICE ELEVATOR KEYS

506.3 Standardized fire service elevator keys. All buildings with elevators equipped with Phase I Emergency Recall, Phase II emergency in-car operation, or a Fire Service Access Elevator shall be equipped to operate with a standardized fire service elevator key approved by the fire code official.

Exception: Where there is a practical difficulty to providing a standardized key the owner shall place the building's non-standardized fire service elevator keys in a key box installed in accordance with Section 506.1.

506.3.1 Requirements for standardized fire service elevator keys. Standardized fire service elevator keys shall comply with all of the following:

1. All fire service elevator keys within the jurisdiction shall be uniform and specific for the jurisdiction. Keys shall be cut to a uniform key code.
2. Fire service elevator keys shall be a patent protected design to prevent unauthorized duplication.
3. Fire service elevator keys shall be factory restricted by the manufacturer to prevent the unauthorized distribution of key blanks. No uncut key blanks shall be permitted to leave the factory
4. Fire service elevator keys subject to these rules shall be engraved with the words "DO NOT DUPLICATE".

506.3.2 Access to standardized fire service keys. Access to standardized fire service elevator keys shall be restricted to the following:

1. Elevator owners or their authorized agents;
2. Elevator contractors.
3. Elevator Inspectors of the jurisdiction.
4. Fire code officials of the jurisdiction.
5. The fire department and other emergency response agencies designated by the fire code official.

506.3.3 Duplication or distribution of keys. No person may duplicate a standardized fire service elevator key or issue, give, or sell a duplicated key unless in accordance with this code.

506.3.4 Responsibility to provide keys. The building owner shall provide up to three (3) standardized fire service elevator keys where required by the fire code official, upon installation of a standardized fire service key switch or switches in the building.

Reason: When fire departments and other public agencies respond to emergencies the ability to quickly access the location of the emergency can be the deciding factor of a successful response. Elevators are increasingly being relied upon for emergency operations and their importance has been highlight by recent additions to the International Building Code requiring the installation of fire service access elevators and providing requirements for the installation of occupant evacuation elevators.

One of the difficulties the fire service and other emergency response agencies have when accessing facilities and attempting to use elevators is the increasing number of non-standardized keys which may not be available at the time of response. Even when emergency responders are provided the necessary keys in case of response, the correct key may have to be identified from a large collection of keys for any one building. In larger jurisdictions the sheer number of keys makes the possession of the keys unwieldy for the emergency responders.

The purpose Part1 of this proposal is to provide for a standardized fire service elevator key to reduce the number of keys necessary for accessing elevators in an emergency. As drafted this section will only apply to those buildings that have elevators with Phase I or Phase II emergency service or to those buildings with a fire service access elevator.

The proposal also provides for a level of security for the standardized key. Access to the key that can take control of an elevator is an existing area of vulnerability for buildings and one that was not addressed in the past with simple key designs being utilized. Since this proposal will create a standardized key, it also includes rules for the safeguarding of that key.

Part 2 of this proposal is included to simply place a pointer in the International Building Code should the International Fire Code Committee approve Part 1 of this proposal.

Because the International Codes are written to enable jurisdictions to adopt the codes at the State, Local or Regional levels the proposal follows that format and designated the "fire code official" as the regulating official. However, it is expected, and preferred, that a State level agency designate a standardized key for all jurisdictions to provide for a statewide standardized key.

In preparing this proposal, statewide regulations requiring standardized fire service elevator keys (or Master Elevator Keys) from Florida, Louisiana and New Jersey were reviewed. Since some states and local jurisdictions have already begun to address this issue with the adoption of regulations and other states and jurisdictions are considering this topic it is beneficial to building owners and code officials to have a standard set of requirements contained within the model codes.

Cost Impact: The code change proposal will not increase the cost of new construction.

Analysis: Similar requirements are proposed in code change proposal F40-09/10.

ICCFILENAME: DAVIDSON-SHUMAN-F5-506.3.DOC

Public Hearing Results

PART I- IFC
Committee Action: **Approved as Modified**

Modify the proposal as follows:

506.3 Standardized fire service elevator keys. All buildings with elevators equipped with Phase I Emergency Recall, Phase II emergency in-car operation, or a Fire Service Access Elevator shall be equipped to operate with a standardized fire service elevator key approved by the fire code official.

> **Exception**: ~~Where there is a practical difficulty to providing a standardized key t~~ The owner shall be permitted to place the building's non-standardized fire service elevator keys in a key box installed in accordance with Section 506.1.

(Portions of the proposed code change not shown remain unchanged.)

Committee Reason: The committee agreed with the proponent's reason statement and felt that the proposal would reduce the number of keys that need to be carried in fire apparatus. The modification removes subjective language which could lead to inconsistent enforcement.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Brian Black, BDBlack Codes Inc, representing National Elevator Industry Inc; Sean DeCrane representing International Association of Fire Fighters and Jack J. Murphy representing Fire Safety Directors Association of Greater New York, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I-IFC

SECTION 506
KEY BOXES AND FIRE SERVICE ELEVATOR KEYS

506.3 Standardized fire service elevator keys. All buildings with elevators equipped with Phase I Emergency Recall, Phase II emergency in-car operation, or a Fire Service Access Elevator shall be equipped to operate with a standardized fire service elevator key ~~approved by the fire code official~~ complying with ASME A17.1/CSA B44.

> ~~**Exception**: Where there is a practical difficulty to providing a standardized key the owner shall place the building's non-standardized fire service elevator keys in a key box installed in accordance with Section 506.1.~~

~~**506.3.1 Requirements for standardized fire service elevator keys**. Standardized fire service elevator keys shall comply with all of the following:~~

1. ~~All fire service elevator keys within the jurisdiction shall be uniform and specific for the jurisdiction. Keys shall be cut to a uniform key code.~~
2. ~~Fire service elevator keys shall be a patent protected design to prevent unauthorized duplication.~~
3. ~~Fire service elevator keys shall be factory restricted by the manufacturer to prevent the unauthorized distribution of key blanks. No uncut key blanks shall be permitted to leave the factory~~
4. ~~Fire service elevator keys subject to these rules shall be engraved with the words "DO NOT DUPLICATE".~~

~~**506.3.2 Access to standardized fire service keys**. Access to standardized fire service elevator keys shall be restricted to the following:~~

1. ~~Elevator owners or their authorized agents;~~
2. ~~Elevator contractors.~~
3. ~~Elevator Inspectors of the jurisdiction.~~
4. ~~Fire code officials of the jurisdiction.~~
5. ~~The fire department and other emergency response agencies designated by the fire code official.~~

~~**506.3.3 Duplication or distribution of keys**. No person may duplicate a standardized fire service elevator key or issue, give, or sell a duplicated key unless in accordance with this code.~~

~~**506.3.4 Responsibility to provide keys**. The building owner shall provide up to three (3) standardized fire service elevator keys where required by the fire code official, upon installation of a standardized fire service key switch or switches in the building.~~

Commenter's Reason: The National Elevator Industry Inc. (NEII) is in complete agreement with the proponent's reason statement that firefighters need to quickly access an emergency situation, often use the elevators in a building to do so, and need a standardized fire service elevator key that is secure and that will work throughout a jurisdiction. However, this is already a requirement in the ASME A17.1/CSA B44 *Safety Code for Elevators and Escalators* referenced by the *International Fire Code*:

ASME A17.1a-2008/CSA B44a-08
SECTION 2.27
EMERGENCY OPERATION AND SIGNALING DEVICES

2.27.8 Switch Keys The key switches required by 2.27.2 through 2.27.5 for all elevators in a building shall be operable by the FEO-K1 key. The keys shall be Group 3 Security (see 8.1). A separate key shall be provided for each switch. These keys shall be kept on the premises in a location readily accessible to firefighters and emergency personnel, but not where they are available to the public. This key shall be of a tubular, 7 pin, style 137 construction and shall have a bitting code of 6143521 starting at the tab sequenced clockwise as viewed from the barrel end of the key. The key shall be coded "FEO-K1." The possession of the "FEO-K1" key shall be limited to elevator personnel, emergency personnel, elevator equipment manufacturers, and authorized personnel during checking of Firefighters' Emergency Operation (see 8.1 and 8.6.11.1).
Where provided, a lock box, including its lock and other components, shall conform to the requirements of UL 1037 (see Part 9).

NOTE (2.27.8): Local authorities may specify additional requirements for a uniform keyed lock box and its location to contain the necessary keys.
Group 3 Security is specified in Section 8.1:

8.1.4 Group 3: Emergency Operation Group 3 covers access or operation of equipment by emergency, authorized, and elevator personnel.
In addition to being unnecessary, F20-09/10 has a number of flaws and conflicts with the ASME A17.1/CSA B44 reference standard.

The requirement that keys be "specific for a jurisdiction" [506.3.1(1)] implies a unique key for each jurisdiction such that the key for Dallas elevators would be different than the key for Fort Worth elevators. In fact, all fire service elevator keys in North America are required to be FEO-K1 keys with a specific bitting code;

The requirement for keys with a "patent protected design" [506-3-1(2)] conflicts with the ASME A17 Standards Committee's experience that there are at least two vendors that can provide the FEO-K1 key. Requiring a patent could constitute a restraint of trade. It is also unclear how this could be enforced by a fire code official;

Regarding the requirement that the keys be "factory restricted by the manufacturer" [506.3.1.(3)], it is again unclear how this is enforceable by a code official;

The list of entities that have access to the fire service keys does not include the elevator manufacturer (e.g., Otis, Schlindler, KONER, *etc*).
This code change also creates a conflict in the IBC by specifying that elevators must comply with ASME A17.1/CSA B44 [3001.2] and with this new set of

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

PART II – IBC GENERAL

Add new text as follows:

3003.3 Standardized fire service elevator keys. All elevators shall be equipped to operate with a standardized fire service elevator key in accordance with the *International Fire Code*.

Reason: When fire departments and other public agencies respond to emergencies the ability to quickly access the location of the emergency can be the deciding factor of a successful response. Elevators are increasingly being relied upon for emergency operations and their importance has been highlight by recent additions to the International Building Code requiring the installation of fire service access elevators and providing requirements for the installation of occupant evacuation elevators.

One of the difficulties the fire service and other emergency response agencies have when accessing facilities and attempting to use elevators is the increasing number of non-standardized keys which may not be available at the time of response. Even when emergency responders are provided the necessary keys in case of response, the correct key may have to be identified from a large collection of keys for any one building. In larger jurisdictions the sheer number of keys makes the possession of the keys unwieldy for the emergency responders.

The purpose Part1 of this proposal is to provide for a standardized fire service elevator key to reduce the number of keys necessary for accessing elevators in an emergency. As drafted this section will only apply to those buildings that have elevators with Phase I or Phase II emergency service or to those buildings with a fire service access elevator.

The proposal also provides for a level of security for the standardized key. Access to the key that can take control of an elevator is an existing area of vulnerability for buildings and one that was not addressed in the past with simple key designs being utilized. Since this proposal will create a standardized key, it also includes rules for the safeguarding of that key.

Part 2 of this proposal is included to simply place a pointer in the International Building Code should the International Fire Code Committee approve Part 1 of this proposal.

Because the International Codes are written to enable jurisdictions to adopt the codes at the State, Local or Regional levels the proposal follows that format and designated the "fire code official" as the regulating official. However, it is expected, and preferred, that a State level agency designate a standardized key for all jurisdictions to provide for a statewide standardized key.

In preparing this proposal, statewide regulations requiring standardized fire service elevator keys (or Master Elevator Keys) from Florida, Louisiana and New Jersey were reviewed. Since some states and local jurisdictions have already begun to address this issue with the adoption of regulations and other states and jurisdictions are considering this topic it is beneficial to building owners and code officials to have a standard set of requirements contained within the model codes.

Cost Impact: The code change proposal will not increase the cost of new construction.

Analysis: Similar requirements are proposed in code change proposal F40-09/10.

PART II-IBC GENERAL
Committee Action: Approved as Submitted

Committee Reason: The committee agreed with the proponent's reason statement and approved the proposal for consistency with the action taken on Part I.

Assembly Action: None

F21-09/10
507.5.1.1 (New)

Proposed Change as Submitted

Proponent: Daniel E. Nichols, PE, New York State Department of State, Div. of Code Enforcement and Administration

Add new text as follows:

507.5.1.1 Hydrant for standpipe systems. Buildings equipped with a standpipe system installed in accordance with Section 905 shall have a fire hydrant within 100 feet of the fire department connections.

Exception: The distance shall be permitted to be greater than 100 feet when approved by the fire code official.

Reason: NFPA 14 Section 6.4.5.4 requires that a fire hydrant be placed within 100 feet from a fire department connection, unless otherwise approved by the AHJ (6.4.5.4.1). However, this section is generally missed as the site work and site approval is based on the fire apparatus access road and fire department water supply requirements in IFC Chapter 5. By placing this requirement in Section 507, the code user is better directed to this requirement during the site design and not an afterthought as it usually happens during the building permit plan review.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: NICHOLS-F3-507.5.1.1.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that the proposed requirement should apply to all fire department connections, not just those for standpipes.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Daniel E. Nichols PE, New York State Div. of Code Enforcement and Administration, requests Approval as Submitted.

Commenter's Reason: The committee agreed that this should be in this section, but disapproved it because it didn't also cover sprinkler system connections. The original submission is based solely on a requirement in NFPA 14 that gets frequently missed. I did not add sprinkler connections in either the original submission or a public comment since NFPA 13 does not have a distance requirement to a fire hydrant for connections serving sprinkler systems. Adding a requirement for a distance to a fire hydrant from a set of sprinkler connections is best suited for either Section 903 or NFPA 13 since it would be a design requirement of the sprinkler system. Also, I would be against a distance to a sprinkler connection since sprinkler systems are used in rural and suburban areas as a reduction for areas without a municipal water and, in turn, fire hydrants.

This proposal should be approved as submitted to better assist the plan reviewer and designer with appropriate fire hydrant placement and not rely on a fire hydrant spacing requirement buried in a referenced standard.

Final Action: AS AM AMPC____ D

F25-09/10
508.1.5 (IBC [F] 911.1.5)

Proposed Change as Submitted

Proponent: Gary Lewis, Chair, ICC Ad Hoc Committee on Terrorism-Resistant Buildings

Revise as follows:

508.1.5 (IBC [F] 911.1.5) Required features. The fire command center shall comply with NFPA 72 and shall contain the following features.

1. The emergency voice/alarm communication system unit.
2. The fire department communications system.
3. Fire-detection and alarm system annunciator system.
4. Annunciator visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air handling systems.
6. The fire-fighters control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking stairway doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans<u>, including a Building Information Card approved by the fire department, which shall provide building statistics including address, height, width and type of construction; stairway access, designation, floors served, pressurization, standpipe availability; elevators bank designation, car numbers, and floors served; ventilation details, including HVAC zones, location of mechanical equipment rooms, and offsite emergency phone numbers; utilities, fuel oil tank locations, gas service locations, electrical service locations; fire protection systems details, including standpipe locations, valve locations, pump room locations; hazardous materials and locations; and, contact phone numbers for building engineers, managers and fire safety directors. The Building Information Card shall also indicate</u> ~~indicating~~ the typical floor plan and detailing the building core, means of egress, fire protection systems, <u>elevator locations</u>, firefighting equipment and fire department access and the location fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.
13. Work table.
14. Generator supervision devices, manual start and transfer features.
15. Public address system, where specifically required by other sections of this code.
16. Elevator fire recall switch in accordance with ASME A17.1.
17. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

Reason: This proposal is a revised follow-up to a similar proposal defeated last cycle. It is part of a package of submittals generated by the ICC's Ad Hoc Committee on Terrorism-Resistant Buildings. The proposal seeks to slightly modify and revise an existing provision of the IBC and a parallel provision in the IFC related to fire command centers in high-rise buildings.

The scope of the proposal has been reduced to simply codifying Item #12 of the list of required fire department support features in the center. There is a need to provide complete, yet concise information to the responding fire service to assist in assessment and management of the rescue and fire fighting efforts.

The Final Report on the Collapse of the World Trade Center contained 30 key recommendations compiled by the National Institute of Standards and Technology designed to address the building vulnerabilities learned in that tragedy. Three of those thirty recommendations (Items #15, 23 and 24) embrace increasing situational awareness and emergency communications of first responders in large-scale emergencies. In fact, the command center was recently doubled in size, and now also contains additional elevator control switching, a relatively new enhancement.

The proposed Building Information Card in #12, as utilized by the NYFD, puts critical response information in a user-friendly format and medium. A simulation of the Building Information Card used in New York City follows:

Bibliography: National Institute of Standards & Technology, Final Report of the National Construction safety Team on the Collapses of the World Trade Center Towers. United States Government Printing Office: Washington, D.C. September 2005.

Cost Impact: The Ad Hoc Committee anticipates no additional cost to construction resulting from this proposal as the bulk of this information must already be provided based on the current code.

ICCFILENAME: LEWIS-F1-508.1.5.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement and felt that the building information card would be a useful tool that would enable the incident commander to quickly gather critical building information upon arrival at a scene and effectively plan tactics.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dave Frable, representing U.S. General Services Administration, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

508.1.5 (IBC [F] 911.1.5) Required features. The fire command center shall comply with NFPA 72 and shall contain the following features.

1. The emergency voice/alarm communication system unit.
2. The fire department communications system.
3. Fire-detection and alarm system annunciator system.
4. Annunciator visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air handling systems.
6. The fire-fighters control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking stairway doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans~~, including a Building Information Card approved by the fire department, which shall provide building statistics including address, height, width and type of construction; stairway access, designation, floors served, pressurization, standpipe availability; elevators bank designation, car numbers, and floors served; ventilation details, including HVAC zones, location of mechanical equipment rooms, and offsite emergency phone numbers; utilities, fuel oil tank locations, gas service locations, electrical service locations; fire protection systems details, including standpipe locations, valve locations, pump room locations; hazardous materials and locations; and, contact phone numbers for building engineers, managers and fire safety directors. The Building Information Card shall also indicate~~ indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, ~~elevator locations,~~ firefighting equipment and fire department access and the location fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.
13. An approved Building Information Card that contains, but is not limited to, the following information:
    (a) general building information that includes: property name, address, the number of floors in the building (above and below grade), use and occupancy classification (mixed used identify the different types of occupancies on each floor), estimated building population (i.e., day, night, weekend);
    (b) building emergency contact information that includes: a list of the building's emergency contacts (e.g., building manager, building engineer, etc.) and their respective work phone number, cell phone number, e-mail address;
    (c) building construction information that includes: the type of building construction (e.g., floors, walls, columns, and roof assembly);
    (d) exit stair information that includes: number of exit stairs in building, each exit stair designation and floors served, location where each exit stair discharges, exit stairs that are pressurized, exit stairs provided with emergency lighting, each exit stair that allows reentry, exit stairs providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve, location of elevator machine rooms, location of sky lobby, location of freight elevator banks;
    (e) building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator, location of natural gas service;
    (f) fire protection system information that includes: locations of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers, location of different types of sprinkler systems installed (e.g., dry, wet, pre-action, etc.);
    (g) hazardous material information that includes: location of hazardous material, quantity of hazardous material.

14.~~13.~~ Work table.
15.~~14.~~ Generator supervision devices, manual start and transfer features.
16.~~15.~~ Public address system, where specifically required by other sections of this code.
17.~~16.~~ Elevator fire recall switch in accordance with ASME A17.1.
18.~~17.~~ Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

Commenter's Reason: The intent of the modification is for clarification purposes only and to make the subject information contained on the building information card more user friendly to understand.

Public Comment 2:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval

Commenter's Reason: This code change should be disapproved for the following reasons:

1. The proposal seeks to add a new 'tool' called the Building Information Card to the list of items provided in the Fire Command Center. However, it does so in a way that reduces the overall information provided. Note that item 12 in the current code requires that schematic drawings include each of the existing items listed; as modified by this proposal, the insertion of the Building Information Card language reduces what is required on the schematic drawings. A code change in the 07/08 cycle added a requirement that schematic drawings include the location of fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions; as modified by this change, that requirement is deleted. Only the 'Building Information Card' would have this information.
2. This appears to be a backward-looking proposal. Major jurisdictions, such as Los Angeles, are currently working with building owners to develop appropriate electronic and/or online building information materials for use by responding emergency services. Establishing a new code requirement for a printed 'card' is pushing the IFC in the wrong direction.
3. The proposed change uses terminology not used in the *International Codes.* It requires providing contact information for 'fire safety directors', which is a term used in New York City, from which this card concept was taken, but is not a title used in the I-codes.

Final Action: AS AM AMPC____ D

F27-09/10

510, 502.1, Appendix J, 105.7.12 (New)

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, Joint Fire Service Review Committee

1. Revise as follows:

SECTION 510
EMERGENCY RESPONDER RADIO COVERAGE

510.1 Emergency responder radio coverage in new buildings. All new buildings shall have *approved* radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

Exceptions:

1. Where *approved* by the *building code official* and the *fire code official*, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained in lieu of an *approved* radio coverage system.
2. Where it is determined by the *fire code official* that the radio coverage system is not needed.

~~**510.3**~~ **510.2** **Emergency responder radio coverage in existing buildings**. Existing buildings that do not have *approved* radio coverage for emergency responders within the building shall be equipped with such coverage according to one of the following:

1. Whenever existing wired communication system cannot be repaired or is being replaced, or where not *approved* in accordance with Section 510.1 Exception 1.
2. Within a time frame established by the adopting authority.

~~**J101.2**~~ **510.3 Permit required.** A construction permit ~~is required~~ for installation of or modification to emergency responder radio coverage systems and related equipment is required as specified in Section 105.7.12. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

510.4 Technical requirements. Systems, components, and equipment required to provide emergency responder radio coverage system shall comply with Sections 511.4.1 through 511.4.2.5.

~~510.2~~ **510.4.1 Radio signal strength.** The building shall be considered to have acceptable emergency responder radio coverage when signal strength measurements in 95 percent of all areas on each floor of the building meet the signal strength requirements in Sections ~~510.2.1~~ 510.4.1.1 and ~~510.2.2~~ 510.4.1.2.

~~510.2.1~~ **510.4.1.1 Minimum signal strength into the building**. A minimum signal strength of -95 dBm shall be receivable within the building.

~~510.2.2~~ **510.4.1.2 Minimum signal strength out of the building**. A minimum signal strength of -100 dBm shall be received by the agency's radio system when transmitted from within the building.

~~J103.1~~ **510.4.2 System design.** The emergency responder radio coverage system shall be designed in accordance with Sections ~~510.3.2.1~~ 510.4.2.1 through ~~510.3.2.5~~ 510.4.2.5.

~~J103.1.1~~ **510.4.2.1 Amplification systems allowed.** Buildings and structures which cannot support the required level of radio coverage shall be equipped with a radiating cable system, a distributed antenna system with Federal Communications Commission (FCC)-certified signal boosters, or other system approved by the *fire code official* in order to achieve the required adequate radio coverage.

~~J103.1.2~~ **510.4.2.2 Technical criteria.** The *fire code official* shall maintain a document providing the specific technical information and requirements for the emergency responder radio coverage system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, effective radiated power of radio sites, and other supporting technical information.

~~J103.1.3~~ **510.4.2.3 Secondary power.** Emergency responder radio coverage systems shall be provided with an *approved* secondary source of power. The secondary power supply shall be capable of operating the emergency responder radio coverage system for a period of at least 12 hours. When primary power is lost, the power supply to the emergency responder radio coverage system shall automatically transfer to the secondary power supply.

~~J103.1.4~~ **510.4.2.4 Signal booster requirements.** If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a NEMA4-type water proof cabinet.
2. Battery systems used for the emergency power source shall be contained in a NEMA4-type water proof cabinet.
3. The ~~system shall include automatic alarming of malfunctions of the~~ signal booster system and battery system~~. Any resulting trouble alarm shall be automatically transmitted to an approved central station or proprietary supervising station as defined in NFPA 72~~ shall be electrically supervised and monitored by a supervisory service, or when approved by the *fire code official*, shall sound an audible signal at a constantly attended location.
4. Equipment shall have FCC Certification prior to installation.

~~J103.1.5~~ **510.4.2.5 Additional frequencies and change of frequencies.** The emergency responder radio coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC.

~~J103.2~~ **510.5 Installation requirements.** The installation of the public safety radio coverage system shall be in accordance with Sections ~~J103.2.1~~ 510.5.1 through ~~J103.2.5~~ 510.5.5.

~~J103.2.1~~ **510.5.1 Approval prior to installation**. No amplification system capable of operating on frequencies licensed to any public safety agency by the FCC shall be installed without prior coordination and approval of the *fire code official*.

~~J103.2.3~~ **510.5.3 Minimum qualifications of personnel.** The minimum qualifications of the system designer and lead installation personnel shall include:

1. A Valid FCC issued General Radio Operators License, and
2. Certification of in-building system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed.

The agency may waive these requirements upon successful demonstration of adequate skills and experience satisfactory to the *fire code official*.

~~J103.2.4~~ **510.5.4** **Acceptance test procedure**. When an emergency responder radio coverage system is required, and upon completion of installation, the building *owner* shall have the radio system tested to ensure that two-way coverage on each floor of the building is a minimum of 90 percent. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of 20 approximately equal areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system.
3. A maximum of two nonadjacent areas will be allowed to fail the test.
4. In the event that three of the areas fail the test, in order to be more statistically accurate, the floor may be divided into 40 equal areas. A maximum of four nonadjacent areas will be allowed to fail the test. If the system fails the 40-area test, the system shall be altered to meet the 90 percent coverage requirement.
5. A test location approximately in the center of each grid area will be selected for the test, then the radio will be enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire area. If the test fails in the selected test location, that grid area shall fail, and prospecting for a better spot within the grid area will not be allowed.
6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner will be required to rerun the acceptance test to reestablish the gain values.
7. As part of the installation a spectrum analyzer or other suitable test equipment shall be utilized to insure spurious oscillations are not being generated by the subject signal booster. This test will be conducted at time of installation and subsequent annual inspections.

~~J103.2.5~~ **510.5.5** **FCC compliance.** The emergency responder radio coverage system installation and components shall also comply with all applicable federal regulations, including but not limited to, FCC 47 CFR 90.219.

~~J103.3~~ **510.6** **Maintenance.** The emergency responder radio coverage system shall be maintained operational at all times in accordance with Sections ~~510.5.1~~ 510.6.1 through ~~510.5.3~~ 510.6.3.

~~**J103.3.1 Maintenance.** The public radio coverage system shall be maintained operational at all times.~~

~~**J103.3.2 Permit required.** A construction permit, as required by Section 105.7.5 of the *International Fire* Code, shall be obtained prior to the modification or alteration of the emergency responder radio coverage system.~~

~~J103.3.3~~ **510.6.1** **Testing and proof of compliance**. The emergency responder radio coverage system shall be inspected and tested annually or whenever structural changes occur including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section ~~J103.2.4~~ 510.5.4.
2. Signal boosters shall be tested to ensure that the gain is the same as it was upon initial installation and acceptance.
3. Backup batteries and power supplies shall be tested under load of a period of one hour to verify that they will properly operate during an actual power outage. If within the one hour test period the battery exhibits symptoms of failure, the test shall be extended for additional one hour periods until the integrity of the battery can be determined.
4. All other active components shall be checked to verify operation within the manufacturer's specifications.
5. At the conclusion of the testing a report which shall verify compliance with Section ~~J103.3.4~~ 510.5.4 be submitted to the *fire code official*.

~~J103.3.4~~ **510.6.2** **Additional frequencies.** The building *owner* shall modify or expand the emergency responder radio coverage system at their expense in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC. Prior approval of a public safety radio coverage system on previous frequencies does not exempt this section.

~~J103.3.5~~ **510.6.3** **Field testing.** Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field-testing to verify the required level of radio coverage.

~~**J102.1 Definitions.** For the purpose of this appendix, certain terms are defined as follows:~~

<u>502.1</u> Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

AGENCY. Any emergency responder department within the jurisdiction that utilizes radio frequencies for communication. This could include, but not be limited to, various public safety agencies such as fire department, emergency medical services and law enforcement.

2. Add new text as follows:

<u>**105.7.12 Radio coverage system.** A construction permit is required for installation of or modification to emergency responder radio coverage systems and related equipment. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.</u>

(Renumber subsequent sections)

3. Delete Appendix J without substitution:

~~APPENDIX J~~
~~EMERGENCY RESPONDER RADIO COVERAGE~~

Reason: This proposal takes the requirements for emergency responder radio coverage made last code cycle and finishes the process. Appendix J was included in the 2009 edition and contains the installation and testing criteria for the emergency responder radio coverage system. In this proposal, the entire appendix is relocated into the code. This action is the result of a request by the Code Development Committee last cycle and can be seen in their Reason Statement in Report on Hearings.

As the appendix is relocated into the code, some minor clarifications occurred. The following revisions are made:

1. 510.1 – the term “new” is included to clarify the difference between Section 510.1 (new construction) and 510.2 (existing construction)
2. 510.3 – this section has been relocated and includes three sections from the appendix which dealt with permits. Sections J101.2, J103.2.2 and J103.3.2 all referenced permits. This revision will provide a single section which covers permits for these systems.
3. 105.7.12 – this permit requirement is added to Chapter 1. Since the appendix is deleted, the permit requirement also needs to be located within the code. This is editorial.
4. 510.4.2.4 – Item 3 is revised to correlate with the new wording used in other sections of the code when referencing monitoring of systems. 510.6 – The two sections from the Appendix J103.3 and J103.3.1 have been combined into one section for simplicity.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: LARIVIERE-F33-510.DOC

<u>Public Hearing Results</u>

Committee Action: **Approved as Modified**

Modify the proposal as follows:

510.2 Emergency responder radio coverage in existing buildings. Existing buildings that do not have approved radio coverage for emergency responders within the building shall be equipped with such coverage according to one of the following:

1. Whenever existing wired communication system cannot be repaired or is being replaced, or where not *approved* in accordance with Section 510.1 Exception 1.
2. Within a time frame established by the adopting authority.

   <u>**Exception:** Where it is determined by the fire code official that the radio coverage system is not needed.</u>

(Portions of the proposed code change not shown remain unchanged.)

Committee Reason:. The committee felt that the specific requirements for emergency responder radio coverage are important enough to warrant relocation into the code text rather than being “hidden” in an appendix. The modification provides the same consideration for existing buildings as Section 510.1 does for new buildings.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Michael E. Dell'Orfano representing Fire Marshal's Association of Colorado, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

510.1 Emergency responder radio coverage in new buildings. All new buildings shall have *approved* radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

Exceptions:

1. Where *approved* by the *building code official* and the *fire code official*, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained in lieu of an *approved* radio coverage system.
2. Where it is determined by the *fire code official* that the radio coverage system is not needed.
3. <u>One- and two-family dwellings and townhouses.</u>

510.2 Emergency responder radio coverage in existing buildings. Existing buildings that do not have *approved* radio coverage for emergency responders within the building shall be equipped with such coverage according to one of the following:

1. Whenever existing wired communication system cannot be repaired or is being replaced, or where not *approved* in accordance with Section 510.1 Exception 1.
2. Within a time frame established by the adopting authority.

Exception<u>s</u>:

<u>1.</u> Where it is determined by the fire code official that the radio coverage system is not needed.
<u>2.</u> <u>One- and two-family dwellings and townhouses.</u>

(Portions of proposal not shown, remain unchanged)

Commenter's Reason: This public comment recommends an additional modification to F27-09/10 by adding an exception for new and existing one- and two-family dwellings and townhouses. Installation of an amplification system, when needed to enhance radio coverage, is unreasonable in a one- and two-family dwelling or townhouse due to the inability to verify maintenance Of these systems. Inadequate maintenance may not only decrease reliability of the individual system, but may also degrade the performance of the overall public safety communication system. Critical periodic inspections would need to be performed to verify the system is operational, secondary power is maintained, signal strengths are appropriate, and frequency changes are accommodated. Such inspections, and the corresponding corrections of system deficiencies, would be difficult or impossible to achieve. It is also not common practice in the fire service to conduct code enforcement inspections in one- and two-family dwellings and townhouses.

Public Comment 2:

Michael E. Dell'Orfano representing Fire Marshal's Association of Colorado, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

510.1 Emergency responder radio coverage in new buildings. All new buildings shall have *approved* radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

Exception~~s~~:

~~1.~~ Where *approved* by the *building code official* and the *fire code official*, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained in lieu of an *approved* radio coverage system.
~~2. Where it is determined by the *fire code official* that the radio coverage system is not needed.~~

510.2 Emergency responder radio coverage in existing buildings. Existing buildings that do not have *approved* radio coverage for emergency responders within the building shall be equipped with such coverage according to one of the following:

1. Whenever existing wired communication system cannot be repaired or is being replaced, or where not *approved* in accordance with Section 510.1 Exception 1.
2. Within a time frame established by the adopting authority.

~~**Exception:** Where it is determined by the fire code official that the radio coverage system is not needed.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Section 510, as modified by F27-09/10, clearly states that buildings shall have adequate radio coverage by naturally-available signal strengths, wired communication systems, or amplification systems. If the requirements and design options are clear, then under what circumstances would a fire code official determine that radio coverage is not needed in order to apply the exception to 510.1 and 510.2? This exception would imply that the code requirement could arbitrarily be waived without contemplating the practical difficulties or alternate methods allowed in chapter 1. Such an exception is not found in any other IFC construction requirement such as fire sprinklers or fire alarms where the required thresholds and design options are similarly clear. Therefore, it is recommended that the exceptions be removed.

Public Comment 3:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

510.4.1.2 Minimum signal strength out of the building. A minimum signal strength of ~~-100~~ -95 dBm shall be received by the agency's radio system when transmitted from within the building.

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason: Section 24.5.2 of the 2010 edition NFPA 72 National Fire Alarm Code provides different outbound signal strength than specified in 510.4.1.2 as approved by the committee. For consistency, these two companion documents should adopt the same parameters.

Public Comment 4:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

510.4.2.3 Secondary power. Emergency responder radio coverage systems shall be provided with an *approved* secondary source of power. The secondary power supply shall be capable of operating the emergency responder radio coverage system for a period of at least ~~12~~ 24 hours. When primary power is lost, the power supply to the emergency responder radio coverage system shall automatically transfer to the secondary power supply.

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason: Emergency power shall be capable of operating at least 24 hours per NFPA 72 National Fire Alarm Code.

Public Comment 5:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

510.4.2.4 Signal booster requirements. If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a NEMA4-type water proof cabinet.
2. Battery systems used for the emergency power source shall be contained in a NEMA4-type water proof cabinet.
3. The system shall include automatic alarming of malfunctions of the signal booster ~~system~~ and battery system. Any resulting trouble alarm shall be automatically transmitted to an approved central station or proprietary supervising station as defined in NFPA 72 ~~shall be electrically supervised and monitored by a supervisory service,~~ or when approved by the *fire code official*, shall sound an audible signal at a constantly attended location.
4. Equipment shall have FCC Certification prior to installation.

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason: The existing text is restored and incorporated into Section 510.4.2.4. The original proposal as approved by the committee has the unfortunate consequence of being very vague regarding monitoring troubles off-site.

Public Comment 6:

Paul K. Heilstedt, PE, HonAIA, Chair, representing ICC Code Technology Committee (CTC) and Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

<u>**510.2 Emergency responder radio coverage in existing buildings**. Existing buildings shall be provided with *approved* radio coverage for emergency responders as required in Chapter 46.</u>

<u>**4603.2**</u> ~~**510.2**~~ **Emergency responder radio coverage in existing buildings**. Existing buildings that do not have *approved* radio coverage for emergency responders within the building shall be equipped with such coverage according to one of the following:

1. Whenever existing wired communication system cannot be repaired or is being replaced, or where not *approved* in accordance with Section 510.1 Exception 1.
2. Within a time frame established by the adopting authority.

   Exception: Where it is determined by the *fire code official* that the radio coverage system is not needed.

510.5.1 Approval prior to installation. ~~No~~ Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC shall <u>not</u> be installed without prior coordination and approval of the *fire code official*.

510.5.3 Minimum qualifications of personnel. The minimum qualifications of the system designer and lead installation personnel shall include:
1. A Valid FCC issued General Radio Operators License, and
2. Certification of in-building system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed.

~~The agency may waive~~ These ~~requirements~~ <u>qualifications shall not be required where</u> ~~upon successful~~ demonstration of adequate skills and experience satisfactory to the *fire code official* <u>is provided</u>.

510.5.4 Acceptance test procedure. When an emergency responder radio coverage system is required, and upon completion of installation, the building *owner* shall have the radio system tested to ensure that two-way coverage on each floor of the building is a minimum of 90 percent. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of 20 approximately equal <u>test</u> areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system.
3. <u>Failure of</u> a maximum of two nonadjacent <u>test</u> areas ~~will be allowed to fail the test~~ <u>shall not result in failure of the test</u>.
4. In the event that three of the <u>test</u> areas fail the test, in order to be more statistically accurate, the floor ~~may~~ <u>shall</u> be <u>permitted to be</u> divided into 40 equal <u>test</u> areas. <u>Failure of</u> a maximum of four nonadjacent <u>test</u> areas ~~will be allowed to fail the test~~ <u>shall not result in failure of the test</u>. If the system fails the 40-area test, the system shall be altered to meet the 90 percent coverage requirement.
5. A test location approximately in the center of each ~~grid~~ <u>test</u> area ~~will~~ <u>shall</u> be selected for the test, ~~then~~ <u>with</u> the radio ~~will be~~ enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire <u>test</u> area. ~~If the test fails~~ <u>Failure</u> in the selected test location <u>shall be considered failure of</u> that ~~grid~~ <u>test</u> area ~~shall fail, and prospecting for a better spot within the grid area will not be allowed~~. <u>Additional test locations shall not be permitted.</u>
6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner ~~will be required~~ <u>shall</u> to rerun the acceptance test to reestablish the gain values.
7. As part of the installation a spectrum analyzer or other suitable test equipment shall be utilized to insure spurious oscillations are not being generated by the subject signal booster. This test ~~will~~ <u>shall</u> be conducted at time of installation and subsequent annual inspections.

Commenter's Reason: This language originated with code change F87-07/08 last cycle for which the CTC was a co-proponent of the public comment with the Joint Fire Service Review committee. As part of the appendix, this text required the adopting entity to review the language for consideration as a set of mandatory requirements. With the relocation into the body of the code, it is important that all such text be compiled in mandatory, enforceable language. This Public Comment proposes such revisions as editorial.

Additionally, in Section 510.2 the language is relocated in to Chapter 46 to be consistent with the other portions of the IFC. All construction requirements applicable to existing buildings have been compiled in Chapter 46. This is simply an editorial revision to format these requirements in the style of the IFC.

Public Comment 7:

Jeffrey Shapiro, P.E., International Code Consultants, representing National Multi Housing Council, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

510.2 Emergency responder radio coverage in existing buildings. Existing buildings that do not have *approved* radio coverage for emergency responders within the building, <u>based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building, </u>shall be equipped with such coverage according to one of the following:

1. Whenever existing wired communication system cannot be repaired or is being replaced, or where not *approved* in accordance with Section 510.1 Exception 1.
2. Within a time frame established by the adopting authority.

Exception: Where it is determined by the *fire code official* that the radio coverage system is not needed.

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason: The text that is recommended for inclusion in Section 510.2 is currently included in 510.1. In that location, it previously applied to both new and existing buildings. When the section was reformatted by this proposal to split new and existing buildings into two sections, the text was mistakenly omitted from 510.2, unintentionally changing the requirement. Including this text is necessary so that there is a basis of judging the adequacy of the existing radio coverage, and it maintains the existing requirement since there was no apparent intent to delete it.

Final Action: AS AM AMPC____ D

F29-09/10
510.1

<u>Proposed Change as Submitted</u>

Proponent: Ronald Marts, Telecordia, Qwest Communications, AT&T

Revise as follows:

510.1 Emergency responder radio coverage in buildings. All buildings shall have *approved* radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained in lieu of an *approved* radio coverage system.
2. Where it is determined by the *fire code official* that the radio coverage system is not needed.
3. <u>In telecommunications buildings, where emergency responder radio coverage is required and such systems, components or equipment required may have a negative impact of radio frequency interference (RFI) on local, regional and/or national telecommunications functions of the facility, it shall be permitted to provide a function switch for the activation of the internal emergency responder radio system. The location of the function switch shall be approved by the fire code official.</u>

Reason: This specific activation of the facilities internal emergency responder radio system will limit potential inference with the vital telecommunications operations of the facility to 24/7 exposure to these signals. The potential for interference with the operations of the telecommunications facility operations is unique to each space and operation of the facility and places in direct risk emergency services, national security and defense, and other critical telecommunications functions of the facility.

To date, studies have suggested that RFI from these transmitters may affect telecommunications equipment and thus telecommunications service.

Cost Impact: The code change proposal will have a small impact on construction cost

ICCFILENAME: MARTS-F1-510.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that exempting a specific type of facility could set up a future trend toward a "laundry list" of facilities that wish to be exempt from the requirement. It also felt that the existing exceptions, reasonably applied, could remedy any such concerns and that IFC Section 104.9 could also be applied. The committee also felt that providing an "on-off" switch for the radio coverage system could place first responders in danger.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ronald Marts representing Telcordia Technologies, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

510.1 Emergency responder radio coverage in buildings. All buildings shall have *approved* radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained in lieu of an *approved* radio coverage system.
2. Where it is determined by the *fire code official* that the radio coverage system is not needed.
3. ~~In telecommunications buildings, where emergency responder radio coverage is required and such systems, components or equipment required may have a negative impact of radio frequency interference (RFI) on local, regional and/or national telecommunications functions of the facility, it shall be permitted to provide a function switch for the activation of the internal emergency responder radio system. The location of the function switch shall be approved by the fire code official.~~ <u>In facilities where emergency responder radio coverage is required and such systems, components or equipment required may have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated responder system.</u>

Commenter's Reason: Some facilities, such as telecommunications central offices have equipment that may be affected by the radio frequency interference (RFI) of responder radio equipment. Having the emergency responder radio equipment off until needed rectifies the expected interference. The fire official and the building owner can decide on the automatic means of activating the responder system.
To date, studies have suggested that RFI from these transmitters may affect telecommunications equipment and thus telecommunications service to the community, including 911 calls.

Cost Impact: The code change proposal will have a small impact on construction cost.

Final Action: AS AM AMPC____ D

F30-09/10
511 (New)

Proposed Change as Submitted

Proponents: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

Add new section as follows:

<u>**SECTION 511**</u>
<u>**SOLAR PHOTOVOLTAIC INSTALLATIONS**</u>

511.1 General. The installation of solar photovoltaic installations shall comply with Table 601 and Chapter 16 of the *International Building Code*. The installation shall also comply with Sections 511.2 through 511.11 and NFPA 70.
511.2 Circuit marking. To facilitate identifying energized electrical lines that connect the solar panels to the inverter, to prevent these conduits from being cut when venting for smoke removal, markings shall be provided to give emergency responders appropriate warning that a solar electric system is present.

511.3 Materials. The materials used for marking shall be reflective, weather resistant and suitable for the environment.

511.4 Main service disconnect. For residential occupancies, the marking shall be placed within the main service disconnect. If the main service disconnect is operable with the service panel closed, then the marking shall be placed on the outside cover. For commercial occupancies, the marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the lever is operated.
511.4.1. Marking content and format. The marking shall contain the words "CAUTION: SOLAR ELECTRIC CONNECTED" in capital letters a minimum of 3/8 inches in height with white letters on a red background.

511.5 DC conduit, raceways, enclosures, cable assemblies, and junction boxes. Marking shall be provided on all interior and exterior dc conduit, raceways, enclosures, cable assemblies, and junction boxes to alert the fire service to their presence. The marking shall be placed every 10 feet or fraction thereof, at turns and above and below penetrations, and on all dc combiner and junction boxes.

511.5.1 Marking content and format. The marking shall contain the words "CAUTION: SOLAR ELECTRIC CONNECTED" in capital letters a minimum of 3/8 inches in height with white letters on a red background.

511.5.2 Locations of DC conductors. Conduit, wiring systems, and raceways for photovoltaic circuits shall be located as close as possible to the ridge or hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities. Conduit runs between sub arrays and to DC combiner boxes shall be installed in a manner that minimizes total amount of conduit on the roof by taking the shortest path from the array to the DC combiner box. The DC combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays.

511.6 Power disconnects. A power disconnect shall be located within 3 feet of the photovoltaic array to provide for de-energizing the DC circuit(s) from the array to the inverter. The disconnect shall be label with reflective lettering.

511.7 Access, pathways for smoke ventilation. Roof access and spacing requirements shall be observed in order to ensure access to the roof; provide pathways to specific areas of the roof; provide for smoke ventilation operations; and to provide emergency egress from the roof.

511.8 Roof access points. Roof access points shall be defined as an area that does not place ground ladders over openings such as windows or doors, and are located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires, or signs.

511.9. Residential systems-One- and two-family residential dwellings. Access shall be provided in accordance with Sections 511.9.1 through 511.9.3

511.9.1 Residential buildings with hip roof layouts. Panels shall be located in a manner that provides one (1) three-foot (3') wide clear access pathway from the eave to the ridge on each roof slope where panels are located. The access pathway shall be located at a structurally strong location on the building such as along a underlying bearing wall.

511.9.2 Residential buildings with a single ridge. Panels shall be located in a manner that provides two (2) three-foot (3') wide access pathways from the eave to the ridge on each roof slope where panels are located.

511.9.3 Hips and Valleys: Panels shall be located no closer than one and one half (1.5) feet to a hip or a valley if panels are to be placed on both sides of a hip or valley. If the panels are to be located on only one side of a hip or valley that is of equal length then the panels shall be permitted to be placed directly adjacent to the hip or valley.

511.9.4 Ventilation. Panels shall be located no higher than three feet (3) below the ridge.

> **Exception:** The fire department is authorized to allow panels to be located two (2) feet below the ridge if a product or method acceptable to the fire department has been provided for ventilation.

511.10 All other occupancies. Access shall be provided in accordance with Sections 511.10.1 through 511.10.3

511.10.1 Access. There shall be a minimum six (6) foot wide clear perimeter around the edges of the roof.

Exception: If either axis of the building is 250 feet or less, there shall be a minimum four feet (4') wide clear perimeter around the edges of the roof.

511.10.2 Pathways. The solar installation shall be designed to provide designated pathways. The pathways shall meet the following requirements:

1. The pathway shall be over structural members
2. The center line axis pathways shall be provided in both axis of the roof. Center line axis pathways shall run on structural members or over the next closest structural member nearest to the center lines of the roof
3. Shall be straight line not less than 4 feet clear to skylights and/or ventilation hatches
4. Shall be straight line not less than 4 feet clear to roof standpipes
5. Shall provide not less than 4 feet clear around roof access hatch with at least one not less than 4 feet clear pathway to parapet or roof edge

511.10.3 Ventilation. The solar installation shall be designed to meet the following requirements.

1. Arrays shall be no greater than 150 by 150 feet in distance in either axis
2. Ventilation options between array sections shall be either a pathway 8 feet or greater in width; a 4 feet or greater in width pathway and bordering on existing roof skylights or ventilation hatches; or a 4 feet or greater in width pathway and bordering 4' x 8' "venting cutouts" every 20 feet on alternating sides of the pathway

511.11 Ground mounted photovoltaic arrays. Ground mounted photovoltaic arrays shall comply with Sections 511.1 through 511.6 and this section. Setback requirements do not apply to ground-mounted, free standing photovoltaic arrays. A clear brush area of 10' is required for ground mounted photovoltaic arrays.

Reason: Photovoltaic arrays are increasing in popularity as an alternative energy source. These arrays, which cannot be shut down and retain electrical charges present unique hazards to firefighters operating on roofs with arrays or nearby circuits.

This proposal is intended to provide general requirements to allow for increased safety of firefighters working around and near the arrays.

These provisions were created from a "DRAFT SOLAR PHOTOVOLTAIC INSTALLATION GUIDELINE " prepared by the CAL FIRE, Office of the State Fire Marshal, local California fire departments, and the solar photovoltaic industry.

Cost Impact: The code change proposal will increase the cost of Photovoltaic installations.

Analysis: Code change proposal F238-09/10 proposes similar requirements.

ICCFILENAME: DAVIDSON-SHUMAN-F20-511.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee recognized the importance of the issues raised by the proposal but felt that it was not sufficiently developed to be included in the code at this time. It was indicated that the California State Fire Marshal's guidelines upon which the proposal was based are still in a draft form and not yet ready for adoption. An issue that the committee noted is that there is no correlation change to the IBC and that there is no IFC permit required for these installations which is important since they are typically done on existing buildings and show up unexpectedly. The proposal is also unclear in Section 511.4 as to where the disconnect would be placed in a mixed occupancy building. It was also noted that walkable pathways cannot always be placed over structural members. The committee indicated some support for placing the proposal in an appendix until the issues of concern are resolved.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tonya L. Hoover, Acting State Fire Marshal, representing California Office of the State Fire Marshal and Robert J. Davidson, Davidson Code Concepts, LLC representing self, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~SECTION 511~~ 605.11 Solar Photovoltaic Power Systems. Solar photovoltaic power systems shall be installed in accordance with this code, the *International Building Code* and NFPA 70.

> **Exception:** Detached Group U non-habitable structures such as parking shade structures, carports, solar trellises, and similar type structures are not subject to the requirements of this section.

~~511.1 General.~~ ~~The installation of solar photovoltaic installations shall comply with Table 601 and Chapter 16 of the *International Building Code*. The installation shall also comply with Sections 511.2 through 511.11 and NFPA 70~~.

~~511.2~~ 605.11.1 ~~Circuit~~ Marking. ~~To facilitate identifying energized electrical lines that connect the solar panels to the inverter, to prevent these conduits from being cut when venting for smoke removal, markings shall be provided to give emergency responders appropriate warning that a solar electric system is present.~~ Marking is required on all interior and exterior dc conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes, and disconnects.

~~511.3~~ 605.11.1.1 Materials. The materials used for marking shall be reflective, weather resistant and suitable for the environment. Marking as required in sections 605.11.1.2 through 605.11.1.4 shall have all letters capitalized with a minimum height of 3/8 inch (9.5 mm) white on red background.

~~511.4.1~~ 605.11.1.2 Marking content ~~and format~~. The marking shall contain the words "~~CAUTION~~: ~~SOLAR ELECTRIC CONNECTED~~ WARNING: PHOTOVOLTAIC POWER SOURCE" ~~in capital letters a minimum of 3/8 inches in height with white letters on a red background~~.

~~511.4~~ 605.11.1.3 Main service disconnect. ~~For residential occupancies, the marking shall be placed within the main service disconnect. If the main service disconnect is operable with the service panel closed, then the marking shall be placed on the outside cover. For commercial occupancies, t~~ The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the ~~lever~~ disconnect is operated.

~~511.5~~ 605.11.1.4 ~~DC conduit, raceways, enclosures, cable assemblies, and junction boxes.~~ ~~Marking shall be provided on all interior and exterior dc conduit, raceways, enclosures, cable assemblies, and junction boxes to alert the fire service to their presence. The marking shall be placed every 10 feet or fraction thereof, at turns and above and below penetrations, and on all dc combiner and junction boxes~~. **Location of Marking.** Marking shall be placed on all interior and exterior dc conduit, raceways, enclosures and cable assemblies every 10 feet (3048 mm) within 1 foot (305 mm) of all turns or bends and within 1 foot (305 mm) above and below all penetrations of roof/ceiling assemblies and all walls and /or barriers.

~~**511.5.1. Marking content and format**. The marking shall contain the words "CAUTION: SOLAR ELECTRIC CONNECTED" in capital letters a minimum of 3/8 inches in height with white letters on a red background.~~

~~511.5.2~~ 605.11.2 Locations of DC conductors. Conduit, wiring systems, and raceways for photovoltaic circuits shall be located as close as possible to the ridge or hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities. Conduit runs between sub arrays and to DC combiner boxes shall be installed in a manner that minimizes total amount of conduit on the roof by taking the shortest path from the array to the DC combiner box. The DC combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays. DC wiring shall be installedn in metallic conduit or raceways when located within enclosed spaces in a building. Conduit shall run along the bottom of load bearing members.

~~**511.6 Power disconnects**. A power disconnect shall be located within 3 feet of the photovoltaic array to provide for de-energizing the DC circuit(s) from the array to the inverter. The disconnect shall be label with reflective lettering.~~

~~511.7~~ 605.11.3 Access ~~,~~ and pathways ~~for smoke ventilation~~. Roof access, pathways, and spacing requirements shall be ~~observed~~ provided in order to ensure access to the roof; provide pathways to specific areas of the roof; provide for smoke ventilation operations; and to provide emergency egress from the roof.

Exceptions:

1. Requirements relating to ridge, hip, and valleys do not apply to roofs slopes of two units vertical in twelve units horizontal (2:12) or less.
2. Residential structures shall be designed so that each array is no greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in either axis.
3. The fire chief may allow panels/modules to be located up to the ridge when an alternative ventilation method acceptable to the fire chief has been provided or where the fire chief has determined vertical ventilation techniques will not be employed.

~~511.8~~ 605.11.3.1 Roof access points. Roof access points shall be defined as an area that does not place ground ladders over openings such as windows or doors, and are located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires, or signs.

~~511.9~~ 605.11.3.2 Residential systems for one- and two-family residential dwellings. Access shall be provided in accordance with Sections ~~511.9.1~~ 605.11.3.2.1 through ~~511.9.3~~. 605.11.3.2.4

~~511.9.1~~ 605.11.3.2.1 Residential buildings with hip roof layouts. Panels /modules shall be located in a manner that provides a 3 foot (914 mm) wide clear access pathway from the eave to the ridge on each roof slope where panels/modules are located. The access pathway shall be located at a structurally strong location on the building ~~such as along a underlying bearing wall~~ capable of supporting the live load of fire fighters accessing the roof.

~~511.9.2~~ 605.11.3.2.2 Residential buildings with a single ridge. Panels/modules shall be located in a manner that provides two 3 foot (914 mm) ~~(2) three foot (3')~~ wide access pathways from the eave to the ridge on each roof slope where panels/modules are located.

~~511.9.3~~ **605.11.3.2.3 Hips and Valleys:** Panels/modules shall be located no closer than ~~one and one half (1.5) feet~~ 18 inches (457 mm) to a hip or a valley if panels/modules are to be placed on both sides of a hip or valley. If the panels are to be located on only one side of a hip or valley that is of equal length then the panels shall be permitted to be placed directly adjacent to the hip or valley.

~~511.9.4~~ **605.11.3.2.4 Smoke Ventilation**. Panels/modules shall be located no higher than ~~three feet (3)~~ 3 feet (914 mm) below the ridge in order to allow for fire department smoke ventilation operations.

~~**Exception:** The fire department is authorized to allow panels to be located two (2) feet below the ridge if a product or method acceptable to the fire department has been provided for ventilation.~~

~~511.10~~ **605.11.3.3 All other occupancies**. Access shall be provided in accordance with Sections ~~511.10.1~~ 605.11.3.3.1 through ~~511.10.3~~ 605.11.3.3.3.

Exception: Where it is determined by the *fire code official* that the roof configuration is similar to a one- or two-family dwelling, the *fire code official* may *approve* the residential access and ventilation requirements provided in 605.11.3.2.1 through 605.11.3.2.4.

~~511.10.1~~ **605.11.3.3.1 Access**. There shall be a minimum ~~six (6) foot~~ 6 foot (1829 mm) wide clear perimeter around the edges of the roof.

Exception: If either axis of the building is 250 feet (76 200 mm) or less, there shall be a minimum ~~four feet (4')~~ 4 foot (1290 mm) wide clear perimeter around the edges of the roof.

~~511.10.2~~ **605.11.3.3.2 Pathways**. The solar installation shall be designed to provide designated pathways. The pathways shall meet the following requirements:

1. The pathway shall be over ~~structural members~~ areas capable of supporting the live load of fire fighters accessing the roof
2. The center line axis pathways shall be provided in both axis of the roof. Center line axis pathways shall run ~~on structural members or over the next closest structural member nearest to the center lines of the roof~~ where the roof structure is capable of supporting the live load of firefighters accessing the roof.
3. Shall be straight line not less than 4 feet (1290 mm) clear to skylights and/or ventilation hatches
4. Shall be straight line not less than 4 feet (1290 mm) clear to roof standpipes
5. Shall provide not less than 4 feet (1290 mm) clear around roof access hatch with at least one not less than 4 feet (1290 mm) clear pathway to parapet or roof edge

~~511.10.3~~ **605.11.3.3.3 Smoke Ventilation**. The solar installation shall be designed to meet the following requirements:

1. Arrays shall be no greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in distance in either axis in order to create opportunities for smoke ventilation operations.
2. Smoke ~~V~~ventilation options between array sections shall be ~~either~~ one of the following:
   2.1. ~~a~~A pathway 8 feet (2438 mm) or greater in width~~;~~
   2.2. ~~a~~A 4 feet (1290 mm) or greater in width pathway and bordering ~~on existing~~ roof skylights or ~~ventilation hatches~~ smoke and heat vents~~;~~
   2.3. ~~or a~~A 4 feet (1290 mm) or greater in width pathway and bordering 4 foot (1290 mm) x 8 foot (2438 mm) "venting cutouts" every 20 feet (6096 mm) on alternating sides of the pathway

~~511.11~~ **605.11.4 Ground mounted photovoltaic arrays**. Ground mounted photovoltaic arrays shall comply with Sections ~~511.1~~ 605.11 through ~~511.6~~ 605.11.2 and this section. Setback requirements do not apply to ground-mounted, free standing photovoltaic arrays. A clear brush area of 10 feet (3048 mm) is required for ground mounted photovoltaic arrays.

105.7.14 Solar photovoltaic power systems. A construction permit is required to install or modify Solar photovoltaic power systems.

IBC Section 1511
Solar Photovoltaic Panels/Modules

IBC 1511.1 Solar photovoltaic panels/modules. Solar photovoltaic panels/modules installed upon a roof or as an integral part of a roof assembly shall comply with the requirements of this code and the *International Fire Code*.

IBC 1511.1.1 Structural fire-resistance. The structural frame and roof construction supporting the load imposed upon the roof by the photovoltaic panels/modules shall comply with the requirements of Table 601.

IBC Section 3111
Solar Photovoltaic Panels/Modules

IBC 3111.1 Solar photovoltaic panels/modules. Solar photovoltaic panels/modules shall comply with the requirements of this code and the *International Fire Code*.

Commenter's Reason: The California Office of the State Fire Marshal (CSFM) supports the National Association of State Fire Marshals (NASFM) proposed changes to the 2009 Edition of the International Fire Code (IFC), F30-09/10 Section 511 Solar Photovoltaic Installations. The CSFM formed a small work group with representatives from the fire service, building officials, and solar industry to develop this public comment proposal base on the CSFM "Guidelines". This proposal seeks to address the ICC Fire Code Committees comments as well as other comments made during and after the ICC code hearings in Baltimore November 2009.

To address the Fire Code Committees comments the CSFM offers the following:

The CSFM/work group disagrees in part with the committees comment that these provisions are "…not sufficiently developed to be in the code…" as these provisions (through the CSFM "Guidelines") are being widely implemented throughout the state to address provisions missing from the IFC. This proposal fills that missing element/provisions for Solar Photovoltaic Installations and further provides for uniform design and enforcement.

The CSFM's "Guidelines" are still in draft form at this time due to specific California rulemaking procedures that have a process to follow to adopt into regulations. The "Guidelines" would be in draft until the regulations were adopted and approved for statewide application.

The CSFM added IFC Section 105.7.14 to address that a permit is required to install or modify solar photovoltaic systems (see part 2 of this public comment proposal).

Section 605.11.1.3 addresses the main service disconnect in a location clearly visible from the location where the lever disconnect is operated regardless if it is for a residential, commercial or mixed occupancy building.

Sections 605.11.3.2.1 and 605.11.3.3.2 both addresses the walkable pathways over structural members for residential and all other occupancies.

The CSFM/work group feel there is not a need to put the proposal in the appendix, it is in the best interest of both the industry and the fire service to have uniform minimum provisions for application and effective. Additional response below regarding relocation to chapter 6.

Additional modifications to address other comments, alignment with the original "Guidelines", coordination with NFPA 70 and OSHA provisions.

The CSFM/work group recommends that the appropriate area for this proposal should be moved to the IFC Chapter 6 Building Services and Systems; Section 605.11 since 605 addresses electrical equipment, wiring and hazards.

The CSFM removed Section 511.6 for power disconnects because it was not provided for and/or addressed the in the "Guidelines" and the CSFM believes that this issue be address by the individual adopting jurisdictions.

Modifications for the marking content and color scheme are made top avoid conflict the OSHA sign and tag requirements.

Other minor changes made are to give clear and specific requirements for Solar Photovoltaic Power Systems.

This public comment also addresses the need expressed by the committee for references to the IFC in the International Building Code (IBC). IBC Section 1511 and Section 3111 are being added so solar systems are referenced to address roofing requirements, such as supporting the load of these systems to roofs and to structural roof frame and pedestrian walkways, awnings and canopies. Additionally these references are located in both chapter 15 and 31 where the user may look to find provisions for either roof mounted, stand alone or ground mounted solar photovoltaic panels/modules.

Final Action: AS AM AMPC____ D

F36-09/10
605.1

Proposed Change as Submitted

Proponent: Philip M. Chandler, representing New York State Department of State, Office of Fire Protection & Control

Revise as follows:

605.1 Abatement of electrical hazards. ~~Identified electrical hazards shall be abated. Identified hazardous electrical conditions in permanent wiring shall be brought to the attention of the responsible code official.~~ <u>Where it is found that the electrical system in a structure constitutes a hazard to the occupants or the structure by reason of inadequate service, improper fusing, insufficient receptacle and lighting outlets, improper wiring or installation, deterioration or damage, or for similar reasons, the fire code official shall require the defects to be corrected to eliminate the hazard.</u> Electrical wiring, devices, appliances and other equipment that is modified or damaged and constitutes an electrical shock or fire hazard shall not be used.

Reason: The proposed revision will make this section consistent with the requirements of the *International Property Maintenance* Code (IPMC), Section 604.3. The new language clearly identifies important electrical hazards that create a risk of fire and eliminates much ambiguity found in the old language.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: CHANDLER-F1-605.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal contains vague language (e.g., "...or for similar reasons...") and includes a "laundry list" of electrical hazards that is not exhaustive and provides no guidance as to what standards are to be used to judge electrical systems as being deficient. The committee was also concerned that the proposal would put the fire code official and/or the fire department in the role of being an electrical expert.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip M. Chandler, representing New York State Department of State, Office of Fire Prevention & Control, requests Approval as Submitted.

Commenter's Reason: It is urged that Code change Proposal F36-09/10 be approved as submitted for the following reasons:

Electrical fires area problem in America. The U.S. Fire Administration estimates that electrical fires in residential occupancies alone take the lives of 360 people each year, injure 1,000, and do $995 million dollars of damage. [1]The Administration further reports that "most electrical fires result from problems with faulty electrical outlets and old wiring, "[2] Surprisingly, however, the IFC barely addresses the issue of defects in permanent wiring. The weak language of IFC 605.1, "Identified electrical hazards shall be abated," gives little support or guidance to fire code officials conducting safety inspections of existing buildings. Why not, therefore, provide fire code officials with the precise and informative code language needed to identify and address electrical deficiencies before they cause a fire?

Accordingly, it is proposed that IFC 605.1 be modified and strengthened by importing the provisions of IPMC 604.3. This descriptive language provides a useful set of criteria for the fire code official. Inasmuch as the USFA has specifically identified "old wiring" as a fire hazard, it is certainly appropriate that the IFC also recognizes and specifies the dangerous conditions indicative of electrical systems that have outlived their safe and useful life as well as systems and components that have been improperly installed, modified or have become damaged.

The IFC Committee has criticized the language of IPMC 604.3, calling it a "laundry list," and has denigrated the use of the explanatory expression "or for similar reasons," as being "vague." The Committee's objections are misplaced in this instance, as the language of IPMC 604.3 has not only been vetted through the same process to which this code change proposal is being subjected, but has also proven itself in the field. Further, so-called "laundry lists" are still used to great effect throughout the IFC, including in the remainder of IFC 605.1 not modified by this proposal("…devices, appliances, and other devices…"). Certainly a referenced standard adds clarity, but there is no one standard, or set of standards presently out there that will adequately do the job here in regards to existing electrical systems and components. NFPA 70, *National Electric Code*, is ostensibly a standard for new construction. NFPA 73, *Electrical Inspection Code for Existing Dwellings*, is just that, a code for dwellings. Until such time as a comprehensive standard for evaluating existing electrical conditions across the full range of occupancy classifications is developed, the tried and true language of IPMC 604.3 proposed for insertion into the IFC is the next best thing.

The Committee has also objected to the strengthening of IFC 605.1 worrying that by so doing, "it would put the fire code official and/or the fire department in the role of being an electrical expert." This line of reasoning, if followed to its logical conclusion, would disqualify all but engineers, physicists and chemists from conducting life safety inspections. Are we worried that Chapter 27 puts the fire inspector in the role of a chemist, able to identify incompatible materials? Are we worried that Chapter 9 puts the fire inspector in the role as a fire protection engineer, able to determine if a complex system is properly functioning? The truth is that the fire code official or firefighter of today must have advanced training and education to function effectively in a rapidly changing, highly technical environment. Obviously they cannot have expertise in every single topic covered by the IFC, but they can, as authorized in IFC 104.7.2, obtain the technical assistance or inspection reports that they need to complete their inspection. But honestly, rocket science is not required to determine that a 15 amp electrical circuit protected by a 30 amp fuse is overloaded and is a fire waiting to happen!

The Committee is apparently quite content that fire code inspectors simply pass off suspected electrical fire hazards to the appropriate building code official. What about those jurisdictions where the fire code official is the building code official as well? What about those jurisdictions where the appropriate building code official only inspects new permitted construction? What about those jurisdictions where as a result of budgetary constraints the building department is unable to respond in a timely fashion to complaints of electrical hazards in existing occupancies? Keep in mind, in many communities, it is the fire code official alone, or for that matter, the fire department alone, that conducts life safety inspections of existing buildings, including occupancies as diverse as high-rise hotels and chip-fabrication facilities. If we as fire protection specialists have only one shot at preventing the next fire, why not make it count! It is quite possible that these inspections constitute the best hope that occupants have of escaping a deadly blaze; why pass the buck?

[1] http://www.usfa.dhs.gov/citizens/focus/electrical.shtm. Accessed 2/3/10.
[2] Ibid.

F37-09/10
605.1.1 (New)

Proposed Changes as Submitted

Proponent: Philip M. Chandler, representing New York State Department of State, Office of Fire Protection & Control

Add new text as follows:

605.1.1 Electrical inspection. In accordance with the provisions of Section 104.7.2, the fire code official is authorized to require an inspection and report on the safety of a structure's electrical system, wiring, devices, appliances and equipment. The inspection and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official.

Reason: The fire code official may have reason to believe that the electrical safety of a structure is compromised, yet lack the highly technical knowledge or specialized skills to make a final determination. Inasmuch as the risk of shock or hazard of fire are very real consequences of defective electrical systems and equipment, this authorization of the fire code official to obtain technical assistance is warranted.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: CHANDLER-F2-605.1.1.DOC

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal would leave out the building official and the electrical inspector. The committee also felt that the proposal is redundant since the code already contains provisions for referring electrical hazards to the appropriate code official

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip M. Chandler, representing New York State Department of State, Office of Fire Prevention & Control, requests Approval as Submitted.

Commenter's Reason: It is urged that this code change proposal be adopted as submitted for the following reasons:

All across America, fire code officials, building code officials, and firefighters conduct life safety inspections of existing occupancies of every type. Frequently, they may have reason to believe by virtue of the presence of certain telltale signs that a building's electrical wiring or components are unsafe, posing an unacceptable life safety risk. Yet often because they lack sufficient technical expertise, appropriate tools or personal protective equipment, those conducting inspections are unable to make a final determination without recourse to specialized outside resources. This often is the case when it comes to assessing obsolescence, a leading cause of electrical fires (see comments of Philip M. Chandler on F36 above). This proposal unambiguously grants the authority to fire inspectors to obtain the necessary assistance to get the job done right.

The intention of this proposal is not as the committee has suggested, to "leave out the building code official or electrical inspector," but rather to give the inspector of existing electrical systems and components access to all the technical assistance required to adequately assess conditions where hazards are suspected. Even building code officials or electrical inspectors may need additional information or knowledge to complete their inspection. It is true that this authority to obtain outside assistance is already granted by IFC 104.7.2. It is repeated here because the incidence of electrical fires and their human toll warrant a second mention. It is also important to note that the invaluable provisions of IFC 104.7.2 may be inadvertently lost by those jurisdictions that choose to rewrite Chapter One to better reflect local policy and procedures. The option of getting a second opinion is a right we all cherish when it comes to clarifying issues of our own health, the same option should be available in all jurisdictions when it comes to identifying electrical life safety hazards.

Final Action: AS AM AMPC____ D

F46-09/10
703.2

<u>Proposed Change as Submitted</u>

Proponent: John Woestman, The Kellen Company, representing the Door Safety Council (DSC)

Revise as follows:

703.2 Opening protectives. Opening protectives shall be maintained in an operative condition in accordance with NFPA 80. <u>Where required by the fire code official, the application of field applied labels associated with the maintenance of opening protectives shall follow the requirements of the *approved* third-party certification organization accredited for *listing* the opening protective.</u> Fire doors and *smoke barrier* doors shall not be blocked or obstructed or otherwise made inoperable. Fusible links shall be replaced promptly whenever fused or damaged. Fire door assemblies shall not be modified.

Reason: This code proposal addresses the very real issue of maintaining labeled opening protectives by requiring field applied labels to follow the requirements of the third-party certification organization which is accredited for listing the specific opening protective. Ongoing maintenance is now an IFC requirement, and this code change provides an enforceable method of allowing maintenance of labeled protectives.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WOESTMAN-F3-1030.2-2.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The relabeling of existing fire doors is a common practice and due to the importance of the rating requirements a level of monitoring by a third party to ensure the labeling matches the rating of the door assembly is necessary. It was suggested that the new language could be better located in its own subsection.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

703.2 Opening protectives. Opening protectives shall be maintained in an operative condition in accordance with NFPA 80. Where ~~required~~ allowed by the fire code official, the application of field applied labels associated with the maintenance of opening protectives shall follow the requirements of the *approved* third-party certification organization accredited for *listing* the opening protective. Fire doors and *smoke barrier* doors shall not be blocked or obstructed or otherwise made inoperable. Fusible links shall be replaced promptly whenever fused or damaged. Fire door assemblies shall not be modified.

Commenter's Reason: The issue is not whether the fire code official "requires" field applied labels, the actual issue is whether the fire code official "allows" field applied labels.

In the listing documentation there are specific criteria for field application of labels. One of the criteria is whether the local code officials allow this practice. IBC 715.4.6.1 states that fire doors must be labeled at the factory. This would apply to new doors or new installations. Now that existing door either has a damaged label, the label is painted over, or the label is gone. The fire code official needs to make a determination as to whether field application of the label is acceptable or not. If field application is allowed, then the certification organization can follow the proper criteria for labeling the opening protective.

Proper maintenance necessitates that the manufacturer's instructions are followed and the listing organization's instructions are followed. The fact is that following proper procedures is required by the code to maintain proper operation of the assemblies and devices; it is required by the manufacturer; and it is required by the listing organization in order to maintain the listing.

Therefore, the phrase of "where required" is proposed to be replaced with "when allowed".

Final Action: AS AM AMPC____ D

F50-09/10
803.6.1, 803.6.2

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler, GBH International, representing American Fire Safety Council

Revise as follows:

803.6.1 General. Expanded vinyl wall or ceiling coverings shall comply with the requirements of Section 803.1.2 using the product mounting system (including adhesive) of actual use. Expanded vinyl wall or ceiling coverings complying with Section 803.1.2 shall not be required to comply with Section 803.1.1.

803.6.2 Compliance alternative. Expanded vinyl wall or ceiling coverings shall be allowed to comply with ~~the requirements for textile wall or ceiling coverings in Section 803.5. When tested in accordance with ASTM E 84 or UL 723, test specimen preparation shall be in accordance with ASTM E 2404~~ one of the following:

1. The wall or ceiling covering shall have a class A flame spread index in accordance with ASTM E 84 or UL 723 and be protected by automatic sprinklers installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E 2404.
2. The wall covering shall meet the criteria of Section 803.5.1.2 when tested in the manner intended for use in accordance with NFPA 265 using the product mounting system (including adhesive) of actual use.
3. The wall or ceiling covering shall meet the criteria of Sections 803.1.2.1 when tested in accordance with NFPA 286 using the product mounting system (including adhesive) of actual use.

Reason: Instead of sending code users to another section, it is best simply to state the requirements for expanded vinyl wall or ceiling covering materials directly. The correct specimen preparation and mounting method for textile, paper and vinyl wall and ceiling coverings tested in accordance with ASTM E 84 (Steiner tunnel) test is ASTM E 2404. The revised text addresses the requirements for wall and ceiling coverings, as appropriate:

1. They point out again that expanded vinyl wall and ceiling coverings are only permitted to be installed when tested in accordance with ASTM E 84 if the compartment is fully protected by sprinklers.
2. The new text also makes it clear that NFPA 265 is inappropriate for testing ceiling coverings since the burner flame does not reach the ceiling.
3. The new text eliminates reference to Method A of NFPA 265, which has been eliminated from the body of the standard. Method A applies only to materials tested in the past.
4. The text also clarifies that testing to NFPA 286 needs to use the correct product mounting system, including adhesive.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HIRSCHLER-F1-803.6.1.DOC

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee approved the provisions adding a separate section detailing the testing requirements for expanded vinyl wall coverings to help clarify when and how the various tests apply to these materials. These provisions would apply to existing and newly introduced expanded vinyl wall or ceiling coverings. The provisions correlate with the IBC.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

803.6 Expanded vinyl wall or ceiling coverings. Expanded vinyl wall or ceiling coverings shall comply with ~~the requirements of either Section 803.6.1 or 803.6.2.~~

~~**803.6.1 General.** Expanded vinyl wall or ceiling coverings shall comply with the requirements of Section 803.1.2 using the product mounting system (including adhesive) of actual use. Expanded vinyl wall or ceiling coverings complying with Section 803.1.2 shall not be required to comply with Section 803.1.1.~~

~~**803.6.2 Compliance alternative.** Expanded vinyl wall or ceiling coverings shall be allowed to comply with~~
one of the following:

1. The wall or ceiling covering shall have a class A flame spread index in accordance with ASTM E 84 or UL 723 and be protected by automatic sprinklers installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E 2404.
2. The wall covering shall meet the criteria of Section 803.5.1.2 when tested in the manner intended for use in accordance with NFPA 265 using the product mounting system (including adhesive) of actual use.
3. The wall or ceiling covering shall meet the criteria of Sections 803.1.2.1 when tested in accordance with NFPA 286 using the product mounting system (including adhesive) of actual use.

Commenter's Reason: This public comment is simply reformatting the section in an effort to simplify the language as the revised wording in Section 803.6.1 is also addressed within item 3 of the revised section 803.6.2. This will streamline the language from three sections into one.

Final Action: AS AM AMPC____ D

F51-09/10
804.3 (New), Chapter 47

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler, GBH International, representing American Fire Safety Council

1. Add new text as follows:

804.3 Interior floor finish Newly introduced interior floor finish and floor covering materials shall comply with Sections 804.3.1 through 804.3.3.

> **Exception:** Floor finishes and coverings of a traditional type, such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not comprised of fibers.

804.3.1 Classification. Interior floor finish and floor covering materials required by Section 804.3.3 to be of Class I or II materials shall be classified in accordance with NFPA 253. The classification referred to herein corresponds to the classifications determined by NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

804.3.2 Testing and identification. Interior floor finish and floor covering materials shall be tested by an approved agency in accordance with NFPA 253 and identified by a hang tag or other suitable method so as to identify the manufacturer or supplier and style, and shall indicate the interior floor finish or floor covering classification according to Section 804.3.1. Carpet-type floor coverings shall be tested as proposed for use, including underlayment. Test reports confirming the information provided in the manufacturer's product identification shall be furnished to the building official upon request.

804.3.3 Interior floor finish requirements. Interior floor covering materials shall comply with Sections 804.3.3.1 and 804.3.3.2 and interior floor finish materials shall comply with Section 804.3.4.2.

804.3.3.1 Pill test. In all occupancies, interior floor covering materials shall comply with the requirements of the DOC FF-1 Apill test@ (CPSC 16 CFR, Part 1630) or of ASTM D 2859.

804.3.3.2 Minimum critical radiant flux. In all occupancies, interior floor finish and floor covering materials in exit enclosures, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux. The minimum critical radiant flux shall not be less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I- 4, M, R-1, R-2 and S.

> **Exception:** Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required and materials complying with DOC FF-1 A pill test@ (CPSC 16 CFR, Part 1630) or with ASTM D 2859 are permitted in any area where Class II materials are required.

(Renumber subsequent section)

2. Add new standard to Chapter 47 as follows:

ASTM D 2859 (2006) Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials

Reason: Somehow, requirements for interior floor finish are missing in the IFC, while such requirements exist in the IBC as well as in the Life Safety Code and the Uniform Fire Code. In this proposal the wording has been taken from the IBC, with four changes. The key change is that this section applies only to "newly introduced" interior floor finish materials, in view of the fact that the IFC is for existing buildings. The other changes are as shown below:

1. The "pill test" is applied to all newly introduced carpets and carpet-like floor finish materials, in view of the fact that the federal government, through CPSC, regulates all carpets and rugs based on 16 CFR 1630 since the 1970s.
2. In the IBC there is confusion because section 804.4 states that "interior floor finish and floor covering materials in exit enclosures, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux" and then section 804.4.1 states that "interior floor finish and floor covering materials in exit enclosures, exit passageways and corridors shall not be ...". This leaves undefined what minimum critical radiant flux is required for "interior floor finish and floor covering materials in rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling". Since section 804.2 only distinguishes two classes for NFPA 253, the logical conclusion is that the words are missing and that these rooms or spaces have to meet the same requirements as the corridors from which they are not separated. A proposal has been submitted to the IBC to make this correction.

3. ASTM D 2859, which is equivalent to 16 CFR 1630 and is used extensively outside of the US, while 16 CFR 1630 is only a federal mandate, is added as an alternate. In fact, ASTM D 2859 is the standard that complies with the ICC policy on referenced standards. A proposal has been submitted to the IBC to allow ASTM D 2859 as an alternate test method to 16 CFR 1630.

The fire hazard of newly introduced floor coverings (which basically means carpets only) is the same in new buildings and in existing buildings. Therefore the IFC should be consistent with the IBC.

An alternate approach: If the addition of ASTM D 2859 is not desired by the committee, please use the following text:

804.3 Interior floor finish.

804.3.1 General. Newly introduced interior floor finish and floor covering materials shall comply with Sections 804.3.2 through 804.3.4.

Exception: Floor finishes and coverings of a traditional type, such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not comprised of fibers.

804.3.2 Classification. Interior floor finish and floor covering materials required by Section 804.3.4 to be of Class I or II materials shall be classified in accordance with NFPA 253. The classification referred to herein corresponds to the classifications determined by NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

804.3.3 Testing and identification. Interior floor finish and floor covering materials shall be tested by an approved agency in accordance with NFPA 253 and identified by a hang tag or other suitable method so as to identify the manufacturer or supplier and style, and shall indicate the interior floor finish or floor covering classification according to Section 804.3.2. Carpet-type floor coverings shall be tested as proposed for use, including underlayment. Test reports confirming the information provided in the manufacturer's product identification shall be furnished to the building official upon request.

804.3.4 Interior Floor Finish R**equirements.**

804.3.4.1 Pill test. In all occupancies, newly introduced floor covering materials shall comply with the requirements of the DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630).

804.3.4.2 Minimum critical radiant flux. In all occupancies, newly introduced interior floor finish and floor covering materials in exit enclosures, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux. The minimum critical radiant flux shall not be less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I- 4, M, R-1, R-2 and S.

Exception: Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required and materials complying with DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630) are permitted in any area where Class II materials are required.

(Renumber subsequent section)

Cost Impact: The cost of carpets that meet Class I or Class II in accordance with NFPA 253 is higher than the cost of carpets that are not classified.

Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM D 2859-2006, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

CPSC 16 CFR, Part 1630 is already referenced in the IBC and NFPA 253 is already referenced in the IFC.

ICCFILENAME: HIRSCHLER-F10-804.3.DOC

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard ASTM D2859 (2006) indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: There were a couple concerns with this proposal including the inconsistencies between the current sections within the IBC and the language proposed for the IFC. In addition there were several typographical errors and the new standard being introduced was not currently referenced in that portion of the IBC.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International) representing American Fire Safety Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

804.3 New Interior Floor Finish ~~Newly introduced~~ New interior floor finish and floor covering materials shall comply with Sections 804.3.1 through 804.3.3.

> **Exception:** Floor finishes and coverings of a traditional type, such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not comprised of fibers.

804.3.1 Classification. Interior floor finish and floor covering materials required by Section 804.3.3.2 to be of Class I or II materials shall be classified in accordance with NFPA 253. The classification referred to herein corresponds to the classifications determined by NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

804.3.2 Testing and identification. Interior floor finish and floor covering materials shall be tested by an approved agency in accordance with NFPA 253 and identified by a hang tag or other suitable method so as to identify the manufacturer or supplier and style, and shall indicate the interior floor finish or floor covering classification according to Section 804.3.1. Carpet-type floor coverings shall be tested as proposed for use, including underlayment. Test reports confirming the information provided in the manufacturer's product identification shall be furnished to the building official upon request.

804.3.3 Interior Floor Finish Requirements. New Interior floor coverings materials shall comply with Sections 804.3.3.1 and 804.3.3.2 and interior floor finish materials shall comply with Section 804.3.1.

804.3.3.1 Pill test. In all occupancies, new floor covering materials shall comply with the requirements of the DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630) or of ASTM D 2859.

804.3.3.2 Minimum critical radiant flux. In all occupancies, new interior floor finish and floor covering materials in exit enclosures, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux. The minimum critical radiant flux shall not be less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I- 4, M, R-1, R-2 and S.

> **Exception:** Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required and materials complying with DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630) or with ASTM D 2859 are permitted in any area where Class II materials are required.

804.4 ~~804.3~~ Interior Floor Wall base. Interior floor wall base that is 6 inches (152 mm) or less in height shall be tested in accordance with NFPA 253 and shall not be less than Class II. Where a Class I floor finish is required, the floor-wall base shall be Class I. The classification referred to herein corresponds to the classifications determined by NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

> **Exception:** Interior trim materials that comply with Section 804.1.

(Portions of the proposal not shown remain unchanged)

Commenter's Reason: The technical committee was concerned about two issues: (a) that the new language was inconsistent with the language in the IBC and (b) that this could be considered to apply to used carpets/floor coverings that are being brought in from a relative or into a new occupancy (apartment to apartment) could be covered. The first concern was addressed by the IBC-FS committee, which met after the IFC committee, and approved both FS137 and FS 138. By approving these proposals the IBC-FS committee incorporated the language that was missing in both the IBC and the IFC (probably via typographical errors) and the new standard. The second concern is addressed in this comment by the language change.

Therefore, the code language proposed for the IFC in this proposal, as modified by the comment, addresses both issues: instead of "newly introduced" the language would now read "new" (in three places) and the remaining language is fully consistent with the IBC, except that it applies only to "new" interior floor finish.

For information, as a result of the approval of FS137 and FS138, the section of the IBC reads as follows.

Section 804 – Interior Floor Finish

804.1 General. *Interior floor finish* and floor covering materials shall comply with Sections 804.2 through 804.4.1.

> **Exception:** Floor finishes and coverings of a traditional type, such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not comprised of fibers.

804.2 Classification. *Interior floor finish* and floor covering materials required by Section 804.4.1 to be of Class I or II materials shall be classified in accordance with NFPA 253. The classification referred to herein corresponds to the classifications determined by NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

804.3 Testing and identification. *Interior floor finish* and floor covering materials shall be tested by an agency in accordance with NFPA 253 and identified by a hang tag or other suitable method so as to identify the manufacturer or supplier and style, and shall indicate the *interior floor finish* or floor covering classification according to Section 804.2. Carpet-type floor coverings shall be tested as proposed for use, including underlayment. Test reports confirming the information provided in the manufacturer's product identification shall be furnished to the building official upon request.

804.4 Interior floor finish requirements.

804.4.1 Pill test. In all occupancies, floor covering materials shall comply with the requirements of the DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630) or with ASTM D 2859.

804.4.2 Minimum critical radiant flux. In all occupancies, interior floor finish and floor covering materials in exit enclosures, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux. The minimum critical radiant flux shall not be less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I- 4, M, R-1, R-2 and S.

~~**804.4 Interior Floor Finish Requirements** In all occupancies, interior floor finish and floor covering materials in exit enclosures, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux as specified in Section 804.4.1.~~

~~**804.4.1 Minimum critical radiant flux.** Interior floor finish and floor covering materials in exit enclosures, exit passageways and corridors shall not be less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I- 4, M, R-1, R-2 and S. In all areas, floor covering materials shall comply with the DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630).~~

> **Exception:** Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required and materials complying with DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630) or with ASTM D 2859 are permitted in any area where Class II materials are required.

Final Action: AS AM AMPC____ D

F52-09/10
805.1 (New)

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler, GBH International

Add new text as follows:

805.1 Ignition by cigarettes. Upholstered furniture newly introduced into occupancies regulated by this code shall comply with 805.1.1. Mattresses newly introduced into occupancies regulated by this code shall comply with 805.1.2.

805.1.1 Upholstered furniture. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked-up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261.
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.1.2 Mattresses. Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

(Renumber subsequent sections)

Reason: Mattresses in the United States have been required to meet 16 CFR 1632 by the Consumer Product Safety Commission since the 1970s. There are no new mattresses sold legally in the US that are not compliant with 16 CFR 1632. As an example, the web site by ISPA (International Sleep Products Association)

(http://www.sleepproducts.org/Content/NavigationMenu/Advocacy_Issues/ISPA_Position_Papers/Flammability_Position_Paper.htm) states as follows: "ISPA Position: ISPA supports the national flammability standards for mattresses codified at 16 C.F.R. Parts 1632 and 1633 promulgated by the U.S. Consumer Product Safety Commission (CPSC) [linked text]. Part 1632 requires that mattresses resist a smoldering cigarette ignition, which has been in place since the mid-1970s. Part 1633, which will become effective July 1, 2007, requires that mattresses resist an open-flame ignition. ISPA also seeks a national standard that addresses the flammability of bedclothes (top-of-the-bed products such as pillows, comforters and mattress pads), given that these are usually the first items ignited in a bedroom fire. Background: The mattress industry takes its product stewardship responsibilities seriously. For over 30 years, the mattress industry has actively supported regulatory efforts to develop flammability standards, public education initiatives and basic scientific research targeted at reducing residential fire casualties and property loss. In the early 1970s, we participated in the development of 16 C.F.R. Part 1632."

There is no mandatory federal flammability regulation for upholstered furniture in the US. However basically, manufacturers of both residential and contract upholstered furniture support the need for their products to meet cigarette ignition resistance requirements.

Residential upholstered furniture: the UFAC (Upholstered Furniture Action Council) web site (www.ufac.org) states: "The Upholstered Furniture Action Council was founded in 1978 to make upholstered furniture more resistant to ignition from smoldering cigarettes which are the leading cause of upholstery fires in the home. Household fires from smoldering ignition have been reduced substantially since its inception. According to the latest figures there has been a 79.3% decline in the number of upholstered furniture fires from cigarette ignition." The web site also states: "Background: In 1970, federal government agencies proposed mandatory safety standards to reduce the potential fire hazards posed by the cigarette ignition of mattresses, carpeting and upholstered furniture. Mandatory standards were imposed for mattresses and carpeting. When the Consumer Product Safety Commission, (CPSC) began looking at upholstered furniture, UFAC was formed to allow upholstered furniture manufacturers the opportunity to work with CPSC in a meaningful way to design safety standards which are effective, cost effective and workable from a manufacturing standpoint. The only logical course of action for the furniture industry was to create a voluntary program that would develop a better safety record for the industry, at a lower cost, than the proposed government regulations." UFAC administers the program that is responsible for the golden hangtags that are found on residential upholstered furniture and indicate that the furniture has passed the UFAC test. The UFAC web site lists the manufacturers (http://www.ufac.org/mfglist.htm) and the retailers (http://www.ufac.org/retailerslist.htm) that comply with their test. UFAC represents the major manufacturers of residential upholstered furniture. Their web site indicates that the UFAC test is identical to NFPA 260 (http://www.ufac.org/method11.htm).

Institutional upholstered furniture: The Business & Institutional Home Furnishings Alliance (BIFMA) was the developer of the standard test that became NFPA 261 (originally known as the BIFMA test). Contract or institutional upholstered furniture now meets either NFPA 260 (UFAC test) or NFPA 261 and is resistant to cigarette ignition resistance. BIFMA is listed in the UFAC web site as a UFAC supporting organization.

Therefore, all newly introduced mattresses and upholstered furniture should be required to meet the appropriate smoldering ignition resistance tests.

Cost Impact: The code change proposal will not increase the cost of construction, as this is normal use.

Analysis: Standards NFPA 260 and 261 and DOC 16 CFR Part 1632 are currently referenced in the IFC.

ICCFILENAME: HIRSCHLER-F17-805.1.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal was disapproved related to concerns with enforceability. These provisions would be applicable to all occupancies which seemed too be broad and application. The proposed text would require that anytime furniture is taken from one building to another, such as one apartment building to another, that the furniture would need to meet this requirement.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment 1:

Marcelo M. Hirschler (GBH International) representing American Fire Safety Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

805.1 Ignition by cigarettes. <u>New</u> upholstered furniture ~~newly~~ introduced into occupancies regulated by this code shall comply with 805.1.1. ~~Mattresses newly introduced into occupancies regulated by this code shall comply with 805.1.2.~~

805.1.1 Upholstered furniture. ~~Newly introduced~~ <u>New</u> upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following<u>:</u>

1. Mocked-up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261.
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

~~**805.1.2 Mattresses.** Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).~~

(Renumber subsequent sections)

Commenter's Reason: The technical committee was concerned that this could be considered to apply to used upholstered furniture that is being brought in from a relative or into a new occupancy (apartment to apartment). Such used items would not be covered with this language. The concern about used items is addressed in this comment by the language change from "newly introduced" to "new". This comment addresses upholstered furniture only.

It needs to be pointed out that the test for addressing cigarette ignition of residential furniture (NFPA 260) is the same test as the UFAC test (Upholstered Furniture Action Council test) that residential furniture manufacturers have been required by their trade association to comply with, on a voluntary basis, since 1978 and that such compliance is shown by the golden hangtags.

Also, NFPA 261 is the test that was originally developed by BIFMA (the Business & Institutional Furniture Manufacturer's Association, note that the original proposal misidentified the name of this association) for compliance by institutional upholstered furniture, on a voluntary basis.

Public Comment 2:

Marcelo M. Hirschler (GBH International) representing American Fire Safety Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

805.1 Ignition by cigarettes. ~~Upholstered furniture newly introduced into occupancies regulated by this code shall comply with 805.1.1.~~ New mattresses ~~newly~~ introduced into occupancies regulated by this code shall comply with 805.1.2.

~~**805.1.1 Upholstered furniture.** Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:~~

1. ~~Mocked-up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261.~~
2. ~~The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.~~

805.1.2 Mattresses. New~~ly~~ ~~introduced~~ mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

(Renumber subsequent sections)

Commenter's Reason: The technical committee was concerned that this could be considered to apply to used mattresses that are being brought in from a relative or into a new occupancy (apartment to apartment). Such used items would not be covered with this language. The concern about used items is addressed in this comment by the language change from "newly introduced" to "new". This comment addresses mattresses only.

It needs to be pointed out that DOC 16 CFR Part 1632 is a requirement for all mattresses sold in the United States since the 1970s, as administered by the Consumer Product Safety Commission, for resistance to cigarette ignition. Therefore all new mattresses introduced in the US now would meet this requirement.

Final Action: AS AM AMPC____ D

F54-09/10

805.5 (New)

Proposed Change as Submitted

Proponent: Carl Ogburn, Chestnut Ridge Foam

Add new text as follows:

805.5 Group A-2 occupancies intended for food or drink consumption. The requirements of Sections 805.5.1 through 805.5.1.3 shall apply to Group A-2 occupancies intended for food or drink consumption.

805.5.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.5.1.1 through 805.5.1.3

805.5.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked-up composites of the upholstered furniture shall have a char length not exceeding $1^1/_2$ inches (38 mm) when tested in accordance with NFPA 261, or
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.5.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total energy released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.5.1.3 Identification. Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.5.1.1 and 805.5.1.2.

Reason: CA TB 133, which is referenced in the IFC, is a standard issued by the California Bureau of Home Furnishings and Thermal Insulation (CBHF) and is equivalent to ASTM E 1537, with the pass/fail criteria contained in the proposal. This proposal would make the same requirements for bars and night clubs than is now used for some other occupancies, such as Groups I-1, I-2, I-3 and R-2. Experience shows that if a bar or night club is not sprinklered the potential for big fires is large. Approval of this proposal would ensure that furniture is not the cause of a big fire with many fatalities.

Cost Impact: CA TB 133 furniture is more expensive than standard furniture.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it was felt that regulating furniture in this way in Group A occupancies intended for food or drink was overly restrictive and would be difficult to enforce. This would prohibit the use of antique furniture. Many of the occupancies would be required to be sprinklered and the phrase "food or drink" would include Group A-2 occupancies serving both alcoholic and non-alcoholic beverages.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

805.5 Group A-2 occupancies intended for ~~food or drink~~ consumption of alcoholic drinks. The requirements of Sections 805.5.1 through 805.5.1.3 shall apply to Group A-2 occupancies intended for ~~food or drink~~ consumption of alcoholic drinks.

805.5.1 Upholstered furniture. New ~~Newly introduced~~ upholstered furniture shall meet the requirements of Sections 805.5.1.1 through 805.5.1.3

805.5.1.1 Ignition by cigarettes. New ~~Newly introduced~~ upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked-up composites of the upholstered furniture shall have a char length not exceeding $1^{1}/_{2}$ inches (38 mm) when tested in accordance with NFPA 261, or
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.5.1.2 Heat release rate. New ~~Newly introduced~~ upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total energy released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.5.1.3 Identification. Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.5.1.1 and 805.5.1.2.

Commenter's Reason: The technical committee was concerned about two key issues: (a) that this could be considered to apply to antique or used upholstered furniture that are being brought in from elsewhere and (b) that this would apply to Group A2 occupancies such as fast-food places and other occupancies that do not serve alcoholic beverages. Both concerns are addressed by the comment. Such antique or used items would not be covered with this language. The concern is addressed in this comment by the language change from "newly introduced" to "new". The concern about food and non alcoholic drinks is addressed in this comment by the language change to specifically address assembly occupancies intended for consumption of alcoholic drinks.

As stated by the proponent, experience shows that if a bar or night club is not sprinklered the potential for big fires is large. Approval of this proposal, as amended, would ensure that furniture is not the cause of a big fire with many fatalities.

Final Action: AS AM AMPC____ D

F55-09/10

805.5 (New)

Proposed Change as Submitted

Proponent: Carl Ogburn, Chestnut Ridge Foam

Add new text as follows:

805.5 Group E Occupancies other than day care facilities. The requirements of Sections 805.5.1 through 805.5.1.3 shall apply to Group E occupancies other than Group E day care facilities.

805.5.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.5.1.1 through 805.5.1.3

805.5.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked-up composites of the upholstered furniture shall have a char length not exceeding $1^1/_2$ inches (38 mm) when tested in accordance with NFPA 261; or
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.5.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

   Exception: Upholstered furniture in rooms or spaces protected by an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1.

2. The total energy released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

   Exception: Upholstered furniture in rooms or spaces protected by an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1.

805.5.1.3 Identification. Upholstered furniture shall bear the label of an *approved* agency, confirming compliance with the requirements of Sections 805.5.1.1 and 805.5.1.2.

Reason: CA TB 133, which is referenced in the IFC, is a standard issued by the California Bureau of Home Furnishings and Thermal Insulation (CBHF) and is equivalent to ASTM E 1537, with the pass/fail criteria contained in the proposal. This proposal would make the same requirements for educational establishments (other than day care occupancies) than is now used for some other occupancies, such as Groups I-1, I-2, I-3 and R-

2. Educational facilities are ones where so many young people are potentially exposed and vulnerable. Approval of this proposal would ensure that furniture is not the cause of a big fire with many fatalities.

Cost Impact: CA TB 133 furniture is more expensive than standard furniture.

ICCFILENAME: OGBURN-F2-805.5-2.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal was disapproved as loss data was not presented to justify the regulation of furnishings in Group E occupancies. In addition, the more vulnerable occupants in Group E occupancies are excluded which are those found in Group E Daycare facilities. The committee also felt that the enforcement of these requirements would be difficult.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

805.5 Group E ~~Occupancies other than~~ day care facilities. The requirements of Sections 805.5.1 through 805.5.1.3 shall apply to ~~Group E occupancies~~ ~~**other than**~~ Group E day care facilities.

805.5.1 Upholstered furniture. New ~~Newly introduced~~ upholstered furniture shall meet the requirements of Sections 805.5.1.1 through 805.5.1.3

805.5.1.1 Ignition by cigarettes. New ~~Newly introduced~~ upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked-up composites of the upholstered furniture shall have a char length not exceeding $1^1/_2$ inches (38 mm) when tested in accordance with NFPA 261; or
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.5.1.2 Heat release rate. New ~~Newly introduced~~ upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

   Exception: Upholstered furniture in rooms or spaces protected by an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1.

2. The total energy released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

   Exception: Upholstered furniture in rooms or spaces protected by an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1.

805.5.1.3 Identification. Upholstered furniture shall bear the label of an *approved* agency, confirming compliance with the requirements of Sections 805.5.1.1 and 805.5.1.2.

Commenter's Reason: The technical committee was concerned about two key issues: (a) that this could be considered to apply to used upholstered furniture that are being brought in from elsewhere and (b) that this would apply to Group E occupancies that had lower risk factors than day-care facilities. Both concerns are addressed by the comment. Such used items would not be covered with this language. The concern is addressed in this comment by the language change from "newly introduced" to "new". The concern about day-care centers is addressed in this comment by the language change to restricting the application specifically to day-care facilities.

Final Action: AS AM AMPC____ D

F64-09/10
901.9 (New)

Proposed Change as Submitted

Proponent: Rick Sheets, Fire Committee Chair, Brinks Home Security, representing National Burglar and Fire Alarm Association

Add new text as follows:

901.9 Discontinuation or change of service. Notice shall be made to the fire code official whenever contracted alarm services for monitoring or testing or inspection of an existing fire alarm system are terminated for any reason, or a change in alarm monitoring provider or other service provider is made. Notice shall be made in writing, to the fire code official by the building owner and where required, by the alarm service provider being terminated.

Reason: It is, and should always remain, the responsibility of the commercial property owner to maintain their building(s) to code. The code prohibits the "removal of or tampering with equipment" and "appurtenances", and in 901.4 of this code states that "fire protection systems shall be maintained in accordance with the original installation standards for that system", yet no such language is provided for non-tangible services. Any contracted services for remote station monitoring and the required testing of equipment in place at the time of acceptance, could be cancelled after the Acceptance Test without notifying the code official. This is of concern for many reasons:

1. The alarm service provider of record may be replaced with non-licensed, non-registered, non-qualified and non-approved personnel or methods.
2. Due to non-payment of fees by the property owner, the alarm service provider may have stopped (or will soon stop) monitoring, repairing and testing of the fire alarm system.
3. If an alarm service provider no longer provides monitoring, repairing or testing services due to non-payment they cannot be seen by the code official as being at fault.

Since by code, the building owner is responsible for keeping their building and fire alarm system in proper working condition, part of that responsibility lies in the fact that they are paying their bills to their alarm service provider. In any other circumstance nonpayment is merely a contract dispute between customer and provider. However, since the service being provided is mandated by code (monitoring and testing) the service provider gets caught in the middle of a complex situation. The addition of this rule will provide the proper notifications to be made before discontinuance of required services.

While the impairment coordinator should be the one to inform the fire official of these types of changes, they may be reluctant to do so because they'd be admitting that these services have been stopped as a cost cutting measure. Allowing the alarm service provider to also notify the fire code official of imminent cessation of service provides a cross-check to ensure the proper continuation of services present at the time of acceptance remain in effect. If another service provider has been procured by the building owner this notification allows the fire code official an opportunity to make sure any required licenses and permits are in place.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: SHEETS-F6-901.8.2.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

901.9 Discontinuation or change of service. Notice shall be made to the fire code official whenever contracted alarm services for monitoring or testing or inspection of an existing fire alarm system are terminated for any reason, or a change in alarm monitoring provider or other service provider is made. Notice shall be made in writing, to the fire code official ~~by the building owner and where required,~~ by the alarm service provider being terminated.

Committee Reason: The committee felt that it was necessary for the fire official to be notified when the alarm system was no longer being maintained or monitored. One concern was that the language as proposed would put this responsibility on the building owner which may be the one who does not understand the significance of the problem and would not notify the fire code official. Therefore a modification was made to remove the building owner and place the responsibility to contact the Fire official on the alarm service provider. This concept was equated to auto insurance companies notifying states when drivers fail to pay their premiums on their insurance.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Steve Orlowski representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

901.9 Discontinuation or change of service. Notice shall be made to the fire code official whenever contracted alarm services for monitoring or testing or inspection of an existing fire alarm system are terminated for any reason, or a change in alarm monitoring provider or other service provider is made. Notice shall be made in writing, to the fire code official by the building owner. ~~by the alarm service provider being terminated.~~

Commenter's Reason: Since the beginning of most model codes, the owner has been the primary person responsible for the maintenance of all life safety and property protection systems within their building. This proposed change, based on the supporting reason statement had little to do with safety and continued service, but more so as a means for the service provider to utilize the code to force the owner to make payments. As for the modification made by the fire committee, taking the building owner out of the equation does little to support the responsibilities put upon the building owner in other sections of this code. If the building owner terminates service or hires another service provider, then it should be the responsibility of the building owner to insure that the local fire department or authority having jurisdiction is notified.

Public Comment 2:

Jeffrey M. Shapiro, PE, International Code Consultants, representing National Multi Housing Council, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

901.9 Discontinuation or change of service. For fire alarm systems required to be monitored by this code, notice shall be made to the fire code official whenever ~~contracted~~ alarm monitoring services ~~for monitoring or testing or inspection of an existing fire alarm system~~ are terminated ~~for any reason, or a change in alarm monitoring provider or other service provider is made~~. Notice shall be made in writing~~,~~ to the fire code official by the ~~alarm~~ monitoring service provider being terminated.

Commenter's Reason: The code does not require all fire alarm systems to be monitored, and for systems that are not required to be monitored, there is no reason that monitoring cannot be terminated without notifying the fire code official. When in doubt about whether monitoring is required, the alarm monitoring company could err on the side of conservatism and send a notice.

Likewise, because there is no requirement in the code that an owner contract with a fire alarm service provider to test or inspect a fire alarm system, requiring notice of terminating such a contract is beyond the scope of the code. Accordingly, the revised section has been limited to notification of discontinuance of required alarm monitoring services.

Final Action: AS AM AMPC____ D

F70-09/10
903.2.6 (IBC [F] 903.2.6)

Proposed Change as Submitted

Proponent: Roland J. Huggins, PE, American Fire Sprinkler Association, representing self

Revise as follows:

903.2.6 Group I. An *automatic sprinkler system* shall be provided throughout buildings with a Group I *fire area*.

> **Exception:** An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 or 903.3.1.3 shall be allowed in Group I-1 facilities provided that:
>
> 1. A hydraulic design information sign is located on the system riser
> 2. Exception 1 of Section 903.4 is not applied
> 3. Systems installed in accordance with Section 903.3.1.3 shall be maintained in accordance with the requirements of Section 903.3.1.2.

Reason: This exception provides a very cost efficient system but an institutional facility is still a commercial facility and warrants a higher level of assurance that the system will work. An NFPA 13D system does not require any identification for the design basis of the system so others working on the system after installation need this information. Granted, building plans are supposed to be maintained, but often aren't and a system riser sign is often the only guidance available. Section 903.4 requires the system to be monitored so in case of fire the fire department is automatically notified. Exception #1 excludes systems in one-and two-family dwellings. Since Section 903.3.1.3 explicitly links NFPA 13D systems and one- and two-family dwellings, it is interpreted that Exception #1 applies to all 13D systems. Clarification is needed. As a final item, if the intent of the ICC is that these facilities be maintained to ensure adequate operation, guidance must be provided. Simply referencing Section 903.5 will not work since it references IFC which references NFPA 25. NFPA 13D systems are outside the scope of NFPA 25. The only maintenance and testing performed on an NFPA 13D system is provided by the homeowner.

Cost Impact: The code change proposal will have minimal impact on the cost of construction.

ICCFILENAME: HUGGINS-F1-903.2.5.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee felt that in order for a 13D system to be used in this application for Group I-1 occupancies that additional controls were necessary to increase the integrity of the system, therefore the proposal was approved as submitted.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Roland J. Huggins, American Fire Sprinkler Association, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

903.2.6 Group I. An *automatic sprinkler system* shall be provided throughout buildings with a Group I *fire area*.

Exceptions:

1. An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 ~~or 903.3.1.3~~ shall be allowed in Group I-1 facilities ~~provided that:~~

   ~~1. A hydraulic design information sign is located on the system riser~~
   ~~2. Exception 1 of Section 903.4 is not applied~~
   ~~3. Systems installed in accordance with Section 903.3.1.3 shall be maintained in accordance with the requirements of Section 903.3.1.2.~~

2. An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be allowed in Group I-1 facilities when in compliance with all of the following:

   2.1. A hydraulic design information sign is located on the system riser
   2.2. Exception 1 of Section 903.4 is not applied, and
   2.3. Systems shall be maintained in accordance with the requirements of Section 903.3.1.2.

Commenter's Reason: This is just an editorial change to better comply with the standard format.

Final Action: AS AM AMPC____ D

F76-09/10
903.2.11.1.3 (IBC [F] 903.2.11.1.3)

Proposed Change as Submitted

Proponents: Tom Lariviere, Chairman, Joint Fire Service Review Committee; Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

Revise as follows:

903.2.11.1.3 (IBC [F] 903.2.11.1.3) Basements. Where any portion of a *basement* is located more than 75 feet (22 860 mm) from openings required by Section 903.2.11.1, <u>or where walls, partitions or other obstructions are installed that restrict the application of water from hose streams,</u> the *basement* shall be equipped throughout with an *approved automatic sprinkler system*.

Reason: The purpose of the openings under Section 903.2.11.1 are for firefighting operations.

The firefighting purpose of these openings is to provide the ability to confine the fire in the basement from the exterior of the building. A basement fire can be especially dangerous to enter under fire conditions. Firefighters must be able to apply hose stream water from the exterior of the structure through these openings provided. This is particularly important in basements (below grade floors) since entry through a stairway would require firefighters to travel down into the heat and smoke that is trying to escape up and out the stairway.

When obstructions such as walls or partitions are installed in the basement, the ability to apply hose streams through these openings and reach the basement area is reduced or eliminated. The configuration and clear-opening requirements become useless when an interior wall or other obstruction is placed inside the basement. In that case, it is reasonable to require automatic fire sprinklers to provide adequate protection in the basement. This proposal requires that in the case of obstructions, the basement shall be provided with an approved automatic sprinkler system.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: LARIVIERE-F11-SHUMAN-F3-903.2.11.1.3.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee felt that this proposal clarified the intent of the code with regard to obstructions in the basement causing challenges to fire fighting operations. It should be noted that there was some concern from committee members that the present code language already addresses this hazard and this language is unnecessary.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marshall A. Klein, requests Disapproval.

Commenter's Reason: There was no fire data submitted with this code proposal to justify that the existing code language, or its existing enforcement, under the present wording in the Code has been a problem. Even the Committee's reason stated a concern from the "…committee members that the present code language already addresses this hazard and this language is unnecessary…", so why change the Code?

This section was originally from the UBC Section 3802(b)(1) that goes back to the 1976 edition of the UBC/UFC. The UBC/UFC did not consider hose stream an issue. The 1997 UBC Commentary stated:

> **"The provisions requiring openings in the exterior walls do not extend beyond the exterior wall line into the building. Thus, the code does not dictate specific openings for interior partition arrangements because the normal openings provided through interior partitions provide adequate accessibility to all interior portions of the building"**

The IFC/IBC Commentary Handbooks further explains the application of this requirement very clearly as follows:

> **"Where obstructions such as walls or other partitions are present in any given story or basement, *the* walls *and partitions enclosing any room or space must have openings* that provide an equivalent degree of fire department access to that provided by the openings prescribed in Section 903.2.10.1 for exterior walls. If an equivalent degree of fire department access to all portions of the floor area is not provided, the story or basement would require an automatic sprinkler system."**

The added language to the code text could cause many of the code complying small basements in existing buildings, to now become non-compliant if renovated because one could argue that an existing opening in an interior wall with any door or window arrangement would not necessarily "…restrict the application of water from hose streams…". Therefore, the adoption of this proposal will adversely affect previously approved code complying small basements during later interior remodels.

With no supporting documentation of fire problems in existing buildings to show a need that the existing code language is not adequate, the new wording for application of hose streams will only create added code interpretation issues for code compliance in small basements in buildings. This is a solution to a problem that does not exist with the present code text as was even stated in the Committee's "soft" approval recommendation. This code proposal should be disapproved.

Final Action: AS AM AMPC____ D

F81-09/10

903.3.1.1.2 (New) [IBC [F] 903.3.1.1.2 (New)]

Proposed Change as Submitted

Proponent: Jeff Hugo, CBO, National Fire Sprinkler Association

Add new text as follows:

903.3.1.1.2 (IBC [F] 903.3.1.1.2) Sprinkler omissions Automatic sprinklers shall not be required to be installed in locations where NFPA 13 permits sprinklers to be omitted. The building shall still be considered equipped throughout.

Reason: The IBC requires that buildings using sprinklers for height/area increases and trade-offs (exceptions) to be sprinklered throughout. NFPA 13 also requires that the structure be sprinklered throughout (Section 8.1.1), unless specifically exempted by the standard. These areas that do not require sprinklers are commonly found in Chapter 8 of NFPA 13, and with these excepted areas, the building is still considered by the standard to be sprinklered throughout, which would comply with the requirements of the IBC.

One of the most common misinterpretations seen are canopies, exterior roofs and porte-cocheres being considered as a part of the main portion of the structure and therefore are being required to be sprinklered. The 2007 NFPA 13 clearly defines when sprinklers are required under the exterior roofs, canopies and porte-cocheres.

NFPA 13 (Section 8.15.7) is very specific on the sprinklering requirements in these appendages. All canopies, exterior roofs and porte-cocheres over 4' in width are required to be sprinklered unless:

- The canopy, roof, or porte-cochere is constructed with non-combustible, limited combustible, or fire retardant treated wood. (all fire retardant treated wood shall comply with NFPA 703)
- The underside (ceiling/eaves) of the canopy, roof, and porte-cochere of combustible construction provided the exposed finish material on the roof, canopy, or porte-cochere is non-combustible, limited combustible, or fire retardant treated wood, and the combustible concealed spaces (attic) is sprinklered, unless:
- The combustible concealed space is filled entirely with noncombustible insulation, or
- Ceilings that are noncombustible or limited combustible connected directly to joists with joist spaces not - exceeding 160 cubic feet, or
- If concealed spaces do not exceed 55 square feet in area.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HUGO-F3-903.3.1.1.2.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this item as they felt that the language explaining what is considered as fully sprinklered appeared unnecessary for the code. The committee noted that such issues are better addressed within the standard and in the commentary for the IBC and IFC.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche representing Hoover Treated Wood Products, Inc, request Approval as Submitted.

Commenter's Reason: Committee decision rested on their belief this belonged in the commentary. We disagree. This is an important issue. Obviously, proponent has been questioned about the term "fully sprinklered". That term is could cause confusion. This proposal clarifies the intent of the code and the NFPA 13 standard.

Final Action: AS AM AMPC____ D

F83-09/10

903.3.5.2 (IBC [F] 903.3.5.2)

Proposed Change as Submitted

Proponent: Phillip A. Brown, American Fire Sprinkler Association

Revise as follows:

903.3.5.2 (IBC [F] 903.3.5.2) Secondary water supply. ~~A~~ An automatic secondary on-site water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings in Seismic Design Category C, D, E or F as determined by the *International Building Code*. An additional fire pump is not required. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.

Exception: Existing buildings.

Reason: A statement needs to be added to this section clarifying that the secondary water supply must be automatic and cannot be from a source that has to be manually activated. The Commentary clarification that an additional fire pump is not required should also be brought forward into this section.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: BROWNP-F1-903.3.5.2.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved as the existing language could be interpreted as being a manual water supply when the intent is for an automatic water supply. This additional language will clarify the need for an automatic secondary water supply.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

903.3.5.2 (IBC [F] 903.3.5.2) Secondary water supply. A ~~An automatic~~ secondary on-site water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings in Seismic Design Category C, D, E or F as determined by the *International Building Code*. An additional fire pump is not required. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.

Exception: Existing buildings.

Commenter's Reason: This code change should be modified as proposed for the following reasons:

1. The intent of the change is not clear. It appears that perhaps the intent is that the sprinkler water supply would automatically switch to the secondary supply upon loss of the primary water supply, but that is not at all clearly stated.
2. It is not clear that this has always been the intent of the code, if it has been the standard practice for secondary water supplies, or if it is even a wise design choice.
3. In the event of a significant earthquake that causes a break in the main water supply, the primary water supply will be lost, and it is possible that the building system could as least partially drain. If the secondary water supply is 'automatically' tapped, it appears to be quite possible that the secondary supply would then be lost through the same break.
4. Secondary water supply sources historically have included swimming pools, on-site ponds, and gravity tanks in buildings. "Automatically" tapping that supply upon any interruption (regardless of the time frame of the interruption or the current conditions in the building) appears to open the door to all kinds of potential problems.
5. The second portion of the change, clarifying that a second fire pump is not required for a secondary water supply, is good clarification of the intent of the code.

Public Comment 2:

Rick Thornberry, PE, The Code Consortium Inc, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

903.3.5.2 (IBC [F] 903.3.5.2) Secondary water supply. An automatic secondary on-site water supply ~~equal to~~ having a capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings in Seismic Design Category C, D, E or F as determined by the International Building Code. An additional fire pump shall ~~is~~ not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the automatic sprinkler system. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.

Exception: Existing buildings.

Commenter's Reason: The purpose of this Public Comment is to further clarify the intent of the original code change proposal, as well as the current Section 903.3.5.2, requiring the on-site water storage for automatic sprinkler/standpipe systems in high-rise buildings in Seismic Design Categories C, D, E, and F. We certainly agree that the on-site water storage needs to be automatically available should the normal water supply to the fire protection system be interrupted for whatever reason. And we also agree that there should be no need to provide an additional fire pump with the automatic water supply since it is intended to directly supply the existing fire pump provided as required by code. However, there may be cases where the on-site water supply is located such that a pump is required in order for the necessary flow and pressure to be maintained to the suction side of the fire pump provided for the original design of the automatic sprinkler/standpipe system so that the fire pump can function properly in order to provide the required flows and pressures to adequately support the system. So the code text should be revised as indicated in this Public Comment to make it clear that, generally, an additional fire pump is not required but may be necessary for the automatic secondary on-site water supply to adequately supply the fire pump provided for the original system design.

Public Comment 3:

Dave Frable, representing U.S. General Services Administration, requests Disapproval.

Commenter's Reason: A water supply is a source of water (e.g., a tank, lake, reservoir, well, etc. or a connection to a municipal water distribution system). Though the means for delivering water from a secondary supply source to where it's needed can be (and maybe should be) automatic (e.g., a fire pump that starts upon loss of pressure), the water supply itself can not be automatic. Regardless of the intent, we believe the new text confuses the issue, more than it helps convey the proponent's intent. If there is a desire to require the means for delivering the water supply from the secondary source be automatic, code language needs to be stated differently. Therefore, it's critical that this comment be accepted so the code change proposal as written is rejected.

Final Action: AS AM AMPC____ D

F87-09/10
904.1.1 (New) [IBC [F] 904.1.1 (New)]

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, Joint Fire Service Review Committee

Add new text as follows:

904.1.1 (IBC [F] 904.1.1) Certification of service personnel for fire extinguishing equipment. Service personnel providing or conducting maintenance on *automatic fire extinguishing systems*, other than *automatic sprinkler systems*, shall possess a valid Certificate issued by an *approved* third party certification organization, an *approved* governmental agency, or other *approved* organization for the type of system and work performed.

Reason: This proposal will allow the code official to specify a minimum level of qualifications for servicing fire extinguishing systems. Ensuring technicians are qualified will enable communities to stay in compliance with the latest code regulations for fire extinguishing systems.

This proposal allows several options for the code official. The code official could choose to accept certification from a third party organization, a governmental agency, or any other organization. Formal certification for automatic fire extinguishing system technicians provides a mechanism for the technicians to demonstrate their knowledge of codes, standards, and related practices. The code official only needs to ascertain that the service technician has the proper certification.

Third party certification programs must meet a minimum acceptable standard that ensures a proper examination preparation. Certification programs provide a mechanism for fire code officials to use to evaluate individuals for the necessary knowledge. Certification programs from third party certification agencies should comply with Regulations and National Standards, such as:

- Uniform Guidelines on Employee Selection Procedures
- US Equal Employment Opportunity Commission (EEOC)
- Standards for Educational & Psychological Testing
- National Council on Measurement in Education (NCME)
- American Educational Research Association (AERA)
- American Psychological Association (APA)

Certification by governmental agency quite often is a certificate issued by a state agency. Similar to third party certifications, governmental certification must be specific to the type of work to be performed.

Certification by other organizations could consist of manufacturer training and certification programs. These certifications typically are only valid for the products from the specific manufacturer.

The code official has the option to determine which certification methods are acceptable, or even if multiple certifications are necessary. Requiring certified technicians helps protect public safety and promotes professionalism and expertise and helps ensure the competency of those individuals involved in the service industry.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LARIVIERE-F12-904.1.1.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

904.1.1 (IBC [F] 904.1.1) Certification of service personnel for fire extinguishing equipment. Service personnel providing or conducting maintenance on *automatic fire extinguishing systems*, other than *automatic sprinkler systems*, shall possess a valid Certificate issued by ~~an *approved* third party certification organization,~~ an *approved* governmental agency, or other *approved* organization for the type of system and work performed.

Committee Reason: This proposal was approved as it was felt that certification programs are necessary and with this requirement such certification will be created. The modification simply removed the phrase "an approved third party certification organization" to provide more control to the jurisdiction.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

Commenter's Reason: This proposal should be disapproved for the following reasons:

1. There are currently no widely-recognized certification programs in place to be utilized for this proposed certification requirement. The Code Development Committee notes that 'with this requirement, such certification will be created'. Without programs already in place, with criteria that has been vetted and accepted, it is premature to add such a code requirement.
2. Existing 'certifications' run the gamut from short written programs to extensive hands-on training.
3. The proposed text would open the door to allowing inadequate certification programs being accepted, while they might not provide adequate levels of training.

Final Action: AS AM AMPC____ D

F94-09/10
906.1 (IBC [F] 906.1)

Proposed Change as Submitted

Proponent: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

Revise as follows:

906.1 (IBC [F] 906.1) Where required. Portable fire extinguishers shall be installed in the following locations.

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.

   ~~**Exception:** In new and existing Group A, B and E occupancies equipped throughout with quick response sprinklers, portable fire extinguishers shall be required only in locations specified in Items 2 through 6.~~

2. Within 30 feet (9144 mm) of commercial cooking equipment.
3. In areas where flammable or *combustible liquids* are stored, used or dispensed.
4. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 1415.1.
5. Where required by the sections indicated in Table 906.1.
6. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the *fire code official*.

Reason: Fire extinguishers have historically been the first line of defense for small, controllable fires. They are intended to be used for fires of limited size and easily controlled. If a fire is discovered in its early stages the most effective means of protecting life and preventing property loss is to sound an alarm and then to control and/or extinguish the incipient stage fire with a portable fire extinguisher. To simply wait for the fire to grow to size large enough for a sprinkler head to activate is contrary to lessons and guidance from the fire service and fire protection professionals. Since fire extinguishers provide a first line of defense vs. sprinklers, it remains unclear as to the justification for this exception .In that light, the Exception 1 to Section 906.1 should be deleted.

This exception was not in the original draft of the International Fire Code and it did not exist in any of the legacy fire codes. It currently does not exist in NFPA 1 Uniform Fire Code, NFPA 10 Standard for Portable Fire Extinguishers or NFPA 5000 Building Construction and Safety Code. It first appeared in the Final Draft of the 2000 editions of the IFC/IBC. Since the first publication of the International Fire Code, some fire service and fire protection professionals have expressed concern over the inclusion of an exception.

As a result a number of states have deleted the exception upon adoption of the IFC/IBC.

12 States plus Washington D.C. and New York City have Deleted Line 1 Exception.
2 States have amended Section 906.1 and the exception to require more extinguishers
2 States use both NFPA 1 and the IFC with more stringent code applicable.
17 additional States have adopted NFPA 1 as their fire code instead of the IFC.

A total of 33 State jurisdictions and an unknown number of local jurisdictions have chosen to delete the exception in favor of providing the ability to control a fire at its earliest stages.

There are other issues with this exception that have arisen since states have now been adopting the IFC and enforcing it within their state. Some examples are:

The exception is not being interpreted correctly and as a result is not being limited to occupancies with “QUICK RESPONSE” sprinklers installed. Instead, it is being applied in all cases where “REGULAR” sprinklers are installed.

When an occupancy is being renovated and the sprinkler system is updated, presently installed extinguishers are being removed, lessening the level of protection available.

Fire code officials do not all see hazard areas the same and as a result Section 906.1, Item 6 is not consistently applied jurisdiction to jurisdiction.

Some officials are exempting all extinguishers from being required thereby placing the occupants in danger at the time of a fire.

An added detriment is that if a building is occupied without fire extinguishers the ability of the building owner to properly and effectively place fire extinguishers is negatively impacted by the practical difficulty of installing fire extinguisher cabinets. Walls may not be thick enough for recessing the cabinets to keep the fire extinguishers from being obstructions to travel or from being hit and damaged themselves. If the walls and partitions can handle the recessed cabinets, design drawings and permits may be required to modify the walls and partitions.

This proposal will eliminate the exception and provide for the proper placement of an important firefighting tool.

Cost Impact: The code change proposal will cause a cost increase in new construction.

ICCFILENAME: DAVIDSON-SHUMAN-F8-906.1.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee felt that even within sprinklered buildings fire extinguishers have made a difference in fighting fires therefore the exception for quick response sprinklers in Groups A, B and E occupancies was deleted. In addition people are used to seeing extinguishers within buildings and having them available for use.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gene Boecker, Code Consultants Inc. representing the National Association of Theatre Owners, requests Disapproval.

Commenter's Reason: The proponent has not provided any indication of the number of jurisdictions that do not delete this exception, which can be assumed to be far greater than those that delete it. As a base code allowance, this has been in the codes for many years, and should not be deleted, since it is obviously adopted in many jurisdictions without problems.

Further, to address the following points from the original proponent:

• The exception is not being interpreted correctly and as a result is not being limited to occupancies with “QUICK RESPONSE” sprinklers installed. Instead, it is being applied in all cases where “REGULAR” sprinklers are installed.

Response: This is not a valid argument. If the exception is being misapplied to areas where ““REGULAR” sprinklers are installed”, changing the code is not a rational response. If the answer to each misapplied code exception is to delete it, then it follows that all exceptions should be removed from the code, since <u>any</u> exception could be misapplied. In fact, most of the code should be deleted if potential misapplication is a reason for deletion of text.

• When an occupancy is being renovated and the sprinkler system is updated, presently installed extinguishers are being removed, lessening the level of protection available.

Response: The protection is not being “lessened”. It is being addressed appropriately, since the current code language clearly allows this exception for existing buildings, based on the equivalent protection provided by the quick response sprinklers.

• Fire code officials do not all see hazard areas the same and as a result Section 906.1, Item 6 is not consistently applied jurisdiction to jurisdiction.

Response: The code clearly states the exception. As stated above, if the answer to each misapplied code exception is to delete it, then it follows that all exceptions should be removed from the code.

• Some officials are exempting all extinguishers from being required thereby placing the occupants in danger at the time of a fire.

Response: As stated above, if the answer to each misapplied code exception is to delete it, then it follows that all exceptions should be removed from the code. If there is a question regarding application, ICC can be contacted and the Code commentary can be reviewed for help.

As a base allowance, this has been in the codes for many years, since it is obviously adopted in many jurisdictions without problems. Based on this alone, the current exception should be retained.

Public Comment 2:

Dave Frable representing the US General Service Administration, requests Disapproval.

Commenter's Reason: We are strongly opposed to deleting the exception that permits new and existing Group A, B, and E occupancies protected throughout by quick response sprinklers, the exemption for installing portable fire extinguishers in certain areas of a building. It should be noted that this exception has been in the International Fire Code since 2000. Please see the Fire Code Committee's reason statement and note that the basis for the Fire Code Committee approving this code change proposal was strictly based on how they "Felt" and not based on any technical justification of fire loss data provided by the proponent. We also strongly believe that evacuation of the building should be the first action of the occupants in the subject occupancies, not fighting the fire.

The exception acknowledges the reliable advantages of an automatic sprinkler system designed to comply with NFPA 13. Group A, B and E occupancies are considered light hazard occupancies in NFPA 13. Light hazard occupancies must be protected with quick-response sprinklers (see Section 903.3.2). The faster-acting sprinklers and lower fuel load associated with Group A, B and E occupancies counter the need for portable fire extinguishers. Our desire is to have occupants evacuate the building whenever possible rather than having them put themselves in harms way in trying to fight the fire with a portable fire extinguisher. It should be noted that portable fire extinguishers are still required to be installed in specific areas within these occupancies where the fire risk warrants.

As stated earlier, no technical substantiation or fire loss data that justifies the need to delete this exception has been provided. In addition, I totally disagree with the proponent's inference that this exception alone is the single primary reason why 19 States have not adopted the IFC. We also disagree with the proponent's statement that this exception is placing occupants in danger at the time of a fire. On the contrary, we feel eliminating this exception the risk of injury of occupants attempting to extinguish a fire will increase.

It should also be noted that the Occupational Safety and Health Administration (OSHA), 29 CFR 1910.157(g)(1) , also addresses portable fire extinguishers by specifically stating: "Where the employer has provided portable fire extinguishers **<u>for employee use</u>** in the workplace, the employer shall also provide an educational program to familiarize employees with the general principles of <u>fire extinguisher use</u> and the hazards involved with incipient stage fire fighting." Therefore, if portable fire extinguishers have been installed in a building and have been designated for occupant use and incorporated into the building's fire safety plan, training would be required. However, if this protocol for occupants using portable fire extinguishers is not incorporated in the building's fire safety plan, no training would be required. Hence, the occupants will not be properly trained to use the subject portable fire extinguishers as the proponent and Fire Code Committee has suggested. Also, we have been informed by several fire department personnel that they also do not utilize the subject building's portable fire extinguishers for suppression purposes based on reliability issues.

As everyone knows, fire is a rare event; however, should a fire occur in these occupancies, the probability that all occupants are knowledgeable and have been trained proficiently in the use of portable fire extinguishers to effectively extinguish a fire is low. We also believe the cost associated with the installation of portable fire extinguishers in these occupancies is unjustified, taking into consideration maintaining the subject fire extinguishers for the life of the building. We believe these costs savings would be better expended active fire detection and suppression system.

Lastly, it should be pointed out that all previous Fire Code Committees disapproved similar proposed code changes in the past by stating there has been no technical justification presented indicating that the current exception presents an increased hazard to safety. Evacuation of the building should be the first action of the occupants in the subject occupancies, not fighting the fire.

Public Comment 3:

Rob Geislinger representing the Fire Marshals Association of Colorado, requests Disapproval.

Commenter's Reason: The exception which would be deleted by F94 has been in the International Fire Code since 2000. While the proponents identified a number of entities which have amended this exception out, many more have not. In fact, many jurisdictions believe the exception has significant merit by providing an additional economic incentive to a building owner who might not otherwise install fire sprinklers.

The proponents also indicated that this provision did not exist in the legacy codes. This is true. However, the legacy Uniform Fire Code required fire extinguishers in far less locations than the IFC. That Code required extinguishers only in proximity to specific hazards (I.e. asphalt kettles, motor vehicle fuel dispensing facilities, and temporary membrane structures). That Code contained no general requirement for fire extinguishers in A, B, or E occupancies unless specifically mandated for specific hazards. The IFC as written is thus more restrictive than UFC.

The proponents also brought up other reasons for deleting the section:

• "The exception is not being interpreted correctly and as a result is not being limited to occupancies with "QUICK RESPONSE" sprinklers installed. Instead, it is being applied in all cases where "REGULAR" sprinklers are installed." **Answer: This is a training issue for fire code officials. The fact is that many sections of the Code may be misinterpreted or misapplied.**

• "When an occupancy is being renovated and the sprinkler system is updated, presently installed extinguishers are being removed, lessening the level of protection available." **Answer: The lower RTI and faster response of QR sprinklers have been demonstrated to protect people even in the room of origin. Standard response sprinklers generally do not activate in time to protect people intimate with a fire. Also, any building being renovated with a quick response automatic fire sprinkler system is obviously safer than it was when it only had manual firefighting devices.**

• "Fire code officials do not all see hazard areas the same and as a result Section 906.1, Item 6 is not consistently applied jurisdiction to jurisdiction." **Answer: The Code includes many provisions that are not consistently applied between jurisdictions. Rather than a laundry list of hazardous locations, the exception provides reasonable guidance to a fire code official based upon specific hazards within an occupancy and jurisdiction.**

• "Some officials are exempting all extinguishers from being required thereby placing the occupants in danger at the time of a fire." **Answer: This would also be a training issue. Fire extinguishers are a necessary safety component where superior automatic suppression systems do not exist.**

The proponents' last justification was that building owners later choosing to voluntarily add fire extinguishers would be at a disadvantage and could compromise necessary fire separations and exiting. In fact, by removing this exception, the proponents will be creating these problems throughout the country as now extinguishers will be required in "new and *existing* Group A, B, E…, occupancies". Also, while some building owners choose to spend their money to exceed the requirements of the Code, most do not. If they so choose, the exception doesn't prohibit them from doing so.

Despite the fact that this provision has been in the Code since its inception, the proponents did not identify any cases where individuals were injured or killed by the lack of fire extinguishers in buildings with quick response sprinklers. On the other hand, NFPA documents numerous cases where individuals are injured or killed in attempting to extinguish fires. It is counterproductive to place a device for property protection in a building where most occupants have not been trained, the likelihood of injury is high, and a building system itself will respond to mitigate the hazard. The proponents' state: "To simply wait for the fire to grow to a size large enough for a sprinkler head to activate is contrary to lessons and guidance from the fire service and fire protection professionals." However, as fire professionals we should not be expecting untrained citizens to extinguish incipient fires. In fact, our message should be, "Get out!"

Public Comment 4:

Lawrence Perry representing the Building Owners and Managers Association, requests Disapproval.

Commenter's Reason: This code change should be disapproved for the following reasons.

1. The Committee reason states "the committee felt that even within sprinklered buildings, fire extinguishers have made a difference in fighting fires before the exception." What does that mean? The committee neither received nor presented any data showing lesser loss of life or lesser property damage in sprinklered buildings that also had portable fire extinguishers installed throughout.
2. The current code provides a safe workplace, and the proponents provide no evidence of an improvement in life safety by adding portable fire extinguishers; they would be hard pressed to do so, based on the excellent life-safety record of fully-sprinkiered office buildings. The proponents want you to support the initial expenditure for large quantities of portable fire extinguishers, possibly large quantities of cabinets to store them, and possibly alarm/monitoring devices to prevent tampering. In addition, they either anticipate that businesses will suddenly choose to then voluntarily choose to opt for the OSHA 'fight-the-fire' approach (contrary to current widespread practice), absorb the costs for training some/most/all of the buildings occupants, and also foot the ongoing costs of maintaining both the equipment and the training program. At what additional benefit?
3. Perhaps the proponents will claim that there are no training costs to be incurred, since the proposal doesn't require occupants to be trained. If that is the case, and large numbers of businesses continue to instruct their employees, as permitted by OSHA, to simply flee the building in the event of any fire, what exactly is the point of this code change? Besides selling a bunch of expensive equipment that comes with an ongoing upkeep fee, there appears to be none.
4. The Committee and the proponents ignore the fact that in many of the affected buildings, there is either a lack of opportunity to train building occupants in the use of portable fire extinguishers, or a significant risk in assigning a fire suppression obligation to building occupants. OSHA regulations require that if employees are expected to perform fire suppression duties, that they be properly trained; however, OSHA also allows a workplace to have a policy that employees are to EVACUATE and not perform any suppression activities. The 'evacuate' approach is widely used in the modern workplace. In a multi-tenant office building, building management has no mechanism to train every employee of every tenant space.
5. The potential risk to property due to some minor water damage from sprinkler activation to control a small fire is a preferred, and an acceptable, risk to the option of either providing equipment that occupants will be instructed not to use, or providing the equipment and then needing to 'deputize' every building occupant as a fire fighter.
6. For both A and E occupancies, also affected by this change, training of building occupants in the proper use of extinguishers is even more impractical, if not impossible.

Final Action: AS AM AMPC____ D

F95-09/10
906.1 (IBC [F] 906.1)

<u>Proposed Change as Submitted</u>

Proponent: Steven Orlowski, National Association of Home Builders

Revise as follows:

906.1 (IBC [F] 906.1) Where required. Portable fire extinguishers shall be installed in the following locations.

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4, and S Occupancies.

   Exception: In new and existing Group A, B, ~~and~~ E <u>and R-2</u> occupancies equipped with quick response sprinklers, portable fire extinguishers shall be required only in locations specified in Items 2 through 6.

2. Within 30 feet (9144 mm) of commercial cooking equipment.
3. In areas where flammable or *combustible liquids* are stored, used, or dispensed.
4. On each floor of structures under construction, except R-3 occupancies, in accordance with Section 1415.1.
5. Where required by the sections indicated in Table 906.1.
6. Special-hazard areas, including but not limited to, laboratories, computer rooms and generator rooms where required by the *fire code official*.

Reason: Both the International Building Code and the International Fire Code specifically require that all new R occupancies, which are considered light hazard according to NFPA 13, are equipped with quick-response or residential type automatic sprinklers. In addition, NFPA 13 permits some R occupancies to install an automatic suppression system in accordance to NFPA 13 R, when the structure does not exceed 4 stories in height. The purpose for requiring the quick response heads in group A, B, E and R-2 occupancies is to lower the operating temperature for the suppression system to react during the incipient stage of a fire emergency. This provides additional time for the occupants to evacuate the structure and achieve the overall desire for the occupant to evacuate the structure rather than fight the fire and put themselves at unnecessary risk.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ORLOWSKI-F1-906.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved to be consistent with the action on code change F94-09/10 that deleted the exception for quick response sprinklers. In addition, it was felt that there have been many situations in Group R-2 dormitories where extinguishers have been necessary.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeffrey Shapiro, International Code Consultants, representing National Multi Housing Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

906.1 Where required. Portable fire extinguishers shall be installed in the following locations.

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.

   Exception<u>s</u>:

   1. In new and existing Group A, B <u>and</u> E ~~and R-2~~ occupancies equipped throughout with quick-response sprinklers, portable fire extinguishers shall be required only in locations specified in Items 2 through 6.
   2. <u>In R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.</u>

2. Within 30 feet (9144 mm) of commercial cooking equipment.
3. In areas where flammable or combustible liquids are stored, used or dispensed.
4. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 1415.1.
5. Where required by the sections indicated in Table 906.1.
6. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the fire code official.

Commenter's Reason: Existing IFC Table 906.3(1) would require fire extinguishers in an R-2 occupancy (considered a Light Hazard Occupancy for fire extinguisher design) to be a minimum of 2A rated (maximum floor area per unit of A is 3000 sq. ft) and no more than 75' to reach the fire extinguisher. Some jurisdictions measure the travel distance to a fire extinguisher from within the dwelling unit to the fire extinguisher placed in the common corridor of the building, and others from the dwelling unit's entrance door to the fire extinguisher placed in the common corridor of the building. Either way the fire extinguishers are placed in the common corridor that would require the occupant to leave the dwelling unit to get the fire extinguisher to use.

Based on NFPA Fire Reports for fires in apartment buildings (2003-2007 Annual Averages), out of the 38,000 fires/year in apartment buildings, 60% of the fires originate within the dwelling unit, and only about 14% in the common areas of the building that would not be covered by Item #3 or #6 in current Section 906.1. The largest numbers of fires in apartment buildings originate in the kitchen, bedrooms, and living rooms so it makes more sense to locate the fire extinguisher closer to the areas within the dwelling unit where the great majority of the fires occur than outside the dwelling unit. Even if a fire is outside the dwelling unit, it seems more likely that the occupant will be able to get to, and use, the fire extinguisher located in his/her dwelling unit, than finding the fire extinguisher in the common corridor.

In addition, there has always been a problem with vandalism and pilfering of fire extinguishers in common corridors of apartment buildings, as well as issues involving the size and weight of such fire extinguishers if an elderly apartment resident were to attempt using one.

This proposed public comment would permit the placement of a fire extinguisher within each dwelling unit to provide rapid access and use by the dwelling unit occupants to an incipient fire in the dwelling unit where a fire would more likely occur. The size and rating of the fire extinguisher would be appropriate for the residential environment. The size of a dwelling unit is typically well under the 3000 sq. ft. rating for a 1A rated fire extinguisher (most dwelling units are in the 750-1000 sq. ft. range) so there is a large safety factor for justifying the minimum 1A-10B:C rating.

Finally, it makes more sense to put extinguishers in dwelling units, as opposed to common areas, because we don't want occupants re-entering a unit that is on fire after they've already left. It's preferable to provide an extinguisher for ready access in the unit, versus encouraging someone to leave the unit to get an extinguisher and then return to fight a fire.

Final Action: AS AM AMPC____ D

F96-09/10
906.3 (New) [IBC [F] 906.3 (New)]

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, Joint Fire Service Review Committee

Add new text as follows:

<u>**906.3 (IBC [F] 906.3) Certification of service personnel.** Service personnel providing or conducting maintenance shall possess a valid Certificate issued by an *approved* third party certification organization, an *approved* governmental agency, or other *approved* organizations for the type of work performed.</u>

(Renumber subsequent sections)

Reason: This proposal will allow the code official to specify a minimum level of qualifications for servicing portable fire extinguishers. Ensuring technicians are qualified will enable communities to stay in compliance with the latest code regulations for portable fire extinguishers.

This proposal allows several options for the code official. The code official could choose to accept certification from a third party organization, a governmental agency, or any other organization. Formal certification for portable fire extinguisher technicians provides a mechanism for the technicians to demonstrate their knowledge of codes, standards, and related practices. The code official only needs to ascertain that the service technician has the proper certification.

Third party certification programs must meet a minimum acceptable standard that ensures a proper examination preparation. Certification programs provide a mechanism for fire code officials to use to evaluate individuals for the necessary knowledge. Certification programs from third party certification agencies should comply with Regulations and National Standards, such as:

- Uniform Guidelines on Employee Selection Procedures
- US Equal Employment Opportunity Commission (EEOC)
- Standards for Educational & Psychological Testing
- National Council on Measurement in Education (NCME)
- American Educational Research Association (AERA)
- American Psychological Association (APA)

Certification by governmental agency quite often is a certificate issued by a state agency. Similar to third party certifications, governmental certification must be specific to the type of work to be performed.

Certification by other organizations could consist of manufacturer training and certification programs. These certifications typically are only valid for the products from the specific manufacturer.

The code official has the option to determine which certification methods are acceptable, or even if multiple certifications are necessary. Requiring certified technicians helps protect public safety and promotes professionalism and expertise and helps ensure the competency of those individuals involved in the service industry.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LARIVIERE-F15-906.3.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

906.3 (IBC [F] 906.3) Certification of service personnel. Service personnel providing or conducting maintenance shall possess a valid Certificate issued by ~~an *approved* third party certification organization,~~ an *approved* governmental agency, or other *approved* organizations for the type of work performed.

Committee Reason: The committee approved this proposal to be consistent with the action taken on code change F87-09/10. In addition, it will provide more leeway for the jurisdiction to ask for a certain level of qualifications. The modification was the same as that made for code change F87-09/10 which deleted the phrase “”an approved third party certification organization” to provide more control to the jurisdiction.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

Commenter's Reason: This proposal should be disapproved for the following reasons:
1. There are currently no widely-recognized certification programs in place to be utilized for this proposed certification requirement. The Code Development Committee, in their approval of similar item F87-09/10, notes that 'with this requirement, such certification will be created'. Without programs already in place, with criteria that has been vetted and accepted, it is premature to add such a code requirement.
2. Existing 'certifications' run the gamut from short written programs to extensive hands-on training. The proposed text would open the door to allowing inadequate certification programs being accepted, while they might not provide adequate levels of training.
3. For this item, part of the Committee reason for approval was that "it will provide more leeway for the jurisdiction to ask for a certain level of qualifications'. This works both ways: while some jurisdictions may develop a very high 'certification' requirement, "certified" to an inappropriate standard will lead to nothing more than an appearance of appropriately trained personnel.

Final Action: AS AM AMPC____ D

F102-09/10
907.2.1.1 (IBC [F] 907.2.1.1)

Proposed Change as Submitted

Proponent: Gene Boecker, Code Consultants, Inc., representing self

Revise as follows:

907.2.1.1 (IBC [F] 907.2.1.1) System initiation in Group A occupancies with an occupant load of 1,000 or more. Activation of the fire alarm in Group A occupancies ~~with an~~ <u>where the</u> occupant load ~~of~~ <u>due to the assembly occupancy</u> is 1,000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.6.2.2. <u>Group A occupancies not separated from one another in accordance with Section 707.3.9 of the *International Building* Code shall be considered as a single occupancy for the purposes of applying this section.</u>

> **Exception:** Where *approved*, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an *approved*, constantly attended location.

Reason: Section 508 of the IBC already addresses the extent of application for conditions where there are differing occupancy groups. The revised language recognizes that and makes reference back to that section of the code. There has been a question about how to apply the 1,000 occupants. If the 1,000 occupants are all in a single room, it is clear. However, it is not clear how the people in different parts of the building are combined to reach the threshold of 1,000.

For example: There are 250 assembly occupants in a small restaurant at one end of a hotel and sports bar with an occupant load of 120 in a separate location. At the other end of the hotel is a conference center with an occupant load of 700. It is not clear from the code whether those people should be added together or not; and, if not, under what conditions. The code will now be clear that the areas must be separated using the mixed occupancy provisions if there are other occupancies between them or by a fire barrier if the areas adjoin one another.

The exception is unaffected by the proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BOECKER-F2-907.2.1.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal with concern that this approach, which was used in code change F100-09/10, is not considered appropriate due to the large occupant loads addressed by this section.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gene Boecker, Code Consultants Inc, representing The National Association of Theatre Owners, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

907.2.1.1 (IBC [F] 907.2.1.1) System initiation in Group A occupancies with an occupant load of 1,000 or more. Activation of the fire alarm in Group A occupancies where the occupant load due to the assembly occupancy is 1,000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.6.2.2~~. Group A occupancies not separated from one another in accordance with Section 707.3.9 of the *International Building* Code shall be considered as a single occupancy for the purposes of applying this section.~~

Exception<u>s :</u>

1. <u>Group A occupancies that do not share any portion of the same exit access system shall not be required to be considered as a single occupancy for the purposes of applying this section.</u>
2. Where *approved*, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an *approved*, constantly attended location.

Commenter's Reason: The committee felt that the missing concept in this proposal was the issue of assembly occupancies that share the exit access portions of the means of egress. Where such occupancies share exit access, and the aggregate occupant loads of such occupancies exceed 1,000, the committee felt that the requirements for voice alarm should be applied. However, should such occupancies use separate exit access components, the committee felt that each occupancy would be permitted to be evaluated separately. This proposal addresses these concerns and comments.

Final Action: AS AM AMPC____ D

F106-09/10
907.2.2.1 (IBC [F] 907.2.2.1)

Proposed Change as Submitted

Proponent: Rick Sheets, Fire Committee Chair, Brinks Home Security, representing National Burglar and Fire Alarm Association

Revise as follows:

907.2.2.1 (IBC [F]907.2.2.1) Group B ambulatory health care facilities. *Fire areas* containing Group B ambulatory health care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory health care facility and in public use areas outside of tenant spaces, including public *corridors* and elevator lobbies.

> ~~**Exception:** Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 provided the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.~~

Reason: Delete Exception.

Another new occupancy has been defined under the "B" Business category, called "Ambulatory Health Care Facilities". (304.1) These facilities are defined as buildings or portions of buildings providing medical, surgical, psychiatric or nursing care less than 24 hours a day to persons incapable of self-preservation (i.e. 'put under' for minor surgery etc.). These occupancies, covered in 907.2.2.1, need an automatic smoke detection system installed in the Ambulatory Health Care Facility plus in their public use areas, corridors and elevator lobbies including all the public areas on other floors outside the AHCF area, ...except if the building is sprinkled and its activation causes the (required) occupant notification appliances to activate.

The problem with allowing this exception is that by code, heat detectors (which is what a sprinkler head is) are not, and never have been, permitted to replace smoke detectors for protection of life. Heat detectors are not life-safety devices in any code or standard because they do not provide the early warning needed for the safe evacuation of occupants. Sprinklers have a great reputation for saving lives only when used along with early detection provided by smoke detectors.

Cost Impact: The code change proposal will increase the cost of construction $.30 per square foot.

ICCFILENAME: SHEETS-F1-907.2.2.1.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal which would have removed the exception allowing sprinklers in lieu of smoke detection was disapproved as it would take away the incentive for sprinklers. In addition since the section is so new it should first have a chance to be applied before being revised.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rick Sheets representing National Burglar and Fire Alarm Association, requests Approval as Submitted.

Commenter's Reason: The committee action was to disapprove F106 because it was felt that removing the exception took away the sprinkler incentive. The proposal did not ask to remove the sprinklers, just to provide smoke detectors in addition to the sprinklers. Smoke detectors provide much earlier warning of a fire emergency than sprinklers. While sprinklers will certainly reduce the fire growth, since many occupants of the AHCF occupancy may need assistance in evacuating if necessary, staff should be given the maximum amount of warning. Life safety can be greatly improved by providing both smoke detection and fire sprinklers.

A number of studies validate this, such as:

"Measurement of Room Conditions and Response of Sprinklers and Smoke Detectors During a Simulated Two-Bed Hospital Patient Room Fire", Notarianni, Kathy A., 1993, NISTIR 5240, Gaithersburg, MD: National Institute of Standards and Technology, July.

Notarianni noted:

> *"Sprinklers in all locations tested actuated before the patient's life would be threatened by this nominally 65 kW fire for the closed door, closed door privacy curtain, and open door privacy curtain tests. However, in the shielded fire test, the sprinklers at locations S6 and S1, the standard sidewall across from the foot of patient bed #2, and the EC sidewall, on the east wall near the bathroom, respectively, activated after the life safety criterion in HAZARD I with regard to temperature was exceeded. Ionization and photoelectric detectors in all locations alarmed before the patient's life would be threatened."*

Structure Fires in Residential Board and Care, Jennifer Flynn, NFPA Fire Analysis and Research, Quincy, MA, December 2009
U.S. Fire departments responded to an estimated average of 2,070 structure fires in residential board and care facilities annually during 2003-2007. These fires caused annual averages of:
• 10 civilian deaths
• 70 civilian injuries
• $10.9 million in direct property damage

Smoking materials caused 3% of fires but 63% of the civilian deaths.
• Fires that started on mattress or bedding material caused 44% of the civilian deaths in these properties.
• Structure fires in these properties peak between 4 and 7 p.m.
• Saturday was the peak day for fires in these properties.

Public Comment 2:

Thomas Hammerberg representing Automatic Fire Alarm Association, requests Approval as Submitted.

Commenter's Reason: The committee action was to disapprove F106 because it was felt that removing the exception took away the sprinkler incentive. The proposal did not ask to remove the sprinklers, just to provide smoke detectors in addition to the sprinklers. Smoke detectors provide much earlier warning of a fire emergency than sprinklers. While sprinklers will certainly reduce the fire growth, since many occupants of the AHCF occupancy may need assistance in evacuating if necessary, staff should be given the maximum amount of warning. Life safety for fire fighters and occupants can be greatly improved by providing both smoke detection and fire sprinklers.

A number of studies validate this, such as:

"Measurement of Room Conditions and Response of Sprinklers and Smoke Detectors During a Simulated Two-Bed Hospital Patient Room Fire", Notarianni, Kathy A., 1993, NISTIR 5240, Gaithersburg, MD: National Institute of Standards and Technology, July.

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activated after the life safety criterion in HAZARD I with regard to temperature was exceeded. Ionization and photoelectric detectors in all locations alarmed before the patient's life would be threatened."

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• Fires that started on mattress or bedding material caused 44% of the civilian deaths in these properties.
• Structure fires in these properties peak between 4 and 7 p.m.
• Saturday was the peak day for fires in these properties.

Final Action: AS AM AMPC____ D

F107-09/10
907.2.3 (IBC [F] 907.2.3)

Proposed Change as Submitted

Proponent: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

Revise as follows:

907.2.3 (IBC [F] 907.2.3) Group E. A manual fire alarm system that ~~activates~~ initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.6.2.2 and installed in accordance with Section 907.6 shall be installed in Group E occupancies. When automatic sprinkler systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.

Exceptions:

1. A manual fire alarm system is not required in Group E occupancies with an occupant load of ~~less than 50~~ 30 or less.
2. Manual fire alarm boxes are not required in Group E occupancies where all of the following apply:
   - 2.1. Interior corridors are protected by smoke detectors.
   - 2.2. Auditoriums, cafeterias, gymnasiums and similar areas are protected by heat detectors or other approved detection devices.
   - 2.3. Shops and laboratories involving dusts or vapors are protected by heat detectors or other approved detection devices.
   - ~~2.4. The capability to activate the evacuation signal from a central point is provided.~~
   - ~~2.5. In buildings where normally occupied spaces are provided with a two-way communication system between such spaces and a constantly attended receiving station from where a general evacuation alarm can be sounded, except in locations specifically designated by the fire code official.~~
3. Manual fire alarm boxes shall not be required in Group E occupancies where the building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, the ~~notification appliances~~ emergency voice/alarm communication system will activate on sprinkler waterflow and manual activation is provided from a normally occupied location.

Reason: Group E occupancies mix a high concentration of children with fuel loads on a daily basis. As budgets shrink, so do the number of adult supervisors. Our children are in schools because they are required to be there. We owe them a duty to ensure they are safe from the risk of fire while in school. We simply cannot wait for a catastrophe to protect children while at school.

Unfortunately the world of elementary, secondary and higher education learning has gone through tremendous changes in security measures undertaken, both operationally and hardware installations, due to the threat of violent acts committed against students and staff. Where we had educational facilities with highly effective fire drill evacuation procedures and actions during system activation, we now have written plans and training in place to ignore the activation of the fire alarm system if a "lockdown" has been declared because the activation of the fire alarm system may be a diversion to bring staff and students out into the open to serve as victims.

This is not a possible situation. This is a very real situation that occurs throughout the country in response to the acts of violence that have occurred at educational facilities. Though the exact procedure may vary site to site, the main premise of a "lockdown" is to gather staff and students into classrooms and offices and to lock the doors, preventing intruders from getting into the room and preventing staff and students from leaving the rooms until an all clear is announced. The staff and students are trained to ignore a fire alarm activation during a lockdown until they are ordered to evacuate after someone in authority, (could be a Principal or could be a Police Commander), makes a determination that the fire threat is real and that they must evacuate to survive the fire.

Once the students and staff ignore the fire alarm, there needs to be a reliable method of communicating the message that now is the time to evacuate. PA systems that do not meet appropriate standards of care for installation or maintenance related to reliability at the time of a fire emergency do not satisfy that need. To address this issue this proposal would require the installation of a emergency voice/alarm communications system installed in accordance with the code and referenced standards. Recognizing that there is a related increase in the cost of construction Section 907.5.2.2 allows that system to be used for other announcements to eliminate the need for a public address system for that purpose.

Section 907.2.3, Exception one has been modified to correlate the occupant load triggers, Items 2.4 and 2.5 would be redundant since the emergency voice/alarm communications system would meet those two requirements and Exception 3 was modified to correlate with the new language in 907.2.3.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: DAVIDSON-SHUMAN-F2-907.2.3.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee felt that this proposal was necessary as schools are dealing with a host of threats such as fires and tornados and in more recent history an increase in school lockdown situations. This provides a better method of communication during emergencies than traditional fire alarm and occupant notification systems

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Disapproval.

Commenter's Reason: This code change proposal, which would require emergency voice alarm systems in any Group E occupancy with more than 30 occupants, should be disapproved for the following reasons:

1. This is an onerous requirement for small schools, with no sensible rationale. A school of 30 or so students could be as small as 1000 square feet or so. What is the point of an emergency voice alarm system in such a small building? Are you going to have one zone at the fingerpaint station and a separate one at the snack table?
2. In larger schools, a two-way communication system is typically installed between each classroom and a central control point (typically the main office), so that administrative staff can communicate with teachers (and vice versa), summon students, make and announcements on a classroom or school-wide basis. Current code recognizes this system, allowing the deletion of manual pull stations in spaces served by such a system. This code change deletes the exception, and removes any incentive for providing these two-way communication systems. What is the increase in protection provided by replacing a two-way system with a one-way system?
3. This change adds a significant cost to all affected Group E buildings. In the current economic climate, with jurisdictions faced with significant budget shortfalls, code changes that add to the cost of new (or renovated) school buildings will simply lead to less new construction and less modernization of existing buildings. This change has not been shown to offer any significant increase to life safety in Group E occupancies, and should therefore, not be a financial burden passed on to local communities.
4. One of the primary reasons given in support of this change was that in some cases, schools have put in place policies that instruct staff and students not to immediately evacuate upon activation of the fire alarm signal. First, a decision by some unclear number of facilities should not become the basis of a major change to all future construction. Second, this concern has been more appropriately been addressed by changes that were processed last cycle, and are already contained in Section 404.3.3 of the IFC. Any facility wishing to put in place any sort of 'lockdown plan' is required to receive approval of the fire department. This package of provisions includes a requirement that any lockdown plan include a means of 'two-way communication' between each secured area and a central control point. With this provision in the code already, what is the purpose of adding an expensive 'one-way' communication system to the same buildings?

Final Action: AS AM AMPC____ D

F109-09/10

907.2.9 (IBC [F] 907.2.9), 907.2.9.3 (New) [IBC [F] 907.2.9.3 (New)]

Proposed Change as Submitted

Proponent: William Freer, Fire Protection Specialist, NYS Office of Fire Prevention and Control

1. Revise as follows:

907.2.9 (IBC [F] 907.2.9) Group R-2. Fire alarm systems and smoke alarms shall be installed in Group R-2 occupancies as required in Section 907.2.9.1 ~~and 907.2.9.2~~ through 907.2.9.3.

907.2.9.3 ([F] 907.2.9.3) Group R-2 college and university buildings. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.6 shall be installed in Group R-2 college and university buildings in the following locations:

1. Common spaces outside of dwelling units and sleeping units
2. Laundry rooms, mechanical equipment rooms, and storage rooms
3. All interior corridors serving sleeping units or dwelling units.

Required smoke alarms in dwelling units and sleeping units in Group R-2 college and university buildings shall be interconnected with the fire alarm system in accordance with NFPA 72.

Exception: An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units or dwelling units and where each sleeping unit or dwelling unit either have a *means of egress* door opening directly to an exterior *exit access* that leads directly to an *exit* or a *means of egress* door opening directly to an exit.

Reason: This code change would add new requirements to the code. The current code only requires single and multiple station smoke alarms in new R-2 student housing. Single and multiple station smoke alarms are not required to be connected to a building fire alarm which would evacuate the building in event of a fire or smoke condition. They are also not required to be in all areas of the building which have been shown to be frequent areas of ignition. In a study completed by the New York State Governor's Task Force on Campus Fire Safety it was cited that 43% of fires in college dormitories are located in dorm rooms or kitchens, leaving the other 57% to be located in areas that would not require smoke detection under the current code. The study also showed that there were approximately 300 fires on college campus over a 3 year period while only 160 and were reported to the Fire Department. The Center for Campus Fire Safety reports 99 deaths have been "reported" in fires in student housing since 2000. An NFPA study on student housing showed 3,300 structural fires in Dormitories, Fraternities, Sororities and Barracks between 2002-2005. Since 1980 there has been an increase of 3% in reported fires in dormitory type occupancies, while there has been a 52% decrease in overall reported structural fires. New York State has required Fire Alarm and detection system in new dormitories since 2003 and has not had any deaths reported in these buildings since that change.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: FREER-F2-907.2.9.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved the proposal due to the unique hazards that are present in Group R-2 college and university buildings. More specifically, there are often more common areas than found in other types of Group R-2 occupancies where occupants congregate. Also it is not uncommon to have activities such as cooking in these common areas.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeffrey Shapiro, International Code Consultants, representing National Multi Housing Council, requests Disapproval.

Commenter's Reason: The justification for approving this proposal failed to consider the inclusion of residential fire sprinkler systems in cited fire statistics, and it failed to look at whether the existing requirement for manual fire alarm systems adequately addresses the need for a supplemental evacuation warning.

Of greater concern however, is the lack of consideration for the increased number of alarms that will be associated with placing smoke detectors in common areas and dorm rooms that will ultimately lead students to ignore the alarm system. Consider that small dorm rooms with cooking equipment (microwaving popcorn being one example) will take very little time to fill with enough smoke to activate the alarm system.

Finally, there is a concern with respect to defining exactly what constitutes "college and university buildings." Are these only buildings that are owned by the school, or do they include off-campus housing. If off-campus housing is included, at what point does the tenant population's student percentage cause the building to differ from any other apartment building? Granted, the code already uses this text in Chapter 4 for emergency planning, but that is a far less ominous requirement to leave vague than what is proposed here.

With all of these concerns and the lack of a comprehensive basis of justification, the proposal should be rejected.

Final Action: AS AM AMPC____ D

F110-09/10

907.2.9.2 (New) [IBC [F] 907.2.9.2 (New)]

Proposed Change as Submitted

Proponent: Ken Kraus, Los Angeles Fire Department

Add new text as follows:

907.2.9.2 (IBC [F] 907.2.9.2) Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.6 shall be installed through out all interior corridors serving 10 or more dwelling units.

> **Exception:** An automatic smoke detection system is not required in buildings that do not have interior *corridors* serving *dwelling units* and where each *dwelling unit* has a *means of egress* door opening directly to an *exit* or to an exterior *exit access* that leads directly to an *exit*.

Reason: Automatic fire alarm systems are currently required, with exception, within interior corridors in R-1 Occupancies, e.g., Hotels and Motels. While Apartment buildings represent, in some respects, hazards similar to those found in R-1 Occupancies, they represent distinct and extenuating conditions that warrant similar protectives. Specifically:

Non transient occupants in R-2 Occupancies utilize cooking appliances to a much greater extent than R-1 Occupants.
R-2 occupants disable smoke alarms since low voltage and false alarms represent a continual nuisance.
R-2 occupants are much more likely to prop open required fire protection assemblies (for ventilation) than occupants in hotels and motels.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: KRAUS-F1-907.2.9.2.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal to add an automatic smoke detection system to Group R-2 occupancies was disapproved as it appeared to be too restrictive. In addition, these requirements would be applicable more often than the manual fire alarm requirements. Group R-1 occupancies require both manual and automatic fire alarm systems but the occupants found in such occupancies are generally more unfamiliar with the building and necessitate this higher level of protection.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Thomas P. Hammerberg, Automatic Fire Alarm Association Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

907.2.9.2 (IBC [F] 907.2.9.2) Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.6 shall be installed throughout all interior corridors serving ~~10~~ 16 or more dwelling units.

> **Exception:** An automatic smoke detection system is not required in buildings that do not have interior *corridors* serving *dwelling units* and where each *dwelling unit* has a *means of egress* door opening directly to an *exit* or to an exterior *exit access* that leads directly to an *exit*.

Commenter's Reason: One of the reasons the committee action was to disapprove F110 was because it would have been more restrictive than the manual fire alarm box requirements. Changing the number of dwelling units from 10 to 16 corrects that. Smoke detectors provide early warning of a fire emergency. Apartments with interior corridors are not that much different than hotels with interior corridors. The IFC requires smoke detectors in corridors of hotels regardless of whether or not the building is sprinklered. It is a known fact that sleeping occupants need more time to react to an alarm, regardless of whether they are sleeping in an apartment or a hotel. Due to the slower response to a fire emergency by occupants who are sleeping, the earliest possible warning must be provided to save more lives. Other factors to consider include the fact that escape time has decreased from approximately 17 minutes to 3 minutes in residential applications and recent studies showing difficulty in awakening the elderly and young children. The more time we allow for reaction, the safer it will be.

There are numerous studies on human behavior during fires. A couple of examples are:

“Evacuation Time and Movement in Apartment Buildings”, Guylene Proulx, Fire Safety Journal, 1995.
“Awakening of Sleeping People – a Decade of Research”, Ian Thomas & Dorothy Bruck, Fire Technology, 2008.

Public Comment 2:

Thomas P. Hammerberg, Automatic Fire Alarm Association Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

907.2.9.2 (IBC [F] 907.2.9.2) Automatic smoke detection system. <u>In addition to smoke alarms required by Section 907.2.11.2,</u> an automatic smoke detection system that activates the occupant notification system in accordance with Section 907.6 shall be installed throughout all interior corridors serving 10 or more dwelling units.

> **Exception:** An automatic smoke detection system is not required in buildings that do not have interior *corridors* serving *dwelling units* and where each *dwelling unit* has a *means of egress* door opening directly to an *exit* or to an exterior *exit access* that leads directly to an *exit*.

Commenter’s Reason: The additional language to the beginning of this proposed section was added to ensure there were no interpretation issues. More specifically, the language is intended to clarify that the smoke detection system in the corridors was in addition to smoke alarms in the rooms, not a replacement for them.

Final Action: AS AM AMPC____ D

F111-09/10
907.2.10.2 (IBC [F] 907.2.10.2)

<u>Proposed Change as Submitted</u>

Proponent: Rick Sheets, Fire Committee Chair, Brinks Home Security, representing National Burglar and Fire Alarm Association

Revise as follows:

907.2.10.2 (IBC [F] 907.2.10.2) Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.6 shall be installed in corridors, waiting areas open to corridors and habitable spaces other than sleeping units and kitchens.

Exception~~s~~:

~~1.~~ ~~Smoke detection in habitable spaces is not required where the facility is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.~~

~~2.~~ An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units and where each sleeping unit has a means of egress door opening directly to an exit or to an exterior exit access that leads directly to an exit.

Reason: Exception #1 should be deleted.

Background: A new R-4 occupancy has been defined under the “B” Business category, called “Ambulatory Health Care Facilities”. (AHCF, 304.1) These facilities provide medical, surgical, psychiatric or nursing care less than 24 hours a day to persons incapable of self-preservation (i.e. ‘put under’ for minor surgery etc.). These occupancies, covered in 907.2.2.1, need an automatic smoke detection system installed in the Ambulatory Health Care Facility area, plus in their public use areas, corridors and elevator lobbies for all the public areas located outside the AHCF area. While we see the need for a new occupancy type, we cannot see where sprinklers are permitted to replace required smoke detection.

Problem:

First, it seems that this exception doesn’t simply allow smoke detection to be omitted; it seems to allow the “smoke detection” to be omitted from an “automatic smoke detection system.” Doesn’t this mean that virtually no system will be installed, since the manual boxes required by 907.2.10.1 are also allowed to be omitted in sprinklered buildings? Isn’t this pushing the sprinkler reliance a little too far?

Secondly, sprinkler heads are essentially fixed-temperature heat detectors. Smoke detectors required in other parts of the ICC codes only permit heat detectors to be used where the environment is not suitable for the use of smoke detectors. It is not reasonable to expect the occupants and staff of these facilities to wait until a smoldering/small fire generates enough heat to activate a sprinkler head, when the environment allows early warning to be used. Section 907.2.10.1 indicates there won’t even be manual pull boxes at the exits, even if the fire is soon discovered by an occupant. We are also confident most fire departments would rather be informed of smoke rather than told that a sprinkler system is currently trying to control a fire.

The fire alarm and detection community has watched as manual pull boxes are permitted to be omitted, but this is the first time automatic smoke detection is permitted to be omitted. Please stop this dangerous trend and provide the early warning needed for the safe evacuation of these occupants. Sprinkler are not perfect and they do have a great reputation for saving lives, but they provide the best chances for survival when used along with the early warning provided by smoke detectors.

Cost Impact: This code change proposal would increase the cost by $0.15 to $0.30 per square foot.

ICCFILENAME: SHEETS-F2-907.2.10.2.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The reason provided by the proponent for this revision did not correlate well with the proposal and adequate justification for elimination of the exception when the facility is sprinklered throughout in accordance with NFPA 13 was not provided. Additionally, it was felt that the resulting level of protection if the exception was eliminated appeared to be overly restrictive.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rick Sheets, SET National Burglar and Fire Alarm Association, requests Approval as Submitted.

Commenter's Reason: The committee action was to disapprove F111 because it was felt that removing the exception took away the sprinkler incentive. The proposal did not ask to remove the sprinklers, just to provide smoke detectors in addition to the sprinklers. Smoke detectors provide much earlier warning of a fire emergency than sprinklers. While sprinklers will certainly reduce the fire growth, since many occupants of the AHCF occupancy may need assistance in evacuating if necessary, staff should be given the maximum amount of warning. Life safety can be greatly improved by providing both smoke detection and fire sprinklers.

A number of studies validate this, such as:

"Measurement of Room Conditions and Response of Sprinklers and Smoke Detectors During a Simulated Two-Bed Hospital Patient Room Fire", Notarianni, Kathy A., 1993, NISTIR 5240, Gaithersburg, MD: National Institute of Standards and Technology, July.

Notarianni noted:

> *"Sprinklers in all locations tested actuated before the patient's life would be threatened by this nominally 65 kW fire for the closed door, closed door privacy curtain, and open door privacy curtain tests. However, in the shielded fire test, the sprinklers at locations S6 and S1, the standard sidewall across from the foot of patient bed #2, and the EC sidewall, on the east wall near the bathroom, respectively, activated after the life safety criterion in HAZARD I with regard to temperature was exceeded. Ionization and photoelectric detectors in all locations alarmed before the patient's life would be threatened."*

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Smoking materials caused 3% of fires but 63% of the civilian deaths.
• Fires that started on mattress or bedding material caused 44% of the civilian deaths in these properties.
• Structure fires in these properties peak between 4 and 7 p.m.
• Saturday was the peak day for fires in these properties.

Public Comment 2:

Thomas Hammerberg, Automatic Fire Alarm Association, requests Approval as Submitted.

Commenter's Reason: The committee action was to disapprove F111 because it was felt the resulting level of protection was overly restrictive with the exception removed. Smoke detectors provide much earlier warning of a fire emergency than sprinklers. While sprinklers will certainly reduce the fire growth, since many occupants of the R-4 occupancy may need assistance in evacuating if necessary, staff should be given the maximum amount of warning. Life safety for both fire fighters and occupants can be greatly improved by providing both smoke detection and fire sprinklers.

A number of studies validate this, such as:

"Measurement of Room Conditions and Response of Sprinklers and Smoke Detectors During a Simulated Two-Bed Hospital Patient Room Fire", Notarianni, Kathy A., 1993, NISTIR 5240, Gaithersburg, MD: National Institute of Standards and Technology, July.

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• Saturday was the peak day for fires in these properties.

Koffel, William E., 2005, "Reliability of Automatic Sprinkler Systems," SUPDET Conference, Quincy, MA: Fire Protection Research Foundation. Sprinklers operated in almost 88% of 50,000 fire incidents in apartments. These did not include fires where the fire was deemed to be too small or where sprinklers were absent from the area of fire origin. In the residential fires where the sprinklers operated, they extinguished the fire in 19% of the incidents, providing support for Koffel's following statement:

> *"While property loss and life loss are greatly reduced in buildings protected with an automatic sprinkler system, the sprinkler system alone is not providing the entire increased protection."*

Final Action: AS AM AMPC____ D

F112-09/10, Part I
907.2.11 (IBC [F] 907.2.11)

Proposed Change as Submitted

Proponents: Joseph Fleming, Deputy Chief, Boston Fire Department, representing The Boston, MA Fire Department; Sean DeCrane, Cleveland Fire Department representing the Cleveland, OH Fire Department and the International Association of Fire Fighters

PART I – IFC

Revise as follows:

907.2.11 (IBC [F] 907.2.11) Single and multiple-station smoke alarms. *Listed* single- and multiple-station photoelectric smoke alarms complying with UL 217 shall be installed in accordance Sections 907.2.11.1 through 907.2.11.4 and NFPA 72.

Reason: (**Fleming)** According to the United States Fire Administration (http://www.usfa.dhs.gov/downloads/pdf/tfrs/v5i1.pdf) 37% of fire fatalities occur with operational smoke alarms and another 21% occur with disabled alarms. The use of photoelectric alarms, as opposed to alarms using ionization technology could reduce both by ½. This would reduce fire deaths in the U.S. by approximately 25% which translates into over 750 lives saved each year. The following information supports this estimated benefit.

1. There are some fires were smoke alarms/detectors cannot provide a benefit: arson fires in egress paths, victims intimate with flaming fires, explosions, etc. In addition, it is unlikely that smoke alarms/detectors provide the critical warning to occupants who are awake. As a consequence, when discussing smoke alarms, we should focus our attention on the types of fires where the smoke alarm can provide a crucial benefit to occupants not on all the types of fires that occur. The vast majority of fires where a smoke alarm/detector can help occupants are smoldering fires started when the victim is asleep.

> *Smoke detectors should be able to save at least 60% and possibly 75% of sleeping victims, but only 13% of victims who were awake.* (McGuire, J., Ruscoe, B., The Value of a Fire Detectors in the Home, Fire Study No. 9, National Research Council of Canada, Division of Building Research, Ottawa, Ont., Canada, December, 1962.)
> *"Delayed discovery, typically associated with fires that occur at night when everyone is asleep, also tends to be a characteristic of the smoldering fire caused by discarded smoking material. These smoldering fires are the leading causes of US fire fatalities and detectors are ideally designed to deal with them.* ("A Decade of Detectors", Fire Journal 09/85, John Hall - NFPA.)

2. In flaming fires the ionization alarm/detector is faster than the photoelectric by 30-50 seconds. This extra time is virtually irrelevant to alert occupants. For example, in the recent smoke alarm testing involving flaming cooking fires (http://smokealarm.nist.gov/pdf_files/SmokeDetectors_Q&As_Feb2008.pdf), which is the most common type of flaming fire, although the photo was 30-50 seconds slower than the ionization it still provided on average over 10 minutes warning. It has often been said that in a fire "seconds count." However it is hard to imagine a scenario were the extra seconds provided by the ionization in the most common type of flaming fires makes a difference for life safety, when the photoelectric is already providing on average over 10 minutes of Available Safe Egress Time. As a consequence, although photoelectric alarms/detectors respond later in flaming fires this is a quantitative as opposed to a qualitative advantage. Here are some quotes from researchers.

> *The advantage of ionization smoke detectors during flaming fires is only about a 15-20 second earlier warning. This margin will only be decisive for the loss of human life in extraordinary circumstances. In general the difference between the alarm times for the optical and the ionization detectors are reduced when the detection is made from an adjacent room. (*Meland, Oysten, and Lonuik, Lars, "Detection of Smoke - Full Scale Tests with Flaming and Smouldering Fires, "Fire Safety Science," - Proceedings of the Third International Symposium, July, 1991,)
>
> *Under the conditions of ignition from flames, the ionization chamber type detector exhibited a greater sensitivity to the smoke produced than the photoelectric system. However, the rate of generation of smoke was so great that the extra time given by the ionization chamber as a result may be of little practical use. (*R., (Riley, K., and Rogers, S., "A Study of the Operation and Effectiveness of Fire Detectors Installed in the Bedrooms and Corridors of Residential Institutions", Fire Research Station, Fire Research Current Paper 26/78, Borehamwood, England, April 1978.)

3. In smoldering fires the photoelectric is faster than the ionization by 30 minutes or more. This extra time is critical for sleeping occupants. If the ionization was consistently providing adequate warning, it would not matter that it was slower than the photoelectric. Unfortunately it doesn't. According to NIST's testimony to the Boston City Council), *"ionization alarms may not always alarm even when a room is filled with smoke from a smoldering fire."* In addition, according to data collected by NIST Report during smoldering fires the ionization smoke alarm often provided less than 1-2 minutes of Available Safe Egress Time. (1-2 minutes is the minimum time needed for sleeping occupants to escape.) In fact the ionization, in many cases, was providing negative available safe egress time. (http://smokealarm.nist.gov/pdf_files/StatementfortheRecordWG1finalsmokealarmstatement.pdf

   This finding has been noted by many other researchers.

> *Ionization chamber type detectors, in the room of origin and the corridor, did not, in the smoldering fire tests, provide adequate warning that the escape route was impassable or that conditions in the room were potentially hazardous to life. (*R., Riley, K., and Rogers, etc.)
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> *"This test will show that most photoelectric detectors, operated by battery will detect smoke at about 1.5-3% smoke, which is good. The test will show that the photoelectric detectors operated by household current will activate between 2 and 4 %, which is still good. But, the test also will show that many ionization detectors will not activate until the smoke obscuration reaches 10-20 and sometimes 25%. … Therefore, because of the present state of the art in detecting smoke, the Subcommittee on Smoke Detectors can take no other course but to recommend the installation of photoelectric detectors."* ("Residential Smoke Alarm Report - Prepared by Special Automatic Detection Committee of the International Association of Fire Chiefs," The International Fire Chief, September 1980.)
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> The tests i.e. the CALCHIEFS Tests, being commented upon in the previous quote were conducted by the Los Angeles Fire Dept. They concluded that photoelectrics were the preferred smoke alarm for all hallways and bedrooms. ("An Evaluation of Fire Detectors for Residential Placement," Los Angeles City Fire Dept., Fire Prevention Bureau – Research Unit, August 1981.)
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> *"Photoelectric detectors sighted in the hallway are more effective for detecting smoldering smoke than ionization detectors, providing adequate escape time for most conditions of size and location of the smoke sources. Ionization detectors sited in the hallway generally provide inadequate escape times unless smoke movement into the hallway is slowed down by narrow door openings, causing a slower loss of visibility, or unless they are sited close to the smoke source." (* P.F. Johnson and S. K. Brown, "Smoke Detection of Smoldering Fires in a Typical Melbourne Dwelling," *Fire Technology,* Vol. 22, No. 4, 1986, pp. 295-340.)
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> *"The ionization detectors detected smoke from a smoldering fire much later than optical (photoelectric) detectors. When the particular conditions during the fire development are taken into consideration there are reasons to indicate that this detection principle would not provide adequate safety during this type of fire".* (Meland, Oysten, and Lonuik, Lars, "Detection of Smoke - Full Scale Tests with Flaming and Smouldering Fires, "Fire Safety Science," - Proceedings of the Third International Symposium, July, 1991, pp. 975-984.)

4. In addition to being inadequate at providing adequate warning in smoldering fires, several researchers have identified that the ionization smoke alarm is far more susceptible to disablement due to nuisance alarms than is the photoelectric. Here are some quotes from the recent NIST Smoke Alarm Report. http://smokealarm.nist.gov/

   Additionally a separate study of nuisance alarm sources was conducted because this was identified as an important issue in a prior study by the U.S. Consumer Product Safety Commission. It was observed that ionization alarms had a propensity to alarm when exposed to nuisance aerosols produced in the early stages of some cooking activities, prior to noticeable smoke production. This phenomenon could be particularly vexing to homeowners who experience such nuisance alarms. … While one third of the smoke detectors did not work on the initial test, half of these were made operational by restoring power. Homeowners interviewed revealed that most of these were intentionally disconnected due to nuisance alarms, mostly from cooking.

   For the Toasting Scenario the ionization located near the kitchen responded in about 130-150 seconds. The photoelectric responded in 225-300. In fact according to NIST, *"Photoelectric alarm thresholds were met only after item started to char and produce visible smoke."* So although both responded, it is much more likely that the ionization will repeatedly respond to most normal toasting and be more likely to be disabled..

   Here are some recent quotes by other researchers on nuisance alarms.

> *"Homes with ionization alarms had more than 8 times the rate of false alarms as those with photoelectric. In small rural residences, photoelectric smoke alarms have lower rates of false alarms and disconnections." (*Perkins, M., "Ionization and

photoelectric smoke alarms in rural Alaskan homes," Western Journal of Medicine, 2000;173:89-92 (Contact: Alaska Injury Prevention Center, Anchorage, AK.))

*"We favor photoelectric detectors to reduce rates of nuisance alarms from cooking and to provide optimal protection from cigarette related fires." (*Kuklinski, D., Berger, L., Weaver, J., "Smoke detector Nuisance Alarms: A Field Study in a Native American Community," NFPA Journal; Sept/Oct. 1995.)

*"On direct observation at first follow-up, ionization study alarms were more likely to be non-functional, 20% ionization vs. 5% photoelectric, with the most common reason being a disconnected or absent battery." (*Mueller, B., et al, "Randomized controlled trial of ionization and photoelectric smoke alarm functionality," Injury Prevention, 2008; 14:80-86.)

Even smoke alarm manufacturers are aware of the benefits of photoelectric technology. (They just do a very poor job of communicating this to consumers.)

*"The optical smoke alarm therefore is less likely to react to the results of cooking and this makes it far more suitable for installation near kitchens or in confined spaces such as bed sits. The slight price differential between the two types of alarms can be balanced out by the elimination of false alarms being triggered by nearby kitchens and bathrooms." "*Domestic smoke alarms – a guide for specifiers," Bendall, D. (BFK Brands Europe), Fire Prevention 281 July/August 1995.

"Never install ionization smoke alarms in areas where cooking fumes, open fires and products of combustion are present. Where these conditions occur and a smoke alarm must be installed, a photoelectric alarm is the best option."
http://www.kidde.com.au/utcfs/kid/How+Smoke+Alarms+Work.html

5. Combination alarms/detectors have the potential to provide the quickest response to both smoldering and flaming fires but due to the excessive nuisance alarms from the ionization part of the alarm/detector, they should not be allowed near kitchens and bathrooms. In addition, the minor advantage that ionization or combination have over photoelectric in flaming fires is marginal and probably not critical.

   To quote a study (Mueller et al) cited earlier, *"An alarm containing both technologies is more expensive; it may also be more likely rendered non-functional if either technology causes frequent nuisance alarms. Our results suggest that installing photoelectric alarms on main floors of homes similar to those in our study may increase the proportion of functioning alarms and therefore provided longer term protection,"*

   Other items to consider:

   I am not aware of any "wireless alarms" that come as combination (photo/ion).

   Both ion and photo are sold with 10 year batteries. Are Combination (ion/photo)?

   Combination CO/Smoke come with CO/Ion or CO/Photo. Is there a Combo Smoke Alarm/CO?

   Why require dual in sprinkled occupancies when, according to the USFA, the only type of fire that can kill someone is a smoldering fire? "*Even though fire sprinklers are effective life safety devices you still need smoke alarms. Some fires can begin as smoldering fires that produce smoke and gases but don't generate enough heat to activate the sprinklers. Smoke alarms are needed to provide warning for these situations."*
   (http://www.usfa.dhs.gov/citizens/all_citizens/home_fire_prev/manufactured/sprinklers-mh.shtm)

6. I would like to mention that based on this research the Australasian Fire Authorities Council has recommended the use of photoelectric smoke alarms as opposed to ionization or combination.

   http://www.afac.com.au/__data/assets/pdf_file/0020/3674/AFACSmokeAlarmposition1June2006.pdf

7. Precedents for this action.

   a. Since 1998 the Massachusetts State Building Code has mandated photoelectric smoke alarm within 20 feet of a kitchen or bathroom due to the propensity of ionization smoke alarms to experience nuisance alarms.
   b. Since 2002 **NFPA 72 (the National Fire Alarm Code)** has only allowed ionization smoke alarms near kitchens if they were equipped with a silence button. The NFPA 72 committee has finally recognized the advantage that photoelectric smoke alarms have in regards to nuisance alarms. However I take exception to their assumption that a "hush button" neutralizes the ionizations propensity for nuisance alarms. No study has shown these to be effective at reducing disablement of ionization alarms. http://www.nfpa.org/assets/files/PDF/ROP/72-A2009-ROC.pdf (Page 72-249)
   c. **New Vermont Law** – Photoelectric-only type of smoke alarms are required to be installed in the vicinity of any bedrooms and on each level of a dwelling, for all new dwellings and dwellings that are sold or transferred, beginning January 1, 2009. http://www.dps.state.vt.us/fire/heating/photoelectric.html
   d. **Massachusetts has voted to Change the State Fire Code** so that as of January 1, 2010, smoke alarms with only ionization technology will not be allowed to meet the code. http://www.realtown.com/massachusettsrealestate/blog/massachusetts-smoke-detector-laws-changing
   e. **The 7th Edition of the Massachusetts State Building Code** was updated so that as of January 1, 2008 smoke alarms with only ionization technology will not be allowed to meet the code. http://www.ludlow.ma.us/building/permit_applications/life-safety-systems-app.pdf

Bibliography – In addition to references cited above, the following will be provided to the committee.

1. Fleming, J., *"Photoelectric vs. Ionization Detectors - A Review of the Literature,"*NFPRF Fire Suppression and Detection Research Symposium, Orlando, FL, 2/98.
2. Fleming, J., *"Photoelectric vs. Ionization Detectors - A Review of the Literature, Revisited,"* (NFPRF Fire Suppression and Detection Research Symposium, Orlando, FL, 01/05. This presentation included analyses of: 1) 30 years of smoke detector studies, 2) the National Institute of Standards Smoke Detector Project, 3) statistic regarding the effectiveness of smoke detectors, ands 4) the effectiveness of Underwriter's Labs Smoke Detector Approval Standard, UL217.)
3. Fleming, J., *"Smoke Detectors and the Investigation of Fatal Fires,"* Published in May 2000 issue of "Fire & Arson Investigator", the official magazine of International Association of Arson Investigators. (Also published on Interfire.org, an Arson Resource Website – posted 02/01.)

Reason: (DeCrane) I do not want to get into me too testimony, even during the reason statement, and my colleague Joseph Fleming from the Boston Fire Department has written an extensive Reason Statement. This will make it difficult to go in depth referencing various reports as Chief Fleming has provided the technical substantiation for this code change.

As a representative of the International Association of Fire Fighters (IAFF), I represent the professional fire fighters of North America. At the IAFF's most recent convention, the Union representatives of over 280,000 professional fire fighters across the United States and Canada, with representatives from the United Kingdom, Australia and New Zealand, voted unanimously to support he requirement of photoelectric smoke detectors.

The representatives, of those who respond to difficult fire scenes involving thousands of fatalities, have determined it is time to move forward with the requirement of photoelectric smoke detectors. Countless times our members have responded to residential fires and removed victims who had disabled their detectors due to nuisance alarms. Tragically many of these families forgot to replace the batteries or reinstall the hard wire detector when they were finished cooking. Unfortunately in many incidents these occupants, or a loved one, ended up paying the ultimate price for their forgetfulness, or some may argue, the lack of the detector industry addressing the problem.

On behalf of the nation's professional fire fighters we request your support for this code change.

Cost Impact: (**Fleming)** The code change proposal will not increase construction costs in any meaningful manner. The cost difference between ionization and photoelectric is minimal, particularly when one considers the benefit.

Cost Impact: (DeCrane) The code change proposal will minimally increase construction costs.

ICCFILENAME: FLEMING-DECRANE-F1-907.2.11

Public Hearing Results

PART I- IFC
Committee Action: Disapproved

Committee Reason: The committee disapproved the code change as they felt that the standards development process should address concerns with the performance of smoke alarms. There was also a concern that by stating a specific type of technology, future technologies could potentially be limited. Finally, there appeared to be conflicting data on the performance of ionization and photoelectric smoke alarms with the reason statement.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Joseph Fleming, Deputy Chief, Boston Fire Department, representing The Boston, MA Fire Department, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

907.2.11 (IBC [F] 907.2.11) Single and multiple-station smoke alarms. *Listed* single- and multiple-station ~~photoelectric~~ smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.4 and NFPA 72. <u>New installations of smoke alarms shall not rely solely on ionization technology to detect a fire.</u>

<u>Any smoke alarm newly installed within 20 feet of a kitchen or bathroom cannot include ionization technology even if used in combination with other detection technology</u>

Commenter's Reason: There were 4 reasons that appeared to concern the Committee about the original proposal: 1) it would apply to existing alarms, 2) it would limit new technology, 3) Some Committee members thought the ICC should defer to the standards, i.e. NFPA/UL, process, and 4) There was conflicting data supporting the proposal. I will address all 4 concerns.

1) Existing Alarms

This new language makes it clear that it is only meant to apply to new alarms installed to comply with this code.

2) Limit of New Technology

This language will allow for new technology while not allowing technology, old or new, that relies solely on ionization technology to detect fires. Ion technology has been repeatedly shown to have 2 flaws (often fatal flaws): 1) poor response to smoldering smoke and 2) excessive nuisance alarms, leading to excessive disablement. Either flaw would justify this proposal.

3) Deference to Standards Process

The ICC is a group that represents code officials. The "standards groups" are theoretically consensus groups. In reality the code officials and AHJ's are almost always a minority on these Committees. Here is a quote from Hyman Rickover, "Father of the Nuclear Navy" to Congress in 1970.

"The typical industry-controlled code or standard is formulated by a committee elected or appointed by a technical society or similar group. Many of the committee members are drawn from the manufacturers to whom the code is to be applied. Others are drawn from engineering consulting firms and various Government organizations. However, since near unanimous agreement in the committee must generally be obtained to set requirements or to change them, the code represents a minimum level of requirements that is acceptable to industry. … In a subtle way, the use of industry codes or standards tends to create a false sense of security. Described by code committees and by the language of many codes themselves as safety rules, they tend to inhibit those legally responsible for protecting the public from taking the necessary action to safeguard health and well being. Many states and municipalities have incorporated these codes into their laws, thus, in effect delegating to code committees their own responsibility for protecting the public."

By deferring to the "standards process" the ICC would be *"delegating their own responsibility for protecting the public*" to the industry. The ICC has not delegated their own opinion to the National Association of Home Builders etc. on the sprinkler issue but it has essentially done this in regards to smoke detectors. I would request that the ICC judge my proposal on its own merits and not defer to the "value judgments" of groups who may not represent the public interest. When "neutral" committees, e.g. Vermont Legislature, and Massachusetts Fire and Building Code Boards, reviewed my proposals, to restrict the use ionization technology, they were adopted. (Maine recently adopted language mandating photoelectric alarms within 20 feet of a kitchens or bath. This copied language that I authored for the Massachusetts Building Code in 1998.)

4) Conflicting Data in Supporting Material

I found this comment confusing. I am not aware of any conflicting data that was submitted with the reason statement and none was pointed out at the Hearing or in the "Committee Reason." The failure to point a specific "conflict" makes it impossible for me to challenge this assertion but I will try.

There may exist some studies that show the ionization to be effective however, as I have pointed out in papers that I have written, which have been submitted to the ICC these studies have one of the following characteristics: 1) they utilized older ion technology that was set to a higher sensitivity, they utilized non-synthetics furniture, which produces a type of smoke to which the ion is more sensitive, 3) they used fires that were either flaming or smoldered for only a short period of time , or 4) they never produced untenable conditions. The studies that I referenced have the following things in common which make them relevant to my proposal: 1) used technology similar to today's, 2) used synthetic furniture, 3) allowed fires to develop to untenable conditions, and 4) smoldered material for over 30 minutes. **In every case the researcher obtained results which indicated that the ionization alarm failed in many smoldering tests.** In addition to the studies that I have previously submitted I will add another.

http://smokealarm.nist.gov/pdf_files/Smoke%20Detector_Supplementary%20Qs%20&%20As_091107.pdf

In response to questions that I had submitted NIST published this document. At the bottom of page 2 the following information can be obtained.

	Available safe Egress Time (s) Average +/- 1 Standard Deviation	
	Photoelectric Alarms	Ionization Alarms
Smoldering	2136 +/- 1011	276 +/- 331
Flaming*	129 +/- 74	177 +/- 69
Cooking	739 +/- 148	796 +/- 241

These "flaming" have been characterized by some researchers as "ultra-fast" fires. Most flaming fires have a more moderate growth rate, e.g. cooking fires.

I would like to point out the following:

The only scenario that is producing "negative" escape times is the smoldering scenario with ionization alarms.
In the smoldering scenarios the photoelectric is on average 30 minutes faster than the ionization
In the most common flaming scenario, i.e. the cooking scenario, the ionization is on average 60 seconds faster than the photoelectric, however the photoelectric is still providing over 8 minutes of ASET so the extra 60 seconds is meaningless.
Even in the "ultra-fast" flaming fires the photoelectric is on average providing over 2 minutes warning.

If the Committee, once again rejects my proposal I would request that they identify the studies which indicate that the ionization is adequate for smoldering fires involving synthetic material. In my opinion this is probably the most common non-arson fatal scenario that occurs in the US while occupants are sleeping.

Some argue that if I am correct then why do the statistics indicate that ionization smoke alarms have been so effective. A close analysis of the available data will show that the statistics support my position.

According to the NFPA, (Ahrens 2009) having a smoke alarm reduce your chances of dying in a fire by about 50%. However, this reduction is only obtained if one includes "confined fires." (According to the USFA confined fires are rarely dangerous.) If one only looks at unconfined fires the following results are obtained. (Anyone with access to this report can do the same analysis.)

	Risk with working alarms	**Risk without working alarms**	**% Reduction**
All Fire & All Homes	1040/1764 = 0.589	1780/1537 = 1.158	(1.158-0.589)/1.158 = 49% reduction
Unconfined Fires & All Homes	1030/842 = 1.223	1780/1052 = 1.692	(1.692-1.223)/1.692 = 28% Reduction
Unconfined Fires in Apartments	240/190 = 1.263	200/166 = 1.20	(1.20-1.263)/1.20 = 5% Increase

- Risk, according to the NFPA, is defined as (# Fatalities / 100 Fires)

So smoke alarms, i.e. ionization smoke alarms are not nearly as effective as we are led to believe. The reduction in risk is only 28%. This is particularly troubling since some of the reduction in risk is probably due to socio-economic factors, e.g. poverty. In apartments, where the occupant has to usually exit through the living room they provide no statistical advantage. In fact there is a 5% increase in risk. I do not mean to state that ionization smoke alarms are not better than having no smoke alarm. I do mean to state that if smoke alarms are to achieve the life saving potential that people expect and deserve, we cannot allow ionization smoke alarms to be allowed to meet the code.

Public Comment 2:

Marcelo M. Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

907.2.11 (IBC [F] 907.2.11) Single and multiple-station smoke alarms. *Listed* single- and multiple-station ~~photoelectric~~ smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.4 and NFPA 72. <u>New installations of smoke alarms shall not rely solely on ionization technology to detect a fire.</u>

Commenter's Reason: The technical committee was concerned about two issues: (a) that the original proposal would require the replacement of existing detectors and (b) that the proposal would not permit the use of combination detectors. The revised language addresses this by stating that it is only <u>new installations</u> of detectors that need to be of the photoelectric type and that combination detectors are also permitted.

The technical rationale for needing photoelectric detectors has been well covered in the reasons for the original proposal.

Final Action: AS AM AMPC____ D

F112-09/10, Part II
IRC R314.1

<u>Proposed Change as Submitted</u>

Proponents: Joseph Fleming, Deputy Chief, Boston Fire Department, representing The Boston, MA Fire Department; Sean DeCrane, Cleveland Fire Department representing the Cleveland, OH Fire Department and the International Association of Fire Fighters

PART II – IRC BUILDING/ENERGY

Revise as follows:

R314.1 Smoke detection and notification. All smoke alarms <u>installed to meet the requirements of this code shall be the photoelectric type and</u> shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72.

Reason: (**Fleming**) According to the United States Fire Administration (<u>http://www.usfa.dhs.gov/downloads/pdf/tfrs/v5i1.pdf</u>) 37% of fire fatalities occur with operational smoke alarms and another 21% occur with disabled alarms. The use of photoelectric alarms, as opposed to alarms using ionization technology could reduce both by ½. This would reduce fire deaths in the U.S. by approximately 25% which translates into over 750 lives saved each year. The following information supports this estimated benefit.

1. There are some fires were smoke alarms/detectors cannot provide a benefit: arson fires in egress paths, victims intimate with flaming fires, explosions, etc. In addition, it is unlikely that smoke alarms/detectors provide the critical warning to occupants who are awake. As a consequence, when discussing smoke alarms, we should focus our attention on the types of fires where the smoke alarm can provide a crucial benefit to occupants not on all the types of fires that occur. The vast majority of fires where a smoke alarm/detector can help occupants are smoldering fires started when the victim is asleep.

> *Smoke detectors should be able to save at least 60% and possibly 75% of sleeping victims, but only 13% of victims who were awake.* (McGuire, J., Ruscoe, B., The Value of a Fire Detectors in the Home, Fire Study No. 9, National Research Council of Canada, Division of Building Research, Ottawa, Ont., Canada, December, 1962.)
> *"Delayed discovery, typically associated with fires that occur at night when everyone is asleep, also tends to be a characteristic of the smoldering fire caused by discarded smoking material. These smoldering fires are the leading causes of US fire fatalities and detectors are ideally designed to deal with them.* ("A Decade of Detectors", Fire Journal 09/85, John Hall - NFPA.)

2. In flaming fires the ionization alarm/detector is faster than the photoelectric by 30-50 seconds. This extra time is virtually irrelevant to alert occupants. For example, in the recent smoke alarm testing involving flaming cooking fires (<u>http://smokealarm.nist.gov/pdf_files/SmokeDetectors_Q&As_Feb2008.pdf</u>), which is the most common type of flaming fire, although the photo was 30-50 seconds slower than the ionization it still provided on average over 10 minutes warning. It has often been said that in a fire "seconds count." However it is hard to imagine a scenario were the extra seconds provided by the ionization in the most common type of flaming fires makes a difference for life safety, when the photoelectric is already providing on average over 10 minutes of Available Safe Egress Time. As a consequence, although photoelectric alarms/detectors respond later in flaming fires this is a quantitative as opposed to a qualitative advantage. Here are some quotes from researchers.

> *The advantage of ionization smoke detectors during flaming fires is only about a 15-20 second earlier warning. This margin will only be decisive for the loss of human life in extraordinary circumstances. In general the difference between the alarm times for the optical and the ionization detectors are reduced when the detection is made from an adjacent room. (*Meland, Oysten, and Lonuik, Lars, "Detection of Smoke - Full Scale Tests with Flaming and Smouldering Fires, "Fire Safety Science," - Proceedings of the Third International Symposium, July, 1991,)
> *Under the conditions of ignition from flames, the ionization chamber type detector exhibited a greater sensitivity to the smoke produced than the photoelectric system. However, the rate of generation of smoke was so great that the extra time given by*

*the ionization chamber as a result may be of little practical use. (*R., (Riley, K., and Rogers, S., "A Study of the Operation and Effectiveness of Fire Detectors Installed in the Bedrooms and Corridors of Residential Institutions", Fire Research Station, Fire Research Current Paper 26/78, Borehamwood, England, April 1978.)

3. In smoldering fires the photoelectric is faster than the ionization by 30 minutes or more. This extra time is critical for sleeping occupants. If the ionization was consistently providing adequate warning, it would not matter that it was slower than the photoelectric. Unfortunately it doesn't. According to NIST's testimony to the Boston City Council), *"ionization alarms may not always alarm even when a room is filled with smoke from a smoldering fire."* In addition, according to data collected by NIST Report during smoldering fires the ionization smoke alarm often provided less than 1-2 minutes of Available Safe Egress Time. (1-2 minutes is the minimum time needed for sleeping occupants to escape.) In fact the ionization, in many cases, was providing negative available safe egress time. (http://smokealarm.nist.gov/pdf_files/StatementfortheRecordWG1finalsmokealarmstatement.pdf

This finding has been noted by many other researchers.

*Ionization chamber type detectors, in the room of origin and the corridor, did not, in the smoldering fire tests, provide adequate warning that the escape route was impassable or that conditions in the room were potentially hazardous to life. (*R., Riley, K., and Rogers, etc.)

"This test will show that most photoelectric detectors, operated by battery will detect smoke at about 1.5-3% smoke, which is good. The test will show that the photoelectric detectors operated by household current will activate between 2 and 4 %, which is still good. But, the test also will show that many ionization detectors will not activate until the smoke obscuration reaches 10-20 and sometimes 25%. … Therefore, because of the present state of the art in detecting smoke, the Subcommittee on Smoke Detectors can take no other course but to recommend the installation of photoelectric detectors." ("Residential Smoke Alarm Report - Prepared by Special Automatic Detection Committee of the International Association of Fire Chiefs," The International Fire Chief, September 1980.)

The tests i.e. the CALCHIEFS Tests, being commented upon in the previous quote were conducted by the Los Angeles Fire Dept. They concluded that photoelectrics were the preferred smoke alarm for all hallways and bedrooms. ("An Evaluation of Fire Detectors for Residential Placement," Los Angeles City Fire Dept., Fire Prevention Bureau – Research Unit, August 1981.)

"Photoelectric detectors sighted in the hallway are more effective for detecting smoldering smoke than ionization detectors, providing adequate escape time for most conditions of size and location of the smoke sources. Ionization detectors sited in the hallway generally provide inadequate escape times unless smoke movement into the hallway is slowed down by narrow door openings, causing a slower loss of visibility, or unless they are sited close to the smoke source." (P.F. Johnson and S. K. Brown, "Smoke Detection of Smoldering Fires in a Typical Melbourne Dwelling," *Fire Technology,* Vol. 22, No. 4, 1986, pp. 295-340.)

"The ionization detectors detected smoke from a smoldering fire much later than optical (photoelectric) detectors. When the particular conditions during the fire development are taken into consideration there are reasons to indicate that this detection principle would not provide adequate safety during this type of fire". (Meland, Oysten, and Lonuik, Lars, "Detection of Smoke - Full Scale Tests with Flaming and Smouldering Fires, "Fire Safety Science," - Proceedings of the Third International Symposium, July, 1991, pp. 975-984.)

4. In addition to being inadequate at providing adequate warning in smoldering fires, several researchers have identified that the ionization smoke alarm is far more susceptible to disablement due to nuisance alarms than is the photoelectric. Here are some quotes from the recent NIST Smoke Alarm Report. http://smokealarm.nist.gov/

Additionally a separate study of nuisance alarm sources was conducted because this was identified as an important issue in a prior study by the U.S. Consumer Product Safety Commission. It was observed that ionization alarms had a propensity to alarm when exposed to nuisance aerosols produced in the early stages of some cooking activities, prior to noticeable smoke production. This phenomenon could be particularly vexing to homeowners who experience such nuisance alarms. … While one third of the smoke detectors did not work on the initial test, half of these were made operational by restoring power. Homeowners interviewed revealed that most of these were intentionally disconnected due to nuisance alarms, mostly from cooking.

For the Toasting Scenario the ionization located near the kitchen responded in about 130-150 seconds. The photoelectric responded in 225-300. In fact according to NIST, *"Photoelectric alarm thresholds were met only after item started to char and produce visible smoke."* So although both responded, it is much more likely that the ionization will repeatedly respond to most normal toasting and be more likely to be disabled..

Here are some recent quotes by other researchers on nuisance alarms.

*"Homes with ionization alarms had more than 8 times the rate of false alarms as those with photoelectric. In small rural residences, photoelectric smoke alarms have lower rates of false alarms and disconnections." (*Perkins, M., "Ionization and photoelectric smoke alarms in rural Alaskan homes," Western Journal of Medicine, 2000;173:89-92 (Contact: Alaska Injury Prevention Center, Anchorage, AK.))

*"We favor photoelectric detectors to reduce rates of nuisance alarms from cooking and to provide optimal protection from cigarette related fires." (*Kuklinski, D., Berger, L., Weaver, J., "Smoke detector Nuisance Alarms: A Field Study in a Native American Community," NFPA Journal; Sept/Oct. 1995.)

*"On direct observation at first follow-up, ionization study alarms were more likely to be non-functional, 20% ionization vs. 5% photoelectric, with the most common reason being a disconnected or absent battery." (*Mueller, B., et al, "Randomized controlled trial of ionization and photoelectric smoke alarm functionality," Injury Prevention, 2008; 14:80-86.)

Even smoke alarm manufacturers are aware of the benefits of photoelectric technology. (They just do a very poor job of communicating this to consumers.)

*"The optical smoke alarm therefore is less likely to react to the results of cooking and this makes it far more suitable for installation near kitchens or in confined spaces such as bed sits. The slight price differential between the two types of alarms can be balanced out by the elimination of false alarms being triggered by nearby kitchens and bathrooms." "*Domestic smoke alarms – a guide for specifiers," Bendall, D. (BFK Brands Europe), Fire Prevention 281 July/August 1995.

"Never install ionization smoke alarms in areas where cooking fumes, open fires and products of combustion are present. Where these conditions occur and a smoke alarm must be installed, a photoelectric alarm is the best option." http://www.kidde.com.au/utcfs/kid/How+Smoke+Alarms+Work.html

5. Combination alarms/detectors have the potential to provide the quickest response to both smoldering and flaming fires but due to the excessive nuisance alarms from the ionization part of the alarm/detector, they should not be allowed near kitchens and bathrooms. In addition, the minor advantage that ionization or combination have over photoelectric in flaming fires is marginal and probably not critical.

   To quote a study (Mueller et al) cited earlier, *"An alarm containing both technologies is more expensive; it may also be more likely rendered non-functional if either technology causes frequent nuisance alarms. Our results suggest that installing photoelectric alarms on main floors of homes similar to those in our study may increase the proportion of functioning alarms and therefore provided longer term protection,"*

   Other items to consider:

   I am not aware of any "wireless alarms" that come as combination (photo/ion).

   Both ion and photo are sold with 10 year batteries. Are Combination (ion/photo)?

   Combination CO/Smoke come with CO/Ion or CO/Photo. Is there a Combo Smoke Alarm/CO?

   Why require dual in sprinkled occupancies when, according to the USFA, the only type of fire that can kill someone is a smoldering fire? "*Even though fire sprinklers are effective life safety devices you still need smoke alarms. Some fires can begin as smoldering fires that produce smoke and gases but don't generate enough heat to activate the sprinklers. Smoke alarms are needed to provide warning for these situations."* (http://www.usfa.dhs.gov/citizens/all_citizens/home_fire_prev/manufactured/sprinklers-mh.shtm*)*

6. I would like to mention that based on this research the Australasian Fire Authorities Council has recommended the use of photoelectric smoke alarms as opposed to ionization or combination.

   http://www.afac.com.au/__data/assets/pdf_file/0020/3674/AFACSmokeAlarmposition1June2006.pdf

7. Precedents for this action.

   a. Since 1998 the Massachusetts State Building Code has mandated photoelectric smoke alarm within 20 feet of a kitchen or bathroom due to the propensity of ionization smoke alarms to experience nuisance alarms.
   b. Since 2002 **NFPA 72 (the National Fire Alarm Code)** has only allowed ionization smoke alarms near kitchens if they were equipped with a silence button. The NFPA 72 committee has finally recognized the advantage that photoelectric smoke alarms have in regards to nuisance alarms. However I take exception to their assumption that a "hush button" neutralizes the ionizations propensity for nuisance alarms. No study has shown these to be effective at reducing disablement of ionization alarms. http://www.nfpa.org/assets/files/PDF/ROP/72-A2009-ROC.pdf (Page 72-249)
   c. **New Vermont Law** – Photoelectric-only type of smoke alarms are required to be installed in the vicinity of any bedrooms and on each level of a dwelling, for all new dwellings and dwellings that are sold or transferred, beginning January 1, 2009. http://www.dps.state.vt.us/fire/heating/photoelectric.html
   d. **Massachusetts has voted to Change the State Fire Code** so that as of January 1, 2010, smoke alarms with only ionization technology will not be allowed to meet the code. http://www.realtown.com/massachusettsrealestate/blog/massachusetts-smoke-detector-laws-changing
   e. **The 7th Edition of the Massachusetts State Building Code** was updated so that as of January 1, 2008 smoke alarms with only ionization technology will not be allowed to meet the code. http://www.ludlow.ma.us/building/permit_applications/life-safety-systems-app.pdf

Bibliography – In addition to references cited above, the following will be provided to the committee.
1. Fleming, J., *"Photoelectric vs. Ionization Detectors - A Review of the Literature,"*NFPRF Fire Suppression and Detection Research Symposium, Orlando, FL, 2/98.
2. Fleming, J., *"Photoelectric vs. Ionization Detectors - A Review of the Literature, Revisited,"* (NFPRF Fire Suppression and Detection Research Symposium, Orlando, FL, 01/05. This presentation included analyses of: 1) 30 years of smoke detector studies, 2) the National Institute of Standards Smoke Detector Project, 3) statistic regarding the effectiveness of smoke detectors, ands 4) the effectiveness of Underwriter's Labs Smoke Detector Approval Standard, UL217.)
3. Fleming, J., *"Smoke Detectors and the Investigation of Fatal Fires,"* Published in May 2000 issue of "Fire & Arson Investigator", the official magazine of International Association of Arson Investigators. (Also published on Interfire.org, an Arson Resource Website – posted 02/01.)

Reason: (DeCrane) I do not want to get into me too testimony, even during the reason statement, and my colleague Joseph Fleming from the Boston Fire Department has written an extensive Reason Statement. This will make it difficult to go in depth referencing various reports as Chief Fleming has provided the technical substantiation for this code change.

As a representative of the International Association of Fire Fighters (IAFF), I represent the professional fire fighters of North America. At the IAFF's most recent convention, the Union representatives of over 280,000 professional fire fighters across the United States and Canada, with representatives from the United Kingdom, Australia and New Zealand, voted unanimously to support he requirement of photoelectric smoke detectors.

The representatives, of those who respond to difficult fire scenes involving thousands of fatalities, have determined it is time to move forward with the requirement of photoelectric smoke detectors. Countless times our members have responded to residential fires and removed victims who had disabled their detectors due to nuisance alarms. Tragically many of these families forgot to replace the batteries or reinstall the hard wire detector when they were finished cooking. Unfortunately in many incidents these occupants, or a loved one, ended up paying the ultimate price for their forgetfulness, or some may argue, the lack of the detector industry addressing the problem.

On behalf of the nation's professional fire fighters we request your support for this code change.

Cost Impact: (**Fleming)** The code change proposal will not increase construction costs in any meaningful manner. The cost difference between ionization and photoelectric is minimal, particularly when one considers the benefit.

Cost Impact: (DeCrane) The code change proposal will minimally increase construction costs.

ICCFILENAME: FLEMING-DECRANE-F1-907.2.11

Public Hearing Results

PART II- IRC B/E
Committee Action: Disapproved

Committee Reason: The proposed language would only permit the photoelectric type. This change would exclude other types and would limit future technology.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Joseph Fleming, Deputy Chief, Boston Fire Department, representing The Boston, MA Fire Department, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:
R314.1 Smoke detection and notification. All smoke alarms ~~installed to meet the requirements of this code shall be~~ ~~the photoelectric type and~~ shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72. New installations of smoke alarms shall not rely solely on ionization technology to detect a fire.

Any smoke alarm newly installed within 20 feet of a kitchen or bathroom cannot include ionization technology even if used in combination with other detection technology

Commenter's Reason: See F112-09/10, Part I

Public Comment 2:

Marcelo M. Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R314.1 Smoke detection and notification. All smoke alarms ~~installed to meet the requirements of this code shall be~~ ~~the photoelectric type and~~ shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72. New installations of smoke alarms shall not rely solely on ionization technology to detect a fire.

Commenter's Reason: See F112-09/10, Part I

Final Action: AS AM AMPC____ D

F113-09/10
907.2.11.2 (IBC [F] 907.2.11.2)

Proposed Change as Submitted

Proponent: Rick Sheets, Fire Committee Chair, Brinks Home Security, representing National Burglar and Fire Alarm Association

Revise as follows:

907.2.11.2 (IBC [F] 907.2.11.1) Groups R-2, R-3, R-4 and I-1. Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of *occupant load* at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.

~~**Exception:** Single- or multiple-station smoke alarms in Group I-1 shall not be required where smoke detectors are provided in the sleeping rooms as part of an automatic smoke detection system.~~

3. In each *story* within *a dwelling unit,* including basements but not including crawl spaces and uninhabitable *attics.* In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm <u>or smoke detector</u> installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

   <u>**Exception:** Single- or multiple-station smoke alarms in Groups R-2, R-3, R-4, and I-1 shall not be required where smoke detectors are part of an automatic smoke detection system and installed in all the locations required by Section 907.2.11.2.</u>

Reason: There is no logical reason that these other groups (R-2, R-3, R-4) should be discouraged from installing superior fire alarm and detection systems. Professional protection using system-type smoke detection, with all its associated technological features, should be allowed for all similar occupancies, not just I-1. Chapter one of this code at 104.09 states that equal or superior alternate methods are allowed.

Cost Impact: The code change proposal will not increase the cost of construction. (No increase is required, but the change allows for optional protection at additional costs.)

ICCFILENAME: SHEETS-F7-907.2.11.2.DOC

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved with concern that connection to the main fire alarm occupant notification system may create many unnecessary alarms throughout the building. These unnecessary alarms would result in occupants not reacting appropriately in a situation where evacuation is necessary.

Assembly Action: **-None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Sheets, SET National Burglar and Fire Alarm Association, requests Approval as Submitted.

Commenter's Reason: Stating that unnecessary alarms would be created by using system smoke detectors insinuates that a poor design of the smoke detection system was installed. These devices can also be programmed to only sound in the detector and annunciate a constantly attended location without sounding the entire building alarm.

Final Action: AS AM AMPC____ D

F116-09/10, Part I
907.2.12 (New) [IBC [F] 907.2.12 (New)], 4603.8 (New)

<u>Proposed Change as Submitted</u>

Proponent: David Fredrick Scarelli representing DBA-Sentry Signal Company

PART I – IFC

Add new text as follows:

<u>**907.2.12 (IBC [F] 907.2.12) Line type heat detection.** A line type heat detection system that activates at 475°F (246°C) shall be installed in Group R Occupancies in accordance with Sections 907.2.12.1 through 907.2.12.2, NFPA 72, NFPA 70 and manufacturer's instructions.</u>

<u>**907.2.12.1 (IBC [F] 907.2.12.1) Location.** A line type heat detection shall be installed in the following locations:</u>

1. Above all NM-B Cable
2. Above all electrical boxes
3. Above or near all raceways.

907.2.12.2 (IBC [F] 907.2.12.2) Interconnection. The line type heat detection system shall be interconnected with the smoke alarms required by Section 907.2.11 in such a manner that when the line type heat detection activates such detection shall activate the smoke alarms in all sleeping units and dwelling units.

4603.8 Line type heat detection. A line type heat detection that activates at 475° F (246°C) shall be installed in existing Group R Occupancies in accordance with Sections 4603.8.1 through 4603.8.2, NFPA 72, NFPA 70 and manufacturer's instructions.

4603.8.1 Location. Line type heat detection shall be installed in the following locations:

1. Above all exposed NM-B Cable
2. Above all electrical boxes
3. Above or near all raceways.

4603.8.2 Interconnection. The line type heat detection system shall be interconnected with the smoke alarms required by Section 907.2.11 in such a manner that when the line type heat detection activates such detection shall activate the smoke alarms in all sleeping and dwelling units.

Reason: According to death certificate data, 25% of fire and flame deaths in 2002 were due to smoke inhalation alone, 26% due to burns and 21% to a combination of burns and smoke inhalation. There were 517,000 structural, 3,140 civilian deaths and 17,730 civilian induries. *(page 37).

ESCAPING – all seemed savable …; SLEEPING – 1/3 estimated as savable; RESCUING OR FIREFIGHTING – ¾ estimated savable … **Reanalysis of who can be saved.** (see additional data attached)

Deterioration of electrical wiring caused by time or the environment is a predominant cause of ignition. *+ (pg. 24)

Fires in electrical distribution systems contribute significantly to the U.S. fire problem, accounting for a consistent portion of the problem year after year. *+ (page 69)

In 2006 an estimated 71,360 injuries involving electrical distribution or lighting equipment were reported to hospital emergency rooms. +

Electrical distributions and lighting equipment dwelling fires are the only type of home fires that have been shown to increase in frequency with increasing dwelling age. *+

The majority of 2002-2005 non-confined home structure fires involving electrical distribution or lighting equipment began with the ignition of products and materials often found in structural areas, including wire or cable insulation (30%), structural members or framing (12%), insulation within the structural area (5%). Pg 6#

Three-fourths (75%) of deaths in 2002-2005 home fires involving electrical distribution or lighting equipment involved victims who were outside the area of origin when the fire began. (pg 6#)

Branch circuit wiring (51%) accounted for half of the 2002-2005 non-confined home structure fires involving wiring. (pg 54 #)

Half (52%) of 2002-2005 non-confined home structure fires involving wiring began in fire areas of origin that are all concealed or exterior spaces. (pg 55 #)

The majority (57%) of 2002-2005 non-confined home structure fires involving overcurrent protection devices began with ignition wire or cable insulation. (pg 89#)

SUMMARY: Electrical distribution equipment is a highly significant contributor to the high number of civilian deaths and civilian injuries resulting year after year in home fires. Many lives can be saved and injuries prevented if earlier warning can be sounded.

CONCLUSION: The line type open switch activated by heat and/or fire is designed by earliest warning to prevent death by asphyxiation and burning.

(6b) Circuitry short circuits and overloads trip the circuit breakers when the breaker rating is reached. Lower leakage causes hot spots along the line and eventually causes fires that could be detected long before they could become autocatalytic. The line type open switch is designed to detect this hazard long before life is endangered.

Bibliography

\+ Characteristics of Home Fire Victims, NFPA, Fire analysis and Research Division. July, 2005. Pg. 59, John R. Hall Jr.

** How Many People Can be Saved From Home Fires if Given More Time to Escape? Fire Technology, 40. Pgs 117-126, 2004: John R. Hall Jr. Fire Analysis and Research Division, NFPA

\+ Statistics from National Electronic Injury Surveillance System (NEISS). Data obtained from the U.S. Consumer Product Safety Commission (CPSC) website, www.cpsc.gov

*+ Linda E. Smith and Dennis McCoskrie, "What Causes Wiring Fires in Residences?" Fire Journal, Jan/Feb 1990. Volume 84, Number 1

\# "Home Structure Fires Involving Electrical Distribution and Lighting Equpment." John R. Hall, Jr., Fire Analysis and Research Division, NFPA, March 2008.

Cost Impact: This code change proposal will increase the cost of construction.

ICCFILENAME: SCARELLI F1-907.2.12.DOC

Public Hearing Results

PART I- IFC
Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal as the requirements seemed difficult to enforce and unnecessary. More specifically, the hazards that the proponent is concerned with are already addressed with the reference to the National Electrical Code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David F. Scarelli representing Sentry Signal Company, requests Approval as Submitted.

Commenter's Reason: The line type heat sensor should not be any more difficult to enforce than any other Fire Code. It is a life saving factor at the point and time of origin. The NEC does not cover the wall and ceiling enclosures with a heat sensing device. The wood destructively distillates inflammable gasses. When the gasses coalesce with air it becomes an inflammable mixture. Only a spark is required to burst the dwelling into flames capturing and possibly asphyxiating the occupants.

The NEC covers the living sections of a dwelling with heat and smoke sensors. It covers circuit overload with arc-fault circuit –interrupters. None of these systems quickly intercept lightning strikes, grass fires (fires from outside the structure), chimney faults, etc. The line type heat sensor (Line type open switch which closes when heat activated or contact by flame.

NOTE: The NEC strives to minimize fires while the Line Type Heat Sensor- (Line Type Open Switch)- strives to minimize deaths and injuries. Future technical innovations will continue to minimize both.

References:

Science fair project on fires -Does wood Burn? http://www.madsci.org/posts/archives/2000-03/953740466.Ch.r.html

Why does smoke come from fire? http://www.howstuffworks.com/question43.htm

Couple Died on anniversary, Democrat and Chronicle, August 7, 2007– http://www.DemocratandChronicle.com

House Burns; Four are Safe, Democrat and Chronicle, August 4, 2007 http://www.DemocratandChronicle.com

Students Death ruled Accidental , Democrat and Chronicle, August 14, 2007 http://www.DemocratandChronicle.com

New Hampshire Title XII Public Safety and Welfare Chapter 155-A New Hampshire Building Code http://www.gencourt.state.nh.us/rsa/html/xii/155-A/155-A-mrg.htm

Chapter XI Fire Prevention Code – NJ (Oakland Borough) http://70.168.205.112/oakland_nj/lpext.dll/Infobase/oaklandc11.htm?fn=document-frame.htm&f=templates&2.0

Memo Adoption of IBC and IFC from CA State Fire Marshal, July 12, 2005 (see second paragraph)
http://www.osfm.fire.ca.gov/codedevelopment/pdf/codeadoption/Code%20Adoption%20History/adpotionofibcandifc.pdf

Final Action: AS AM AMPC____ D

F116-09/10, Part II

IRC R314.5 (New), R314.5.1(New), R314.5.2 (New), R314.5.3 (New)

Proposed Change as Submitted

Proponent: David Fredrick Scarelli representing DBA-Sentry Signal Company

PART II – IRC

Add new text as follows:

R314.5 Line type heat detection. A line type heat detection system that activates at 475°F(246°C) shall be installed in accordance with Sections 314.5.1 through 314.5.2, NFPA 72, NFPA 70 and manufacturer's instructions.

R314.5.1 Location. Line type heat detection shall be installed in the following locations:

1. Above all NM-B Cable
2. Above all electrical boxes
3. Above or near all raceways.

R314.5.2 Interconnection. The line type heat detection system shall be interconnected with the smoke alarms in such a manner that when the line type heat detection activates such detection shall activate all of the alarms in the dwelling unit. Where there are two dwelling units the line type heat detection shall be interconnected with the smoke alarms in both dwelling units.

Reason: According to death certificate data, 25% of fire and flame deaths in 2002 were due to smoke inhalation alone, 26% due to burns and 21% to a combination of burns and smoke inhalation. There were 517,000 structural, 3,140 civilian deaths and 17,730 civilian induries. *(page 37).

ESCAPING – all seemed savable …; SLEEPING – 1/3 estimated as savable; RESCUING OR FIREFIGHTING – ¾ estimated savable … Reanalysis of who can be saved.** (see additional data attached)

Deterioration of electrical wiring caused by time or the environment is a predominant cause of ignition. *+ (pg. 24)

Fires in electrical distribution systems contribute significantly to the U.S. fire problem, accounting for a consistent portion of the problem year after year. *+ (page 69)

In 2006 an estimated 71,360 injuries involving electrical distribution or lighting equipment were reported to hospital emergency rooms. +

Electrical distributions and lighting equipment dwelling fires are the only type of home fires that have been shown to increase in frequency with increasing dwelling age. *+

The majority of 2002-2005 non-confined home structure fires involving electrical distribution or lighting equipment began with the ignition of products and materials often found in structural areas, including wire or cable insulation (30%), structural members or framing (12%), insulation within the structural area (5%). Pg 6#

Three-fourths (75%) of deaths in 2002-2005 home fires involving electrical distribution or lighting equipment involved victims who were outside the area of origin when the fire began. (pg 6#)

Branch circuit wiring (51%) accounted for half of the 2002-2005 non-confined home structure fires involving wiring. (pg 54 #)

Half (52%) of 2002-2005 non-confined home structure fires involving wiring began in fire areas of origin that are all concealed or exterior spaces. (pg 55 #)

The majority (57%) of 2002-2005 non-confined home structure fires involving overcurrent protection devices began with ignition wire or cable insulation. (pg 89#)

SUMMARY: Electrical distribution equipment is a highly significant contributor to the high number of civilian deaths and civilian injuries resulting year after year in home fires. Many lives can be saved and injuries prevented if earlier warning can be sounded.

CONCLUSION: The line type open switch activated by heat and/or fire is designed by earliest warning to prevent death by asphyxiation and burning.

(6b) Circuitry short circuits and overloads trip the circuit breakers when the breaker rating is reached. Lower leakage causes hot spots along the line and eventually causes fires that could be detected long before they could become autocatalytic. The line type open switch is designed to detect this hazard long before life is endangered.

Bibliography

+ Characteristics of Home Fire Victims, NFPA, Fire analysis and Research Division. July, 2005. Pg. 59, John R. Hall Jr.

** How Many People Can be Saved From Home Fires if Given More Time to Escape? Fire Technology, 40. Pgs 117-126, 2004: John R. Hall Jr. Fire Analysis and Research Division, NFPA

+ Statistics from National Electronic Injury Surveillance System (NEISS). Data obtained from the U.S. Consumer Product Safety Commission (CPSC) website, www.cpsc.gov

*+ Linda E. Smith and Dennis McCoskrie, "What Causes Wiring Fires in Residences?" Fire Journal, Jan/Feb 1990. Volume 84, Number 1

"Home Structure Fires Involving Electrical Distribution and Lighting Equpment." John R. Hall, Jr., Fire Analysis and Research Division, NFPA, March 2008.

Cost Impact: This code change proposal will increase the cost of construction.

ICCFILENAME: SCARELLI F1-907.2.12.DOC

Public Hearing Results

PART II- IRC B/E
Committee Action: **Disapproved**

Committee Reason: The electrical portion of the code already provides for protection with the arc-fault circuit-interrupter. There was no documentation provided that a product exists that will provide activation at 475°F.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David F. Scarelli representing Sentry Signal Company, requests Approval as Submitted.

Commenter's Reason: The arc-fault circuit-interrupter distinguishes the difference between electronic wave patterns of naturally occurring sparks produced by light switches turning on/off and household appliances. When sparking of unknown origin is sensed the circuit is interrupted.

WOOD DOES NOT BURN!! It destructively distillates!!! A fault which does not spark, produces a combustible gas. When the gas mixes with oxygen it becomes inflammable. It travels throughout the walls and ceiling/floor spaces. When it is sparked it ignites explosively trapping the occupants that it surrounds. The line type heat sensor is the only available product that can be strung within the wall and ceiling/floor cavities which can detect hot spots and flame at their place of origin and sound the alarm to alert unsuspecting possible victims to avoid them of horrid death or injury.

The arc-fault circuit-interrupter will reduce detectable fire instances while the line type heat sensor will protect life both human and animal.

The NEC protects against the occurrence of fire while the line type heat sensor protects against loss of life and injury due to the fire itself.

Together, both the NEC and the line type heat sensor through technological innovations will more closely close the gap between death/injuries caused by fires by reducing the conditions which cause them and providing early warning alarms where they were not avoided.

Under-writers Laboratories lists three manufacturers that produce a line type heat sensor which are activated at 475F.

The line type heat sensor in question here was tested and approved May 19, 1999 in their LAB 417 ENG 8475096244. File S7229 Vol. 1 App. B was issued 5-14-99. It is documented at 455-485F.

References:

File S7229 Project 97NK41991 Report Appendix A, B and C, Underwriters Laboratory 1999

Science fair project on fires -Does wood Burn? http://www.madsci.org/posts/archives/2000-03/953740466.Ch.r.html

Why does smoke come from fire? http://www.howstuffworks.com/question43.htm

Preventing deaths and Injuries of Fire Fighters Working Above Fire-Damaged Floors(NIOSH) http://www.cdc.gov/niosh/docs/wp-solutions/2009-114/

What is an AFCI? http://www.afcisafety.org/qa.html

The Arc Fault Circuit Interrupter, John Pfeiffer, Pfeiffer Engineering http://www.pfeiffereng.com/The%20Arc%20Fault%20Circuit%20Interrupter.pdf

Research aims to reduce damage in home fires http://www.engr.wisc.edu/cee/newsletter/2001_spring/drywall.html

Consumer product safety Commission, Preventing Home Fires: Arc Fault Circuit Interrupters (AFCIs) http://www.cpsc.gov/cpscpub/pubs/afci.html

Couple Died on anniversary,Democrat and Chronicle, August 7, 2007– http://www.DemocratandChronicle.com

House Burns Four are Safe ,Democrat and Chronicle, August 4, 2007 http://www.DemocratandChronicle.com

Students Death ruled Accidental ,Democrat and Chronicle, August 14, 2007 http://www.DemocratandChronicle.com

Smoke Detector and Arc Fault Circuit Interrupter Requirements and Frequently Asked Questions (Washington, North Carolina) http://www.ci.washington.nc.us/planning/planning_smokedetector.aspx

NEMA AFCISafety.org – What is an AFCI (Q&A) http://www.afcisafety.org/qa.html

Final Action: AS AM AMPC____ D

F120-09/10, Part I
907.2.13.1.2 (IBC [F] 907.2.13.1.2)

Proposed Change as Submitted

Proponent: Dave Frable, U.S. General Services Administration

PART I – IFC

Revise as follows:

907.2.13.1.2 (IBC [F] 907.2.13.1.2) Duct smoke detection. Duct smoke detectors complying with Section 907.3.1 shall be located as follows:

1. In the main supply air duct of each air-handling system having a design capacity greater than 2,000 cubic feet per minute (cfm) (0.94 m^3/s), downstream of any filters.
2. ~~1.~~ 2. In the main return ~~air and exhaust air plenum~~ of each air-~~conditioning~~ handling system having a design capacity greater than ~~2,000~~ 15,000 cubic feet per minute (cfm) ~~(0.94 m^3/s)~~(7.1 m^3/s). Such detectors shall be located in a serviceable area downstream of the last duct inlet.
3. In the supply air system where multiple air-handling systems share common or supply return air ducts or plenums with a combined design capacity greater than 2,000 cfm (0.9 m^3/s),
4. At each story in return air systems having a design capacity greater than 15,000 cfm (7.1 m^3/s), where return air risers serve two or more stories.
5. ~~2.~~ 5. At each connection to a vertical duct or riser serving two or more stories from a return air duct or plenum of an air-conditioning system with a design capacity of greater than 15,000 cfm (7.1 m^3/s). In Group R-1 and R-2 occupancies a listed smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m^3/s) and serving not more than 10 air inlet openings.

   Exception: Smoke detectors are not required in the return air system where all portions of the building served by the air distribution system are protected by area smoke detectors connected to a fire alarm system in accordance with the *International Fire Code*.

Reason: The intent of this proposal is to improve the level of detection of smoke within air handling units cost effectively and to correlate smoke detector requirements in air handling systems in the IBC, IFC and IMC with the requirements currently found in NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*.

During the 2006/2007 ICC Code Development Hearings in Orlando, both the Fire Code Committee and Mechanical Code Committee recommended approval of two similar code change proposals (F113-06/07 – Part 1& Part 2). However, at the Final Action Hearings of the ICC in May 2007, the ICC membership voted to overturn both the Fire Code Committee and the Mechanical Code Committee's recommendations and disapproved the subject code change proposals. At the hearings, no new information or technical substantiation was brought forth to substantiate overturning the two Code Committee's recommendations for approval. It should be emphasized that the main issue of contention by the opponents of this code change proposal at both the Code Committee and Final Action Hearings was that this issue had been debated many times before in the ICC Code Development Process. However, that is untrue. During the 2009 Code Hearings in Minneapolis, the only mention of this occurring was in the Commonwealth of Virginia's Mechanical Code over 10 years ago.

The technical substantiation to revise the location of smoke detectors from the return air side to the supply air side is valid; and will improve the level of detection of smoke within air-handling units. Opponents may argue that return air detectors will detect fires in a building much quicker than detectors located on the supply air side, but return air detectors are **not** a substitute for area detectors. If there is a desire for early detection of smoke, area smoke detectors should be installed. However, we contend that the detector serving the supply air detector will operate as desired once the smoke concentration levels in the supply air exceeds the alarm threshold so occupants should not be at risk should the return air fan continues to run prior to the supply air fan shutting down. In addition, return air detectors will not be able to detect smoke from a fire on the supply side of air handling units due to fan belts, motors or combustible filters so their respective fan will shut off appropriately. A smoke detector located on the supply side can also detect smoke from an exterior fire that gets pulled into the fresh air intake for the air handling system. Thus, a smoke detector located on the supply side will serve the purpose of protecting building occupants from smoke produced by air handling unit fire or smoke ingress via the fresh air intake for the air handling unit. Therefore overall detection is improved.

Correlating the IFC, IBC and IMC with NFPA 90A is also important as many jurisdictions adopt both the IFC/IMC and NFPA 90A. Accredited health care organizations are required by law to comply with NFPA 90A. Not having the subject requirements in the IBC in concert with NFPA 90A results in the unnecessary installation of smoke detectors in both the return and supply air systems. This code change proposal aims to maintain detection in air handling systems, not remove it. There should be no increase in installation costs as this code change proposal merely shifts the location of devices from the return air side to the supply air side, where air handling units are greater than 2000 cfm. In fact, changing the requirement as proposed will reduce the cost in jurisdictions that must comply with the IFC/IMC and NFPA 90A (i.e., leaving the requirements as currently stated in both the IFC and IMC already results in unnecessary additional costs).

Specific code changes are as follows:

PART I:
(New) IFC 907.2.13.1.2, paragraph 1
Over the past few years, the U.S. General Services Administration has had a number of fire incidences that did not activate the building fire alarm system because there were no smoke detectors installed in the main supply air duct of the air-handling system downstream of any filter.

Conversely, GSA has no incidence of a return air duct smoke detector activating as a result of detecting smoke in the return air handling system. Installing duct smoke detectors in the supply air system would ensure that a fire within the supply air filters, in the air handling motors or originating outside near air intakes can be discovered before it spreads. Establishing a 2,000 cfm threshold for installing detectors in supply air fans appears to be an industry standard.

(New) 907.2.13.1.2, paragraphs 2 & 3 (Note: the intent is for 907.2.13.1.2 to be have similar language as 606.2.2 and 606.2.3 so the codes are coordinated). The current requirement for installing duct smoke detectors in return air systems exceeding 2,000 cfm is overly restrictive. The 15,000 cfm threshold for return air systems appears to be an industry standard, as this capacity was used in the legacy codes and is currently used by NFPA 90A. The term “air conditioning system” has been replaced with “air handling system to more accurately reflect the type of system used in buildings today.

(Deleted text) Per the commentary for Section 606.1, requiring duct smoke detectors in exhaust air plenums does not provide any protection for the fan or the building occupants, since smoke is being exhausted out of the building. In addition, return air smoke detection is not supposed to be used as a means for detecting smoke in buildings.

(New) IFC 907.2.13.1.2, paragraph 4 is material extracted from IMC existing 606.2.3 (changed to 606.2.4). This is an editorial change to coordinate the two codes.

(Revision) 907.2.13.1.2 Paragraph No. 5 (formally Paragraph No. 2) – The purpose of this code change is to correlate this paragraph with the changes above. The code language contained in the IBC does not have a capacity threshold for return air ducts/plenum with connections to more than two stories and, therefore, all return duct/plenum system that connects more than two floors would require duct mounted smoke detectors at the connection to the riser regardless of the size of the system. This would be onerous to smaller buildings that have multi-story returns. In addition, no other code (either the legacy codes or NFPA 90A require duct smoke detectors in multi-story return air systems unless they exceed 15,000 cfm. This change also would correlate the capacity requirements currently specified in NFPA 90A - 2007 edition (NFPA 90A – 6.4.2).

(New) Exception to IFC 907.2.13.1.2 (2) through (5) is material extracted from the IMC existing exception to 606.2.1 (changed to 606.2.2) that eliminates the need for duct smoke detectors in return air systems when the entire building is protected by area smoke detectors.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FRABLE-F1-907.2.13.1.2.DOC

Public Hearing Results

PART I- IFC
Committee Action: Approved as Modified

Modify the proposal as follows:

907.2.13.1.2 (IBC [F] 907.2.13.1.2) Duct smoke detection. Duct smoke detectors complying with Section 907.3.1 shall be located as follows:

1. In the main supply air duct of each air-handling system having a design capacity greater than 2,000 cubic feet per minute (cfm) (0.94 m^3/s), downstream of any filters.
2. In the main return of each air handling system having a design capacity greater than 15,000 cubic feet per minute (cfm)(7.1 m^3/s). Such detectors shall be located in a serviceable area downstream of the last duct inlet.
3. In the supply air system where multiple air-handling systems share common or supply return air ducts or plenums with a combined design capacity greater than 2,000 cfm (0.9 m^3/s),
4. At each story in return air systems having a design capacity greater than 15,000 cfm (7.1 m^3/s), where return air risers serve two or more stories.
5. At each connection to a vertical duct or riser serving two or more stories from a return air duct or plenum of an air-~~conditioning~~ <u>handling</u> system with a design capacity of greater than 15,000 cfm (7.1 m^3/s). In Group R-1 and R-2 occupancies a listed smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m^3/s) and serving not more than 10 air inlet openings.

   Exception: Smoke detectors are not required in the return air system where all portions of the building served by the air distribution system are protected by area smoke detectors connected to a fire alarm system in accordance with the *International Fire Code*.

Committee Reason: The proposal was approved as it correlates with NFPA 90A and provides the detection on the supply side where it is most effective. The modification was simply to change the terminology from "air-conditioning" to "air handling" to be consistent with the intent and the wording throughout the proposed revisions.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace representing VPMIA/VBCOA, requests Disapproval.

Commenter's Reason: The purpose of this code section is to protect the people in the structure and to allow time for evacuation during a fire. The purpose is not to protect the equipment. If the detection takes place in the supply duct, the air being tested will have been filtered by the unit filters and diluted with the outside air introduced through the return, which will jeopardize the effectiveness of the smoke detector. The proponent indicated that area smoke detectors were the primary protection for the occupants, however they do not shut down the air distribution equipment, allowing any smoke developed to be distributed throughout the structure while people are trying to evacuate.

This proposed change has been submitted many times in the past, and has been defeated every time except this time. The difference between then and now is that only the IFC committee heard testimony for both parts. A lot of people in the mechanical community, including myself, was not even aware that this change to the IMC was being presented. In the past, the ICC membership having vested interest in the IMC was included in this discussion by being presented with either Part I or Part II of the proposed change. Not this time.

The intent of installing a smoke detector in an air handling unit is simple, prevent the passage of smoke from one space to another. By installing this smoke detector in the return air portion of the air handling unit, upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment, the smoke detector has a chance of doing what it is supposed to do. By installing the smoke detector as outlined in these proposed changes (Parts I and II), this will allow smoke that is being drawn into the return air system from one space to become diluted by filters, outdoor air, and decontamination equipment (not to mention that some is actually going to be exhausted to the exterior) prior to reaching the smoke detector and shutting down the air handling unit. This will allow smoke to be transferred from one space to another, effectively rendering a smoke detector operation ineffective.

Final Action: AS AM AMPC____ D

F120-09/10, Part II
IMC 606.2.1 (New), 606.2.2

<u>Proposed Change as Submitted</u>

Proponent: Dave Frable, U.S. General Services Administration

PART II – IMC

Revise as follows:

606.2 Where required. Smoke detectors shall be installed where indicated in Sections 606.2.1 through ~~606.2.3~~ <u>606.2.4</u>.

> **Exception:** Smoke detectors shall not be required where air distribution systems are incapable of spreading smoke beyond the enclosing walls, floors and ceilings of the room or space in which the smoke is generated.

<u>**606.2.1 Supply air systems.** Smoke detectors shall be installed in supply air systems with a design capacity greater than 2,000 cubic feet per minute (cfm) (0.94 m^3/s), in the supply air duct or plenum downstream of any filters</u>.

~~606.2.1~~ <u>606.2.2</u> Return air systems. Smoke detectors shall be installed in return air systems with a design capacity greater than ~~2,000~~ <u>15,000</u> cfm (~~0.9~~ <u>7.1</u>m^3/s), in the return air duct or plenum upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment and appliances.

> **Exception:** Smoke detectors are not required in the return air system where all portions of the building served by the air distribution system are protected by area smoke detectors connected to a fire alarm system in accordance with the *International Fire Code*. The area smoke detection system shall comply with Section 606.4.

~~606.2.2~~ <u>606.2.3</u> Common supply and return air systems. Where multiple air-handling systems share common supply or return air ducts or plenums with a combined design capacity greater than 2,000 cfm (0.9 m^3/s), the <u>supply</u> ~~return~~ air system shall be provided with smoke detectors in accordance with Section 606.2.1.

> ~~**Exception:** Individual smoke detectors shall not be required for each fan-powered terminal unit, provided that such units do not have an individual design capacity greater than 2,000 cfm (0.9 m^3/s) and will be shut down by activation of one of the following:~~
>
> ~~1. Smoke detectors required by Sections 606.2.1 and 606.2.3.~~
> ~~2. An approved area smoke detector system located in the return air plenum serving such units.~~
> ~~3. An area smoke detector system as prescribed in the exception to Section 606.2.1~~.

In all cases, the smoke detectors shall comply with Sections 606.4 and 606.4.1.

Reason: The intent of this proposal is to improve the level of detection of smoke within air handling units cost effectively and to correlate smoke detector requirements in air handling systems in the IBC, IFC and IMC with the requirements currently found in NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*.

During the 2006/2007 ICC Code Development Hearings in Orlando, both the Fire Code Committee and Mechanical Code Committee recommended approval of two similar code change proposals (F113-06/07 – Part 1& Part 2). However, at the Final Action Hearings of the ICC in May 2007, the ICC membership voted to overturn both the Fire Code Committee and the Mechanical Code Committee's recommendations and disapproved the subject code change proposals. At the hearings, no new information or technical substantiation was brought forth to substantiate overturning the two Code Committee's recommendations for approval. It should be emphasized that the main issue of contention by the opponents of this code change proposal at both the Code Committee and Final Action Hearings was that this issue had been debated many times before in the ICC Code Development Process. However, that is untrue. During the 2009 Code Hearings in Minneapolis, the only mention of this occurring was in the Commonwealth of Virginia's Mechanical Code over 10 years ago.

The technical substantiation to revise the location of smoke detectors from the return air side to the supply air side is valid; and will improve the level of detection of smoke within air-handling units. Opponents may argue that return air detectors will detect fires in a building much quicker than detectors located on the supply air side, but return air detectors are **not** a substitute for area detectors. If there is a desire for early detection of smoke, area smoke detectors should be installed. However, we contend that the detector serving the supply air detector will operate as desired once the smoke concentration levels in the supply air exceeds the alarm threshold so occupants should not be at risk should the return air fan continues to run prior to the supply air fan shutting down. In addition, return air detectors will not be able to detect smoke from a fire on the supply side of air handling units due to fan belts, motors or combustible filters so their respective fan will shut off appropriately. A smoke detector located on the supply side can also detect smoke from an exterior fire that gets pulled into the fresh air intake for the air handling system. Thus, a smoke detector located on the supply side will serve the purpose of protecting building occupants from smoke produced by air handling unit fire or smoke ingress via the fresh air intake for the air handling unit. Therefore overall detection is improved.

Correlating the IFC, IBC and IMC with NFPA 90A is also important as many jurisdictions adopt both the IFC/IMC and NFPA 90A. Accredited health care organizations are required by law to comply with NFPA 90A. Not having the subject requirements in the IBC in concert with NFPA 90A results in the unnecessary installation of smoke detectors in both the return and supply air systems. This code change proposal aims to maintain detection in air handling systems, not remove it. There should be no increase in installation costs as this code change proposal merely shifts the location of devices from the return air side to the supply air side, where air handling units are greater than 2000 cfm. In fact, changing the requirement as proposed will reduce the cost in jurisdictions that must comply with the IFC/IMC and NFPA 90A (i.e., leaving the requirements as currently stated in both the IFC and IMC already results in unnecessary additional costs).

Specific code changes are as follows:

PART II:
(Revision) 606.2. This is an editorial change to coordinate the two codes.

(New) IMC 606.2.1

Over the past few years, the U.S. General Services Administration has had a number of fire incidences that did not activate the building fire alarm system because there were no smoke detectors installed in the main supply air duct of the air-handling system downstream of any filter. Conversely, GSA has no incidence of a return air duct smoke detector activating as a result of detecting smoke in the return air handling system. Installing duct smoke detectors in the supply air system would ensure that a fire within the supply air filters, in the air handling motors or originating outside near air intakes can be discovered before it spreads. Establishing a 2,000 cfm threshold for installing detectors in supply air fans appears to be an industry standard.

(Revision/New) 606.2.1 and 606.2.2 (changed to 606.2.2 and 606.2.3, respectively) (Note: the intent is for 907.2.13.1.2 paragraphs 2 & 3 to have similar language as 606.2.2 and 606.2.3 so the codes are coordinated). The current requirement for installing duct smoke detectors in return air systems exceeding 2,000 cfm is overly restrictive. The 15,000 cfm threshold for return air systems appears to be an industry standard, as this capacity was used in the legacy codes and is currently used by NFPA 90A. The term "air conditioning system" has been replaced with "air handling system to more accurately reflect the type of system used in buildings today.

(Deletion) Exception to IMC 606.2.2 (changed to IMC 606.2.3):

The 2,000 cfm requirement has been applied to the supply air side. Therefore the Exception needs to be deleted given the proposed new return air threshold will be increased from 2,000 cfm to 15,000 cfm.

(Revision) IMC 606.2.3 (changed to IMC 606.2.4) editorial as a new section was inserted. Existing text unchanged.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FRABLE-F1-907.2.13.1.2.DOC

Public Hearing Results

PART II- IMC

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved to be consistent with the action taken on Part I of this proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Grace representing VPMIA/VBCOA, requests Disapproval.

Commenter's Reason: See F120-09/10, Part I.

Final Action: AS AM AMPC____ D

F121-09/10
907.4, 907.4.1 (New) [IBC [F] 907.3, [F] 907.3.1 (New)]

Proposed Change as Submitted

Proponent: Rick Sheets, Fire Committee Chair, Brinks Home Security, representing National Burglar and Fire Alarm Association

Revise as follows:

907.4 (IBC [F] 907.3) Fire safety functions. Automatic fire detectors utilized for the purpose of performing fire safety functions shall be connected to the building's fire alarm control unit where a fire alarm system is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at *a constantly attended location.*

907.4.1 (IBC [F] 907.3.1) Power source. In buildings not equipped with a fire alarm system, the automatic fire detector shall be powered by normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with NFPA 72.

> **Exception:** Elevator recall and supervisory service detectors shall be connected to a dedicated function fire alarm control unit that shall be designated as "Elevator Recall Control & Supervisory Unit".

Reason: Including this exception means-monitoring the integrity of the initiating device circuits cannot be omitted. In the past, smoke alarms and heat detectors were directly wired in the elevator equipment without providing the required monitoring for integrity of the circuit wiring, allowing elevators to be used during a fire. The requirement for the use of a fire alarm control unit for elevator recall is also a requirement of NFPA 72, (found in Section 6.16.3 in the 2007 edition), and should be added here for conformity as well as safety.

Cost Impact: The code change proposal will not increase the cost of construction since compliance with NFPA 72 is already required by this code and elevator codes.

ICCFILENAME: SHEETS-F12-907.4.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the exception has limited applicability and the code format of the exception was inappropriate. More specifically, the exception as written is actually a requirement which would be cause for confusion.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Sheets, SET National Burglar and Fire Alarm Association, Approval as Modified by this Public Comment.

Modify proposal as follows:

[F] **907.4 Fire safety functions.** Automatic fire detectors utilized for the purpose of performing fire safety functions shall be connected to the building's fire alarm control unit where a fire alarm system is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at *a constantly attended location.*

~~**907.4.1 (IBC [F] 907.3.1) Power source.**~~ In buildings not equipped with a fire alarm system, the automatic fire detectors shall be ~~powered by normal electrical service and, upon actuation, perform the intended function~~. ~~The detectors shall be~~ located and installed in accordance with NFPA 72.

> ~~**Exception:** Elevator recall and supervisory service detectors shall be connected to a dedicated function fire alarm control unit that shall be designated as "Elevator Recall Control & Supervisory Unit".~~

Commenter's Reason: To ensure monitoring of integrity of wiring the fire safety function system should be required to be installed per NFPA 72, 2007 Section 6.16.3.

Final Action: AS AM AMPC____ D

F122-09/10
907.5.1 (IBC [F] 907.4.1)

Proposed Change as Submitted

Proponent: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc

Revise as follows:

907.5.1 (IBC [F] 907.4.1) Protection of fire alarm control unit. In areas that are not continuously occupied, a single smoke detector shall be provided at the location of each fire alarm control unit, notification appliance circuit power extenders and supervising station transmitting equipment.

Exception~~s~~:

~~1.~~ Where ambient conditions prohibit installation of smoke detector, a *heat detector* shall be permitted.
~~2. The smoke detector shall not be required where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Reason: This exception was added to this requirement during the last code cycle so the language would be consistent with NFPA 72. This exception was deleted in the 2010 edition of NFPA 72, so needs to be deleted here for consistency.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HAMMERBERG-F2-907.5.1.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved the proposal to delete the exception because it was felt that if the exception remains, early notification and alarm would be jeopardized since sprinklers react slower than smoke detectors.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dave Frable representing U.S. General Services Administration, requests Disapproval.

Commenter's Reason: We are in opposition of deleting Exception 2 which permits and recognizes that a building protected throughout by an automatic sprinkler systems, installed in accordance with the requirements in NFPA 13 provides an acceptable alterative to installing a smoke detector at the location of each fire alarm control unit, each notification appliance circuit power extender, and supervising station transmitting equipment within a building. It should be noted that this issue has been debated by the NFPA 72 Technical Committee over numerous code development cycles in NFPA 72 and involves much more than eliminating or installing 1 smoke detector directly over one fire alarm control unit.

We are in opposition for the following reasons:

1. The basis of Exception 2 was that the installation of a smoke detector over the subject equipment only offered limited value in terms of detecting all threats to a fire alarm system from a fire and that fire growth would be limited in a fully sprinklered building. It should be noted that the installation of a smoke detector within the vicinity of this equipment is not required to meet the spacing requirements for smoke detection in NFPA 72.
2. We strongly believe that the protection of each control unit, each notification appliance circuit power extender and supervising station transmitting equipment is a determination that should be made by the designer based on risk.
3. The proponent of this code change has not demonstrated that the installation of a smoke detector at the location of each fire alarm control unit, notification appliance circuit power extender, and supervising station transmitting equipment within a building protected throughout by an

automatic sprinkler system will improve the overall reliability and performance of the system based on the smoke detectors not meeting the spacing requirements in NFPA 72.

4. The proponents assumption that a smoke detector not meeting the spacing requirements in NFPA 72; installed at the location of each fire alarm control unit, notification appliance circuit power extender, and supervising station transmitting equipment in all conditions will protect the operation of the fire alarm system in a fire scenario is illogical and to delete the subject sprinkler exception is unreasonable since no evidence has been brought forth by the proponents that fire alarm system failures are occurring at an alarming rate due to a fires in buildings protected by an automatic sprinkler system without the subject smoke detector installed. In addition, no recent evidence has been brought forth by the proponents that the installation of the smoke detector of the fire alarm system protected the operation of the system in a fire scenario.
5. Proponents also stated in their testimony that an activated sprinkler could spray water on fire alarm control equipment, thus disabling the equipment. This should be a concern regardless of whether or not a smoke detector is installed above the control equipment. Sprinklers can also be activated by physical damage, and locating fire alarm control equipment in the direct spray pattern should probably be avoided in all conditions.
6. Proponents also noted that NFPA 13, Section 8.15.10.3 permits sprinklers to be omitted from certain electrical rooms, and thus there would be no sprinkler protection should a fire alarm control panel be installed in such a room. The “certain electrical rooms” permitted to have sprinklers omitted must comply with 4 conditions per NFPA 13: (1) the room is dedicated to electrical equipment only, (2) only dry-type electrical equipment is used, (3) equipment is installed in a 2 hour fire rated enclosure including protection for penetrations, and (4) no combustible storage is permitted in the room. When this is taken in context, it indicates that the room has limited combustible loading, and is protected from fire outside the room by a two hour enclosure. Rather than have this scenario be a source of concern regarding the protection of fire alarm control equipment, this sounds like an ideal application with 2 hour protection from fire outside the room, and no storage of combustibles permitted in the room. This scenario certainly isn’t justification to remove exception no. 2. In addition, in all new high-rise construction, the building is required to be protected throughout by an automatic sprinkler system and the fire alarm control units are required to be installed in a fire command center that is separated from the remainder of the building by not less than a 1-hour fire barrier. Once again, this scenario certainly isn’t justification to remove exception No. 2 and require the installation of unjustified smoke detection.

We also disagree with the proponent that this code change will not increase the cost of construction as the proponent has stated in his reason statement. We believe not only will this code change increase the cost of initial construction but will also increase the cost of maintenance over the life of the building.

Final Action: AS AM AMPC____ D

F128-09/10
907.6.2.3.4 (IBC [F] 907.5.2.3.4)

Proposed Change as Submitted

Proponent: Gene Boecker, Code Consultants, Inc.

Revise as follows:

907.6.2.3.4 (IBC [F] 907.5.2.3.4) Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, all dwelling units and sleeping units shall be provided with the ~~capability~~ <u>capacity at the fire alarm control unit</u> to support visible alarm notification appliances in accordance with ICC A117.1.

Reason: The section indicates that all dwelling units shall be provided with the capability to support visible alarm notification appliances in accordance with ICC/ANSI A117.1. The code requires that all dwelling units be provided with the capability to support visible notification appliances, which allows for misinterpretation. The added text clarifies the intent for the dwelling units being capable of supporting visible notification appliances and provides a means of enforcing the intent of the code.

The cost of construction may or may not be increased depending on what is currently being used as the “norm” for meeting this provision. Therefore, the comment below is stating the position with regards to increase in cost. It is just as likely, however, that the cost will be reduced if there are more restrictive interpretations being used to meet the requirement.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: BOECKER-F5-907.6.2.3.4.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Although the committee agreed that clarification of this section was necessary the proposal was disapproved with the primary concerns being that the revisions may conflict with ICC/ANSI A117.1 and would not clarify the intent of the section for visible alarm notification.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

907.6.2.3.4 (IBC [F] 907.5.2.3.4) Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, all dwelling units and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with ICC A117.1. <u>Such capability shall be permitted to include the potential for future interconnection of the building fire alarm system with the unit smoke alarms, replacement of audible appliances with combination audible/visible appliances, or future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances.</u>

Commenter's Reason: This public comment seeks to better address the original intent of the 'capability' requirement for visible alarms in dwelling and sleeping units. As originally crafted by the A117 Committee, the intent was as follows:

1. It was assumed that the unit would be provided with hard-wired, interconnected smoke alarms.
2. It was assumed that the either the building fire alarm system would have an audible appliance within the unit (to satisfy audibility requirements); if not, at a minimum, the building fire alarm system would have wiring extended into the unit to a point where it could, in the future, be 'tapped' for use for visible signals within the unit.
3. It was assumed that, if visible appliances were needed within the unit in the future, that the fire alarm wiring could be interconnected with the smoke alarm wiring through a relay. The A117 Committee submitted a change to NFPA 72 to specifically permit this interconnection; this change was approved. It has since been expanded on to allow system interconnections, provided they meet protocols specified in NFPA 72.
4. It was assumed that providing visible alarm coverage in the unit would require replacement of audible-only appliances with combination audible/visible appliances, or additional wiring would be added from the audible appliance to the appropriate location of a newly-installed visible appliance.
5. There apparently are widely varying interpretations of the current IBC and A117 text. In some cases, all units are being required to be pre-wired for visible appliances, which was not the intent of the A117 Committee.

Final Action: AS AM AMPC____ D

F132-09/10, Part II
IRC R315, R202, Chapter 44

NOTE: PART I WAS WITHDRAWN BY PROPONENT. PART I IS REPRODUCED ONLY FOR INFORMATIONAL PURPOSES FOLLOWING ALL OF PART II.

Proposed Change as Submitted

Proponent: Roger Evans, Park City Municipal Corporation, representing Utah Chapter of ICC

PART II – IRC BUILDING/ENERGY

1. Revise as follows:

R315.1. <u>**Carbon monoxide alarms, carbon monoxide detectors or combination smoke/carbon monoxide devices.** Carbon monoxide alarms, carbon monoxide detectors and combination smoke/carbon monoxide devices described in sections R315.1.1 through R315.1.4 shall be installed and maintained in accordance with the provisions of this code, NFPA 72 and NFPA 720.</u> ~~**Carbon monoxide alarms.** In new construction, dwelling units within which fuel-fired appliances are installed or have attached garages shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).~~

<u>**R315.1.1 Carbon monoxide alarms.** Single- or multiple-station carbon monoxide alarms shall be listed and labeled in accordance with ANSI/UL 2034.</u>

<u>**R315.1.2 Carbon monoxide detectors.** Carbon monoxide detectors shall be listed and labeled in accordance with ANSI/UL 2075.</u>

R315.1.3 Combination smoke/carbon monoxide alarms. Combination smoke/carbon monoxide alarms shall be listed and labeled in accordance with ANSI/UL 217 and ANSI/UL 2034

R315.1.4 Combination smoke/carbon monoxide detectors. Combination smoke/carbon monoxide detectors shall be listed and labeled in accordance with ANSI/UL 268 and ANSI/UL 2075.

R315.2 Where Required in New Construction. **In new construction within which fuel burning appliances exist or which have attached garages, carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall be installed in the following locations:**

1. Outside each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms.
2. On every level of a dwelling unit, including basements

~~**R315.2**~~ **R315.3 Where required in existing dwellings.** Where work requiring a permit occurs in existing dwellings that have attached garages or in existing dwellings within which fuel-fired appliances exist, carbon monoxide alarms/detectors shall be provided in accordance with Sections R315.1 and R315.2.

~~**R315.3 Alarm Requirements** Single station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.~~

R315.4 Carbon monoxide alarm signal requirements. Where more than one listed carbon monoxide alarm, or combination smoke/carbon monoxide is required to be installed within a dwelling unit they shall be interconnected in such a manner that the activation of one carbon monoxide alarm shall activate all of the carbon monoxide alarms in the dwelling unit and the activation of a carbon monoxide detector or combination smoke/carbon monoxide detector shall activate the carbon monoxide audible notification devices throughout the individual dwelling unit. The required carbon monoxide alarm signal shall be clearly audible in all sleeping rooms, having a sound level of at least 15 db above average ambient sound level or 5 db above the maximum sound level, or a sound level at least 75 db at the pillow.

R315.5 Power source. Required single- or multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall receive their power by one of the following means:

1. Listed carbon monoxide alarms shall be battery-powered, plug-in with battery backup, or receive their primary power from the building wiring when such wiring is served from a commercial source with secondary power backup and without a disconnecting switch other than those required for overcurrent protection.Listed carbon monoxide alarms that are battery-powered or plug-in with battery backup shall not be permitted in new construction.
2. Listed carbon monoxide detectors shall receive their power from the approved control panel. The approved control panel shall receive its primary power from the building wiring when such wiring is served from a commercial source and the primary power source shall not include a disconnecting switch other than those required for overcurrent protection. The control panel shall be equipped with rechargeable batteries for secondary power backup.
3. Listed low-power radio frequency (wireless) detectors shall be permitted to be battery powered when the battery is electrically supervised and shall be capable of sending an alarm signal to the approved control panel for a minimum of 7 days after sending the initial battery depletion signal.

2. Add new definition to Section R202 as follows:

CARBON MONOXIDE.

Single-Station Carbon Monoxide Alarm. A device intended for the purpose of detecting carbon monoxide gas and alerting occupants by a distinct and audible signal comprising of an assembly that incorporates a sensor, control components and an alarm notification appliance in a single unit operated from a power source either located in the unit or obtained at the point of installation.

Multiple-Station Carbon Monoxide Alarm. A carbon monoxide alarm capable of being interconnected to one or more additional carbon monoxide alarms so that the actuation of one causes the appropriate alarm signal to be annunciated in all interconnected alarms.

Carbon Monoxide Detector. A device intended to be connected to an approved carbon monoxide detection system for the purpose of detecting carbon monoxide gas and alerting occupants by a distinct and audible signal.
Carbon Monoxide Detection System. A system of devices that consists of a control panel and circuits arranged to monitor and annunciate the status of carbon monoxide detectors and to initiate the appropriate response to those signals.

Combination Smoke/Carbon Monoxide Device. A device that combines a carbon monoxide alarm or carbon monoxide detector with smoke sensing technology; provided that the combined device is listed by a nationally recognized testing laboratory (NRTL) to the applicable ANSI/ UL Standards for both smoke detection and carbon monoxide detection. Such combined alarm units or detection systems shall emit an audible alarm in a manner that clearly differentiates between the two hazards as specified in the appropriate NFPA and ANSI/UL Standard.

3. Add new standards to Chapter 44 as follows:

NFPA
720-2009 Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment 2009 Edition

UL
2075-2004 First Edition of the Standard for Gas and vapor Detectors and Sensors, with revisions through September 28, 2007

Reason (Part II): The purpose for this code change is to improve the life safety of citizens by reducing the incidence of carbon monoxide (CO) poisoning in dwellings and to revise the language in the 2009 edition of the IRC so it is consistent with nationally recognized industry consensus standards.

The CO provisions in the 2009 edition of the IRC did not include the reliable, proven and tested technologies of system-connected CO detectors even though they meet nationally recognized industry consensus standards

1. ANSI/UL 2075, *Gas and Vapor Detectors and Sensors*
2. ANSI/NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*

The performance and reliability of system-connected CO detectors have shown to be extremely high if they are listed and maintained to ANSI/UL 2075 and installed in accordance with NFPA 720. System-connected CO detectors designed to be part of a carbon monoxide detection system are required to be connected to an approved panel. The panel is required to be equipped with rechargeable batteries that keep the carbon monoxide detection system operating during a power outage and will communicate the power loss condition to the supervising station. When the primary power is restored, the control panel will fully recharge the standby batteries. An added feature of a carbon monoxide detection system is that the interconnecting wiring to system-connected CO detectors are supervised such that a wiring fault results in a trouble signal at the premises and the supervising station.

The installation provisions in the 2009 edition of the IRC seem inconsistent with NFPA 720 when two or more CO alarms are installed within a dwelling unit. Section 9.6.5 of NFPA 720 requires that when two or more carbon monoxide alarms are to be installed that they are interconnected.. The rationale for this requirement is if a CO device is activated in the basement the occupants on the second floor on the opposite end of the home is unable to hear the audible alarm if the devices are not interconnected.

The 2009 edition of the IRC requires CO alarms outside each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms. However, NFPA 720 requires CO devices to be installed on every level of a dwelling unit, including basements as well as outside each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms.

Cost Impact (Part II): It is estimated that the proposed code modification will have a minimal cost impact on the construction of one- and two- family dwellings and townhouses. The proposed new requirements will not require addition CO detection devices to be installed; however the proposed changes will require additional wiring. While there are many variables that affect the cost of construction, most new dwelling construction is anticipated no more than two stories in height and will require wiring between no more than three CO detection devices: one per floor and one in the basement.

Analysis (Part II): A review of the standard(s) proposed for inclusion in the code, NFPA 720-2009, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

UL 2075 is already referenced in the IFC but not currently in the IBC. If the code change is approved, UL 2075 would be added to Chapter 35 of the IBC as a referenced standard.

ICCFILENAME: EVANSR-F1-908.DOC

Public Hearing Results

PART II- IRC B/E

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standards NFPA 720-2009 and UL 2075-2004 indicated that, in the opinion of ICC staff, the standards did comply with ICC standards criteria. Standard UL 2075 is already referenced in the IFC but not currently in the IRC. If the code change is approved, UL 2075 would be added to Chapter 44 of the IRC as a referenced standard.

Committee Action: **Disapproved**

Committee Reason: Based upon the proponent's request for disapproval. The proponent will rework this and bring it back to the Final Action.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Roger R. Evans, Park City Municipal Corporation, representing Utah Chapter of ICC, requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

Add new text as follows:

R315.2 Carbon monoxide detection systems. Carbon monoxide detection systems, that include carbon monoxide detectors and audible notification appliances, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720 shall be permitted. The carbon monoxide detectors shall be listed as complying with UL 2075. Where a household carbon monoxide detection system is installed it shall become a permanent fixture of the occupancy, owned by the homeowner and shall be monitored by an approved supervising station.

Exception: Where carbon monoxide alarms are installed meeting the requirements of Section R315.1 compliance with Section 315.2 is not required.

Add standards to Chapter 44 as follows:

NFPA 720-2009 Standard for the Installation of Carbon Monoxide (C0) Detection and Warning Equipment 2009 Edition

UL 2075-2004 First Edition of the Standard for Gas and vapor Detectors and Sensors, with revisions through September 28, 2007.

Commenter's Reason: The purpose of the original proposal was to permit carbon monoxide detection systems that include carbon monoxide detectors and audible notification appliance to be installed. During the Code Development Hearings the proponent realized the original proposal needed to be reworked and asked the committee to disapprove so that a public comment could be submitted for the Final Action Hearing. Therefore this public comment provides a straightforward solution of permitting carbon monoxide detection systems and carbon monoxide detectors to be installed. Furthermore, the requirement for the household carbon monoxide detection system to be owned by the homeowner and to be monitored by an approved supervising station mirrors the household fire alarm system requirements that were added to Section 314.2 of the 2009 edition of the IRC.

Final Action: AS AM AMPC____ D

NOTE: PART I REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

F132-09/10, Part I
908 (New) [IBC [F] 908(New)], 902 (IBC [F] 902), Chapter 47 (IBC Chapter 35)

PART I – IFC

1. Add new text as follows:

SECTION 908 (IBC SECTION [F] 908)
CARBON MONOXIDE ALARMS AND
CARBON MONOXIDE DETECTION SYSTEMS

908.1 General. This section covers the application, installation, performance and maintenance of carbon monoxide alarms and carbon monoxide detection systems in new buildings and structures.

908.1.1 Carbon monoxide alarms, carbon monoxide detectors and combination smoke/carbon monoxide devices. Carbon monoxide alarms, carbon monoxide detectors and combination smoke/carbon monoxide alarms and combination smoke/carbon monoxide detectors described in sections 908.1.2 through 908.1.5 shall be installed and maintained in accordance with the provisions of this code, NFPA 72 and NFPA 720.
908.1.2 Carbon monoxide alarms. Single- or multiple-station carbon monoxide alarms shall be listed and labeled in accordance with ANSI/UL 2034.

908.1.3 Carbon monoxide detectors. Carbon monoxide detectors shall be listed and labeled in accordance with ANSI/UL 2075.

908.1.4 Combination smoke/carbon monoxide alarms. Combination smoke/carbon monoxide alarms shall be listed and labeled in accordance with ANSI/UL 217 and ANSI/UL 2034

908.1.5 Combination smoke/carbon monoxide detectors. Combination smoke/carbon monoxide detectors shall be listed and labeled in accordance with ANSI/UL 268 and ANSI/UL 2075

908.2 Power Source. Required single- or multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall receive their power by one of the following means:

1. Listed carbon monoxide alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source with secondary power backup and without a disconnecting switch other than those required for overcurrent protection. Listed carbon monoxide alarms that are battery-powered or plug-in with battery backup shall not be permitted in new construction.
2. Listed carbon monoxide detectors shall receive their power from the approved control panel. The approved control panel shall receive its primary power from the building wiring when such wiring is served from a commercial source and the primary power source shall not include a disconnecting switch other than those required for overcurrent protection. The control panel shall be equipped with rechargeable batteries for secondary power backup.
3. Listed low-power radio frequency (wireless) detectors shall be permitted to be battery powered when the battery is electrically supervised and shall be capable of sending an alarm signal to the approved control panel for a minimum of 7 days after sending the initial battery depletion signal.

908.2.1 Interconnection. Where more than one listed carbon monoxide alarm, or, combination smoke/carbon monoxide alarm is required to be installed within a dwelling unit they shall be interconnected in such a manner that the activation of one carbon monoxide alarm shall activate all of the carbon monoxide alarms in the dwelling unit and the activation of a carbon monoxide detector or combination smoke/carbon monoxide detector shall activate the carbon monoxide audible notification devices throughout the individual dwelling unit. The required carbon monoxide alarm signal shall be clearly audible in all sleeping rooms, having a sound level of at least 15 db above average ambient sound level or 5 db above the maximum sound level, or a sound level at least 75 db at the pillow.

> **Exception:** Carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors installed in existing construction shall not be required to cause all carbon monoxide alarms to sound.

908.2.2 Acceptance testing. When the installation of carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors is complete, each alarm or detector and interconnecting wiring shall be tested in accordance with NFPA 72 and NFPA 720.

908.2.3 Where required. Listed single- or multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall be installed in locations described in sections 908.2.4 through 908.2.5.

908.2.4 Group R-1. Group R-1 occupancies located in a buildings that contain fuel burning appliances or which have attached garages, listed multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall be installed in the following locations:

1. On the ceiling or wall of the same room as permanently installed fuel burning appliances in accordance with manufacturers published instructions
2. Centrally located on every habitable level, in every HVAC zone of the building

   Exception: Carbon monoxide alarms or carbon monoxide detectors shall not be required in sleeping units unless the sleeping unit contains a fuel-burning appliance.

The required carbon monoxide alarms or carbon monoxide detectors shall be annunciated at a constantly attended location

908.2.5 Groups R-2, R-3 and R-4. Group R-2, R-3 and R-4 occupancies located in buildings that contain fuel burning appliances or which have attached garages, listed multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall be installed in the following:

1. Outside each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms
2. On every level of a dwelling unit, including basements and in every HVAC zone of the building
3. On the ceiling or wall of the same room as permanently installed fuel burning appliances in accordance with manufacturers published instructions.

   Exception: Carbon monoxide alarms or carbon monoxide detectors shall not be required in sleeping units unless the sleeping unit contains a fuel-burning appliance.

The required carbon monoxide alarms or carbon monoxide detectors shall be annunciated at a constantly attended location

2. Add new definitions as follows:

902.1(IBC [F] 902.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

CARBON MONOXIDE.

Single-Station Carbon Monoxide Alarm. A device intended for the purpose of detecting carbon monoxide gas and alerting occupants by a distinct and audible signal comprising of an assembly that incorporates a sensor, control components and an alarm notification appliance in a single unit operated from a power source either located in the unit or obtained at the point of installation.

Multiple-Station Carbon Monoxide Alarm. A carbon monoxide alarm capable of being interconnected to one or more additional carbon monoxide alarms so that the actuation of one causes the appropriate alarm signal to be annunciated in all interconnected alarms.

Carbon Monoxide Detector. A device intended to be connected to an approved carbon monoxide detection system for the purpose of detecting carbon monoxide gas and alerting occupants by a distinct and audible signal.

Carbon Monoxide Detection System. A system of devices that consists of a control panel and circuits arranged to monitor and annunciate the status of carbon monoxide detectors and to initiate the appropriate response to those signals.

Combination Smoke/Carbon Monoxide Device. A device that combines a carbon monoxide alarm or carbon monoxide detector with smoke sensing technology; provided that the combined device is listed by a nationally recognized testing laboratory (NRTL) to the applicable ANSI/ UL Standards for both smoke detection and carbon monoxide detection. Such combined alarm units or detection systems shall emit an audible alarm in a manner that clearly differentiates between the two hazards as specified in the appropriate NFPA and ANSI/UL Standard.

3. Add new standards to Chapter 47 (IBC Chapter 35) as follows:

NFPA

720-2009	Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment 2009 Edition

UL

2034-2008	Standard for Single and Multiple Station Carbon Monoxide Alarms, with Revisions through February 20, 2009
2075-2004	Standard for Gas and vapor Detectors and Sensors, with revisions through September 28, 2007

Reason (Part I): The purpose for this code change is to protect people sleeping in commercial Group R occupancies such as hotels, motels, adult & child day care, apartments and dormitories from serious injury or possibly death from unintentional non-fire related carbon monoxide (CO) exposure by mandating the installation of carbon monoxide detection devices. The Centers for Disease Control and Prevention (CDC) reports that an estimated 15,000 emergency department visits and 500 unintentional deaths in the United States each year for the six year period 1999-2004. These carbon monoxide incidents were a contributing factor for 20 states enacting laws to require the installation of carbon monoxide detection devices. Of the 20 states that have adopted requirements for carbon monoxide detection, ten require the installation of carbon monoxide detectors in commercial Group R occupancies. In the absence of a national installation standard for commercial Group R occupancies each jurisdiction developed its own regulations with varying installation requirements.

We recommend that the International Fire Code develop the necessary installation requirements for CO detection devices in commercial Group R.

Cost Impact (Part I): It is estimated that the proposed code modification will have a minimal cost impact on the construction of Group R occupancies. For example in R-1 occupancies a CO alarm or detector will be installed by fuel burning appliance(s) and in each HVAC zone. In other R occupancies cost will be minimal as installation requirements are outside of each sleeping area and on each floor.

Analysis (Part I): UL 2034 is already referenced in the IRC but not currently in the IFC or IBC. If the code change is approved, UL 2034 would be added to Chapter 47 of the IFC and Chapter 35 of the IBC as a referenced standard.

UL 2075 is already referenced in the IFC but not currently in the IBC. If the code change is approved, UL 2075 would be added to Chapter 35 of the IBC as a referenced standard.

PART I- IFC **Withdrawn by Proponent**

F133-09/10

908.7 (New) [IBC [F] 908.7 (New)], 4606.1 (New), Chapter 47 (IBC Chapter 35)

Proposed Change as Submitted

Proponent: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

1. Add new text as follows:

908.7 (IBC [F] 908.7) Carbon monoxide alarms. Group I or R occupancies located in a building containing a fuel-burning appliance or a building which has an attached garage shall be provided with single station carbon monoxide alarms. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in the *International Building Code*, shall not be deemed to be an attached garage.

> **Exception:** Sleeping units or dwelling units which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be provided with single station carbon monoxide alarms provided that:
>
> 1. The ~~s~~sleeping unit or dwelling unit is located more than one story above or below any story which contains a fuel-burning appliance or an attached garage;

2. The sleeping unit or dwelling unit is not connected by duct work or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage; and
3. The building is provided with a common area carbon monoxide alarm system.

4606.1 Carbon monoxide alarms. Existing Group I or R occupancies located in a building containing a fuel-burning appliance or a building which has an attached garage shall be provided with single station carbon monoxide alarms. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in the *International Building Code*, shall not be deemed to be an attached garage.

Exception: Sleeping units or dwelling units which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be provided with single station carbon monoxide alarms provided that:

1. The sleeping units or dwelling unit is located more than one story above or below any story which contains a fuel-burning appliance or an attached garage;
2. The sleeping units or dwelling unit is not connected by duct work or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage; and
3. The building is provided with a common area carbon monoxide alarm system.

2. Add new standards to Chapter 47 (IBC Chapter 35) as follows:

NFPA
720-2005 Standard for the Installation of Carbon Monoxide (CO) Warning Equipment in Dwelling Units

UL
2034-2008 Standard for Single and Multiple Station Carbon Monoxide Alarms

Reason: At the final action hearings for the last code change cycle held in Minnesota the voting membership present voted overwhelmingly to add requirements for the installation of carbon monoxide alarms for dwelling units built in compliance with the International Residential Code (IRC). The threat of poisoning from exposure to carbon monoxide is not limited to dwellings regulated by the IRC, it includes other institutional and residential occupancies. This proposal is intended to provide correlation with the position the membership took on this issue and add language to the IBC/IFC requiring the installation of carbon monoxide alarms in institutional and residential group occupancies.

According to the Journal of the American Medical Association (JAMA), carbon monoxide is the leading cause of accidental poisoning deaths in America with approximately 2,100 deaths per year. http://jama.ama-assn.org/cgi/search?fulltext=Carbon+Monoxide Over 15,000 people seek medical attention due to carbon monoxide exposure each year. http://www.ul.com/newsroom/newsrel/nr012609a.html

The industry has addressed the issue of reliability by updating the requirements of the UL 2034 standard. http://www.iccsafe.org/cs/cc/ctc/CO/CO_UL2034History.pdf Underwriters Laboratories instituted a Carbon Monoxide Field Study in 1994 and completed the study in March of 2004. The report on the study includes the following summary:

> *"Throughout the first phase of this study, the CO alarms have performed in an effective manor. During the September 2002 tests we recorded our first false positive at 70ppm CO (94 minutes into the test, post 1998 alarm). Also during the September 2002 tests we recorded our first no response sample (pre1998 alarm). During the September 2003 we recorded a significant late response sample (pre1998 alarm). These samples have been returned and analyzed by the manufacturer and/or the UL Field Report Group has opened an investigation. Other samples in the survey of the same, or similar, models are continuing to perform as expected.*
>
> *On one occasion, a field study CO sample alarmed in an employee's home after their furnace was serviced. It was confirmed that there was a high level of CO present in their home. The problem was corrected and the alarm continues to function properly during follow-up sensitivity tests. On another occasion, a field sample was activated when the damper on a fireplace closed prematurely. The damper was opened, the house vented, and the alarm returned to its normal standby condition.*
>
> *Throughout the entire survey program we have experienced a few units providing early/delayed signals during the sensitivity tests, but all of these CO alarms would provide effective signaling protection to the users should there be a fatal concentration of CO.*
>
> *Of the few CO alarms that did not meet the UL2034 test points, most of them alarmed early and it was determined with the Stability Test results that these samples would most likely not false alarm in the field.*
>
> *It is important to note that providing effective signaling protection does not necessarily mean complying with the finite test points of UL2034. All the alarms would have sounded while a person can react and follow the recommended procedures during an alarm signal.*
>
> *The data shows that these CO alarms are providing the necessary signaling protection."*
>
> http://www.iccsafe.org/cs/cc/ctc/CO/CO_UL_AlarmSurvey.doc

All carbon monoxide detectors available today meet the updated requirements of the UL standard which eliminated the false positive indications that occurred when carbon monoxide detectors were first brought to market in the 1990's. The State of New Jersey has had regulations mandating the installation of carbon monoxide alarms in all new and existing residential occupancies since 1992. The state implemented a reporting program at that time to identify reliability and false positive indication problems and there have been no problems identified in over 10 years.

Carbon monoxide poisonings leading to injury or death is well documented and the only way to protect the occupants from this odorless and tasteless product of combustion, known as the "Silent Killer" is through the installation of detectors complying with today's standards.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, NFPA 720-2005 and UL 2034-2008, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: DAVIDSON-SHUMAN-F14-908.7.DOC

Public Hearing Results

Committee Action: Approved as Modified

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf

Analysis: Review of proposed new standards NFPA 720-2009 and UL 2034-2008 indicated that, in the opinion of ICC Staff, the standards did comply with ICC standards criteria.

Modify proposal as follows:

908.7 (IBC [F] 908.7) Carbon monoxide alarms. Group I or R occupancies located in a building containing a fuel-burning appliance or a building which has an attached garage shall be provided with single station carbon monoxide alarms. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in the *International Building Code*, <u>or enclosed parking garage ventilated in accordance with Section 404 of the *International Mechanical Code*</u> shall not be deemed to be an attached garage.

> **Exception:** Sleeping units or dwelling units which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be provided with single station carbon monoxide alarms provided that:
>
> 1. The sleeping unit or dwelling unit is located more than one story above or below any story which contains a fuel-burning appliance or an attached garage;
> 2. The sleeping unit or dwelling unit is not connected by duct work or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage; and
> 3. The building is provided with a common area carbon monoxide alarm system.

<u>**908.7.1 Carbon monoxide detection systems.** Carbon monoxide detection systems, that include carbon monoxide detectors and audible notification appliances, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720 shall be permitted. The carbon monoxide detectors shall be listed as complying with UL 2075.</u>

4606.1 Carbon monoxide alarms. Existing Group I or R occupancies located in a building containing a fuel-burning appliance or a building which has an attached garage shall be provided with single station carbon monoxide alarms. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in the *International Building Code*, <u>or enclosed parking garage ventilated in accordance with Section 404 of the *International Mechanical Code*</u> shall not be deemed to be an attached garage.

> **Exception:** Sleeping units or dwelling units which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be provided with single station carbon monoxide alarms provided that:
>
> 1. The sleeping units or dwelling unit is located more than one story above or below any story which contains a fuel-burning appliance or an attached garage;
> 2. The sleeping units or dwelling unit is not connected by duct work or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage; and
> 3. The building is provided with a common area carbon monoxide alarm system.

(Portions of the proposal not shown remain unchanged.)

Committee Reason: The committee approved the proposal adding CO detectors to the code since having provisions within the IBC and IFC is a better approach than what has been occurring on a state level through the legislative process. This also makes the IBC and IFC consistent with the IRC. The first modification clarifies that ventilated enclosed parking garages were not intended to be considered as an attached garage for the purposes of enforcing this section. The second modification includes the use of CO detectors and associated systems in accordance with UL 2075. Such detectors are allowed by NFPA 720 and the committee felt it was appropriate to recognize both CO alarms and detectors.

Assembly Action: None

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ron Nickson representing National Multi Housing Council, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

908.7 (IBC [F] 908.7) Carbon monoxide alarms. Group I or R occupancies located in a building containing a fuel-burning appliance or a building which has an attached garage <u>with a communicating opening</u> shall be provided with single station carbon monoxide alarms <u>outside of each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms and on every occupiable level of a dwelling unit</u>. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in the *International Building Code*, or enclosed parking garage ventilated in accordance with Section 404 of the *International Mechanical Code* shall not be deemed to be an attached garage.

Exception: Sleeping units or dwelling units which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be provided with single station carbon monoxide alarms provided that:

1. The sleeping unit or dwelling unit is located more than one story above or below any story which contains a fuel-burning appliance or an attached garage;
2. The sleeping unit or dwelling unit is not connected by duct work or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage; and
3. ~~The building is provided with a common area carbon monoxide alarm system the room with the fuel burning~~ A carbon monoxide detector is installed in the room containing the fuel burning appliance.

908.7.1 Carbon monoxide detection systems. Carbon monoxide detection systems, that include carbon monoxide detectors and audible notification appliances, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720 shall be permitted. The carbon monoxide detectors shall be listed as complying with UL 2075.

4606.1 Carbon monoxide alarms. Existing Group I or R occupancies located in a building containing a fuel burning appliance or a building which has an attached garage with a communicating opening shall be provided with single station carbon monoxide alarms outside of each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms and on every occupiable level of a dwelling unit . The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in the *International Building Code*, or enclosed parking garage ventilated in accordance with Section 404 of the *International Mechanical Code* shall not be deemed to be an attached garage.

Exception: Sleeping units or dwelling units which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be provided with single station carbon monoxide alarms provided that:

1. The sleeping units or dwelling unit is located more than one story above or below any story which contains a fuel-burning appliance or an attached garage;
2. The sleeping units or dwelling unit is not connected by duct work or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage; and
3. ~~The building is provided with a common area carbon monoxide alarm system the room with the fuel burning~~ A carbon monoxide detector is installed in the room containing the fuel burning appliance.

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason: The modification to F133 cleans up the language approved during the code development hearings as to when carbon monoxide detection is required in Group I and R occupancies. The change modifies the requirement to requirement carbon monoxide detectors only when the attached garage has an opening that communicates with the dwelling unit and second clarifies the location when the carbon monoxide detectors are installed. The change to item 3 of the exception removes the requirement for a carbon monoxide alarm system and requires only that a carbon monoxide detector be installed in the room containing a fuel burning appliance. This type of installation would provide warning of any problem with the heating system, without the excessive cost burden associated with a complete carbon monoxide alarm system.

This change as modified has been submitted as a public comment to PM-23-09/10 which was approved by the code development establishing requirements for carbon monoxide in the IPMC and IEBC. If the modifications as proposed above and the modifications as proposed by NMHC to PM23-09/10 are approved by the membership the codes will be aligned with the same requirements thus eliminating the problem that the requirements for new construction differ from those in the IPMC and IEBC that are enforced after the building is completed.

F134-09/10
909.2 (IBC [F] 909.2), 909.10.2.1 (IBC [F] 909.10.2.1)

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council

Revise as follows:

909.2 (IBC [F] 909.2) General design requirements. Buildings, structures or parts thereof required by this code to have a smoke control system or systems, or a stair pressurization system shall have such systems designed in accordance with the applicable requirements of Section 909 and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to adequately describe the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied by sufficient information and analysis to demonstrate compliance with these provisions.

909.20.6.1 Ventilation systems. Smokeproof enclosure <u>and pressurized stairway</u> ventilation systems shall be independent of other building ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the smokeproof enclosure <u>or pressurized stairway</u> or connected to the smokeproof enclosure <u>or pressurized stairway</u> by ductwork enclosed by not less than 2-hour *fire barriers* constructed in accordance with <u>Section 707</u> or *horizontal assemblies* constructed in accordance with <u>Section 712</u>, or both.
2. Equipment, control wiring, power wiring and ductwork shall be located within the smokeproof enclosure <u>or pressurized stairway</u> with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour *fire barriers* constructed in accordance with <u>Section 707</u> or *horizontal assemblies* constructed in accordance with <u>Section 712</u>, or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour *fire barriers* constructed in accordance with <u>Section 707</u> or *horizontal assemblies* constructed in accordance with <u>Section 712</u>, or both.

Exceptions:

1. Control wiring and power wiring utilizing a 2-hour rated cable or cable system.
2. Where encased with not less than 2 inches (51 mm) of concrete.
3. <u>Ductwork shall be permitted to be protected using an approved alternative fire-resistive duct assembly that is a *listed* and *labeled* specifically for such purpose.</u>

Reason: This proposal would require Stair pressurization ducts installed for the purposes of stairwell pressurization to be enclosed within a shaft or protected by an equivalent tested and listed assembly or system evaluated for the purpose. Smoke control systems have been required in nearly two thirds of the United States for over a decade. High-rise buildings constructed to the requirements of International Building Code, but without any specific measures to control smoke migration, are all the more vulnerable to property damage and occupants' loss of life.

The purpose of a closed pressurization system is to provide fresh air directly to stairwells or egress areas. This design air pressures need to be sufficient to maintain closed doors while preventing smoke from entering the egress path. Several incidents in North America during the past 40 years have demonstrated that serious fires can occur in modern high-rise buildings, that these fires can generate tremendous quantities of smoke, and that smoke can spread rapidly throughout these buildings. Most notable were the 1970 One New York Plaza fire, the1973 Hyatt Regency O'Hare Hotel fire, the 1980 MGM Grand Hotel in Las Vegas, a 1981 fire in North York Ontario at the Inn on the Park Hotel, the 1983 First Canadian Place in Toronto, Ontario, One Meridian Plaza, Philadelphia, Pennsylvania and the First Interstate Bank in Los Angeles, California in the 1990's, and the 2001 World Trade Center.

There is a large body of available research that indicates the need for smoke control is more pressing in tall buildings that in any other type of construction. Pressurization results in airflows of high velocity in the gaps around closed doors and construction cracks, thereby preventing smoke from flowing back into the pressurized space through these openings. Pressurized stairwells are provided with the goal of maintaining a tenable environment within the escape routes in the event of a building fire. While the option to use stairwell pressurization exists, the IBC does not require stairwell pressurization in high-rise buildings, and only requires smoke control in underground buildings, atriums, and covered mall buildings. Section 403.13 of the 2009 IBC requires smokeproof exit enclosures for high-rise buildings in every required stairway serving floors more than 75 feet (22.86 m) above the ground. Section 909.20.5 merely permits sprinklered Buildings to use stairwell pressurization as an alternate to the smokeproof enclosures. When employed, ducts used for Stair pressurization to provide uncontaminated air within required interior exit stairwells or areas of egress need to be protected from the effect of fire, or constructed as fire resistant systems.

Particularly in the case of tall buildings, the predominant factors that cause smoke movement in tall buildings are stack effects, the affect of external wind forces, and forced air movement within the building. Smoke removal and venting practices are complicated by stack effects, which will tend to favor natural air movement vertically through the building as a result of differences in temperature and densities between the inside and outside air. [1]

Options such as the use of natural ventilation are only available where openings in exterior stairwells can be accommodated. Even then, a number of problems have been identified with this approach. Firstly, the required volume of fresh air is high. Secondly, natural supply and exhaust through vents may be subject to adverse exterior wind conditions, and even when functioning satisfactorily, would generally require vents located on different exterior walls. Thirdly, the performance of natural vents is influenced by building stack effects, which may be particularly significant on the upper or lowermost stories for tall buildings. This effect can range from either strong inflow or strong outflow from all natural vents on a given storey.[2]

The IBC needs to provide more effective means to prevent smoke from entering critical exit stairwells in high-rise buildings. Properly designed stairwell pressurization prevents smoke from flowing back into the pressurized exit stairwells and smokeproof enclosures. The goal of this proposal is maintaining a tenable environment within the escape routes in the event of a building fire.

Bibliography:

1. Klote, J.H. and Milke, J.A. Fire Protection Handbook, NFPA 19th Edition, Volume II, Smoke Movement in Buildings, Chapter 6, Section 12-113 –12-126
2. Building Research Establishment, UK, Smoke Ventillation of Common Access Areas of Flats & Maisonettes (BD2410), Final Factual Report, Appendix A (Review), BRE Ltd, 2005

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: CRIMI-F1-909.2.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee disapproved the proposal for a couple reasons. First, it was felt that the proposed exception is best dealt with as an alternative method in accordance with Chapter 1. The second reason was concern with the inconsistency with terminology related to pressurized systems. Finally there was concern that there are other pressurization methods such as elevator pressurization that should be correlated with this section.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

909.2 (IBC [F] 909.2) General design requirements. Buildings, structures or parts thereof required by this code to have a smoke control system or systems, or a stair pressurization system shall have such systems designed in accordance with the applicable requirements of Section 909 and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to adequately describe the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied by sufficient information and analysis to demonstrate compliance with these provisions.

IBC 909.20.6.1 Ventilation systems. <u>The ventilation system for </u>smokeproof enclosure<u>s</u> and pressurized stairway<u>s</u> ~~ventilation systems~~ shall be independent of other building ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the smokeproof enclosure or pressurized stairway or connected to the smokeproof enclosure or pressurized stairway by ductwork enclosed by not less than 2-hour *fire barriers* constructed in accordance with Section 708 or *horizontal assemblies* constructed in accordance with Section 712, or both.
2. Equipment, control wiring, power wiring and ductwork shall be located within the smokeproof enclosure or pressurized stairway with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour *fire barriers* constructed in accordance with Section 708 or *horizontal assemblies* constructed in accordance with Section 712, or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour *fire barriers* constructed in accordance with Section 708 or *horizontal assemblies* constructed in accordance with Section 712, or both.

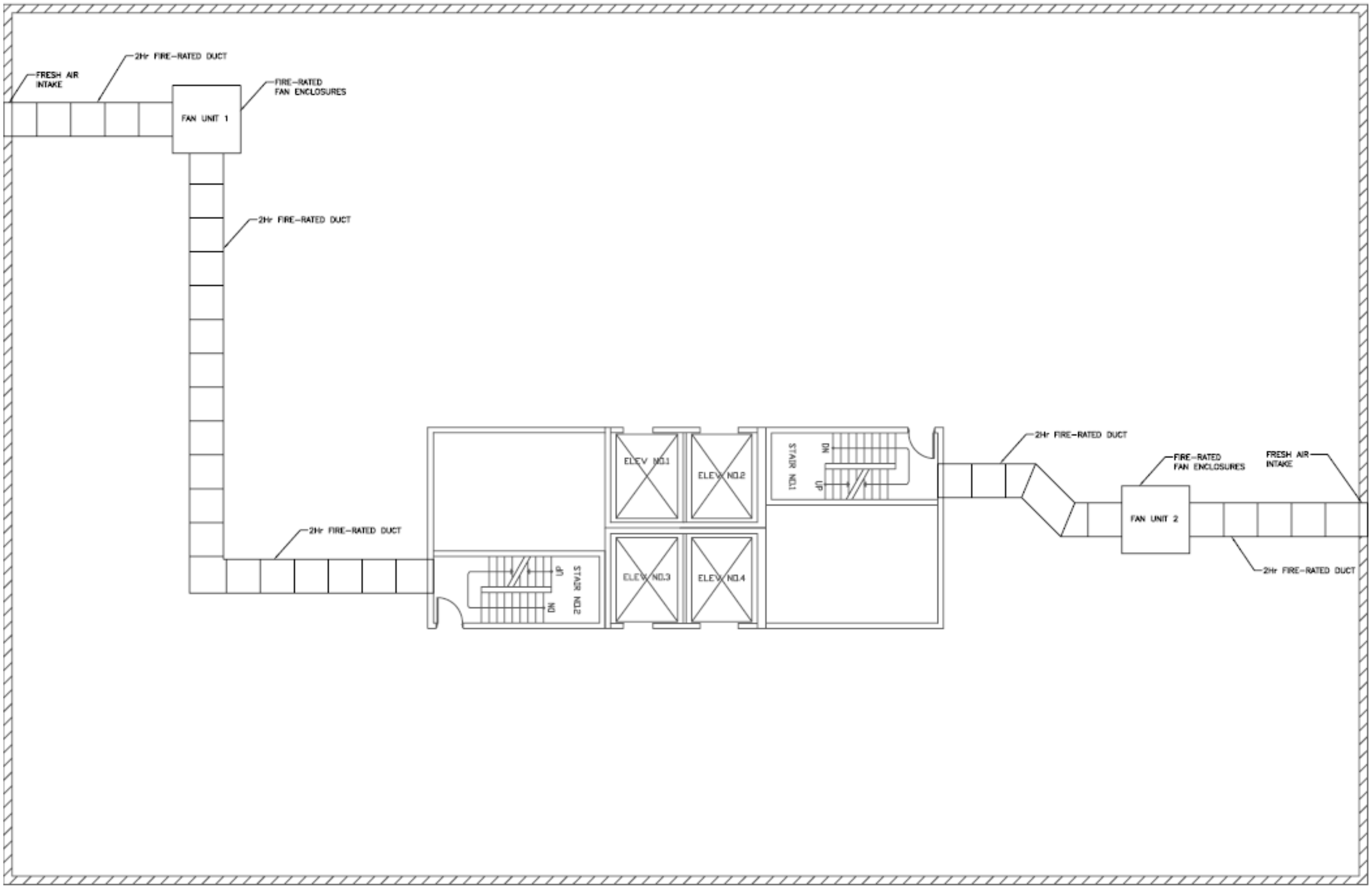
Exceptions:

1. Control wiring and power wiring utilizing a 2-hour rated cable or cable system.
2. Where encased with not less than 2 inches (51 mm) of concrete.
3. Ductwork shall be permitted to be protected using an approved alternative <u>fire resistant</u> ~~fire-resistive~~ duct ~~assembly~~ <u>construction approved by the building official.</u> ~~that is a *listed* and *labeled* specifically for such purpose~~.

Commenter's Reason: The purpose of a closed pressurization system is to provide fresh air directly to stairwells or egress areas. This proposal would require Stair pressurization systems to be designed in accordance with the existing requirements of section 909, and require ducts installed for the purposes of stairwell pressurization to be enclosed within a shaft enclosure or alternate construction approved by the building official, in accordance with the IBC.

Where stair pressurization is used, the design air pressures need to be sufficient to maintain closed doors while preventing smoke from entering the egress path. At the same time, the ducts and fans supplying the pressurized air to the Stairwells need to be protected in order to ensure that they can continue to function in the event of a fire in the remainder of the floor area. This is particularly critical because, even if installed, fire and/or smoke dampers are not closed during a fire emergence in a pressurization duct designed to supply air to the stairwell.

The illustration below shows a typical contemporary floor plate. Stairwells are not typically located on the exterior wall of a building. It is not unlikely that the ducts supply the pressurization will pass through the floor are, and possibly through fire resistance rated separations. The IBC needs to stipulate the design and protection required to ensure reliable operation of these systems during a fire event. Properly designed stairwell pressurization prevents smoke from flowing back into the pressurized exit stairwells and smokeproof enclosures.



TYPICAL FIRE-RATED STAIR
PRESSURIZATION SYSTEM

Final Action: AS AM AMPC____ D

F135-09/10

909.3 (IBC [F] 909.3, IMC [F] 513.3), 909.18.8 (IBC [F] 909.18.8), 909.18.8.1 (IBC [F] 909.18.8.1), 909.18.8.2 (IBC [F] 909.18.8.2), 909.18.8.2.1 (IBC [F] 909.18.8.2.1), 909.18.8.2.2 (IBC [F] 909.18.8.2.2), 909.18.8.2.3 (IBC [F] 909.18.8.2.3); IBC [F] 1704.16, [F] 1704.16.1, [F] 1704.16.2

Proposed Change as Submitted

Proponent: Vickie Lovell, Representing National Energy Management Institute

1. Revise as follows:

909.3 (IBC [F] 909.3, IMC [F] 513.3) Special inspection and test requirements. In addition to the ordinary inspection and test requirements to which buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of Section 909 shall undergo special inspections and tests sufficient to verify the proper commissioning of the smoke control design in its final installed condition. The design submission accompanying the *construction documents* shall clearly detail procedures and methods to be used and the items subject to such inspections and tests. Such commissioning shall be in accordance with generally accepted engineering practice and, where possible, based on published standards for the particular testing involved. The special inspections and tests required by this section shall be conducted under the same terms as in Section 1704 of the International Building Code <u>and Section 909.18 of this code.</u>

909.18.8 (IBC [F] 909.18.8) Special inspections for smoke control. Smoke control systems shall be tested by a special inspector in accordance with the requirements for special inspections in Sections 909.18 through 909.19 and Section 909.20.6.3 of the *International Building Code*.

909.18.8.1 (IBC [F] 909.18.8.1) Scope of testing. Special inspections shall be conducted in accordance with the following:

1. During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.
2. Prior to occupancy and after sufficient completion for the purposes of pressure-difference testing, flow measurements, and detection and control verification.

909.18.8.2 (IBC [F] 909.18.8.2) Qualifications. Special inspection agencies for smoke control shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers, or be certified by a third party accreditation program for air testing, adjusting and air balancing and for inspection of smoke control systems. An approved special inspection agency shall provide all information as necessary for the building official to determine that the agency meets the applicable requirements and shall be qualified to conduct, supervise and evaluate tests and periodic inspections and maintenance.

909.18.8.2.1 (IBC [F] 909.18.8.2.1) Independence. An approved special inspection agency shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.
909.18.8.2.2 (IBC [F] 909.18.8.2.2) Equipment. An approved special inspection agency shall have adequate equipment to perform required tests. The equipment shall be periodically calibrated.

909.18.8.2.3 (IBC [F] 909.18.8.2.3) Personnel. An approved special inspection agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and inspections.

IBC [F] 1704.16 Special inspection for smoke control. Smoke control systems shall be tested by a special inspector in accordance with Section 909.18.8.

~~**IBC [F] 1704.16.1 Testing scope.** The test scope shall be as follows:~~

1. ~~During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.~~
2. ~~Prior to occupancy and after sufficient completion for the purposes of pressure difference testing, flow measurements and detection and control verification.~~

~~**IBC [F] 1704.16.2 Qualifications**. *Special inspection* agencies for smoke control shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.~~

Reason: The purpose of this code change is to clarify and centralize the language as it relates to the qualifications of special inspectors and special inspection agencies of smoke control systems. This ties together the IBC, IFC, and IMC with consistent language as it relates to special inspections, testing and maintenance of smoke control systems.
909.3. This is an editorial change which adds the reference of the new language in Sections 909.18.
909.18.8. The addition of the referenced sections clarifies the intent of the code's requirement of special inspections, agencies, and inspectors.
909.18.8.2. through 909.18.8.2.3. This language is derived from Chapter 1703.1.1 of the 2009 IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LOVELL-F2-909.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this code change with concern that Section 909.18.8.2.1 did not include the engineer and only referenced the contractor. In addition it would be more appropriate to reference the fire code official versus the building official. Generally there was concern that allowing third party accreditation may lessen the testing requirements. It should be noted that the committee did like that the proposal coordinated the smoke control special inspection requirements between the IBC, IFC and the IMC.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Vickie Lovell, InterCode Incorporated, representing National Energy Management Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

909.3 (IBC [F] 909.3, IMC [F] 513.3) Special inspection and test requirements. In addition to the ordinary inspection and test requirements to which buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of Section 909 shall undergo special inspections and tests sufficient to verify the proper commissioning of the smoke control design in its final installed condition. The design submission accompanying the *construction documents* shall clearly detail procedures and methods to be used and the items subject to such inspections and tests. Such commissioning shall be in accordance with generally accepted engineering practice and, where possible, based on published standards for the particular testing involved. The special inspections and tests required by this section shall be conducted under the same terms as in Section 1704 of the International Building Code and Section 909.18 of this code.

909.18.8 (IBC [F] 909.18.8) Special inspections for smoke control. Smoke control systems shall be tested by a special inspector in accordance with the requirements for special inspections in Sections 909.18 through 909.19 and Section 909.20.6.3 of the *International Building Code*.

909.18.8.1 (IBC [F] 909.18.8.1) Scope of testing. Special inspections shall be conducted in accordance with the following:

1. During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.
2. Prior to occupancy and after sufficient completion for the purposes of pressure-difference testing, flow measurements, and detection and control verification.

909.18.8.2 (IBC [F] 909.18.8.2) Qualifications. Special inspection agencies for smoke control shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers,or be certified by a third party accreditation program for air testing, adjusting and air balancing and for inspection of smoke control systems. An approved special inspection agency shall provide all information as necessary for the ~~building~~ fire code official to determine that the agency meets the applicable requirements and shall be qualified to conduct, supervise and evaluate the annual and semiannual operational test required by 909.20 ~~tests and periodic inspections and maintenance~~.

> **Exception:** Periodic component inspection and maintenance shall be permitted to be performed by facility maintenance personnel, or personnel certified by a third party accreditation program for inspection and maintenance of the components of the system.

909.18.8.2.1 (IBC [F] 909.18.8.2.1) Independence. An approved special inspection agency shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.

909.18.8.2.2 (IBC [F] 909.18.8.2.2) Equipment. An approved special inspection agency shall have adequate equipment to perform required tests. The equipment shall be periodically calibrated.

909.18.8.2.3 (IBC [F] 909.18.8.2.3) Personnel. An approved special inspection agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and inspections.

IBC [F] 1704.16 Special inspection for smoke control. Smoke control systems shall be tested by a special inspector in accordance with Section 909.18.8.

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason: The International Fire Code specifies in 909.20.1 that a routine inspection and maintenance program and an annual or semi annual operational testing program of the system be initiated immediately after the smoke control system has passed the acceptance tests. The IBC, IMC, IFC all have partial requirements as to who should be qualified to execute this work, which may be divided into two categories of work. One type of inspection is the ongoing system component maintenance which may be required regular inspections per the written schedule for routine maintenance. The other is annual or semiannual operational testing of the entire smoke control system.

This public comment combines the requirements of the IBC, IMC, IFC into one location in the IFC and makes a distinction between maintenance personnel, or otherwise qualified individuals who can perform routine inspections and maintenance and those who have the technical expertise to evaluate the operation and function of the entire smoke control system.

Final Action: AS AM AMPC____ D

F142-09/10
909.20

Proposed Change as Submitted

Proponent: Vickie Lovell, Representing National Energy Management Institute

Add new text as follows:

909.20 Maintenance. Smoke control systems shall be maintained to ensure to a reasonable degree that the system is capable of controlling smoke for the duration required. The maintenance and testing of the smoke control system shall be supervised by personnel who have expertise in fire protection engineering, mechanical engineering and certified as air balancers, or are certified by a third party accreditation program for air testing, adjusting and air balancing and for inspection of smoke control systems. The system shall be maintained in accordance with the manufacturer's instructions and Sections 909.20.1 through 909.20.5.

Reason: The purpose of this addition is to further clarify the requirements of those supervising individuals who test and maintain smoke control systems. Third-party accreditation programs provide individuals with the needed expertise in fire-protection engineering, mechanical engineering, and air adjusting and balancing.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LOVELL-F3-909.20

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that it would be too restrictive to require the proposed level of qualifications for the maintenance of approved smoke control systems.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Vickie Lovell, InterCode Incorporated, representing National Energy Management Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

909.20 Maintenance. Smoke control systems shall be maintained to ensure to a reasonable degree that the system is capable of controlling smoke for the duration required. The annual and semiannual inspection and operational ~~maintenance and~~ testing of the smoke control system as required by 909.20.4 and 909.20.5 shall be supervised by personnel who have expertise in fire protection engineering, mechanical engineering and certified as air balancers, or are certified by a third party accreditation program for air testing, adjusting and air balancing and for inspection of smoke control systems. The system components shall be maintained in accordance with the manufacturer's instructions and Sections 909.20.1 through 909.20.5.

Commenter's Reason: The purpose of this public comment is to clarify that this requirement for qualified supervisory personnel is intended to fulfill the required annual and semiannual operational testing of the smoke control system. Routine component maintenance and testing may be performed by either a certified third-party or otherwise qualified individuals, such as facility maintenance personnel; however it is not required by this new code section.

Final Action: AS AM AMPC____ D

F144-09/10

910 (IBC [F] 910), 2306, Chapter 47 (IBC Chapter 35)

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, HonAIA, Chair, representing ICC Code Technology Committee (CTC)

1. Revise as follows:

SECTION 910
SMOKE AND HEAT VENTS

910.1 (IBC [F] 910.1) General. Where required by this code ~~or otherwise installed~~, smoke and heat vents and draft curtains or mechanical smoke ~~exhaust~~ removal systems~~, and draft curtains~~ shall conform to the requirements of this section. The provisions of Section 910.3 shall only apply to buildings or portions thereof, which are not protected by an automatic sprinkler system. The provisions of Section 910.4 shall apply to buildings or portions thereof which are protected by an automatic sprinkler system in accordance with Section 903.3.1.1.

~~**Exceptions:**~~

1. ~~Frozen food warehouses used solely for storage of Class I and II commodities where protected by an approved automatic sprinkler system.~~
2. ~~Where areas of buildings are equipped with early suppression fast-response (ESFR) sprinklers, automatic smoke and heat vents shall not be required within these areas.~~

910.2 (IBC [F] 910.2) Where required. Smoke and heat vents and draft curtains or a smoke removal system shall be ~~installed in the roofs of one-story buildings or portions thereof occupied for the uses set forth in Sections 910.2.1 through 910.2.3.~~ provided as required by Sections 910.2.1 through 910.2.3

910.2.1 (IBC [F] 910.2.1) Group F-1 or S-1. ~~Buildings and portions thereof used as~~ A mechanical smoke removal system shall be installed in one story buildings or portions thereof used as a Group F-1 or S-1 occupancy exceeding 50,000 square feet. ~~having more than 50,000 square feet (4645 m^2) in undivided area.~~

~~**Exception:** Group S-1 aircraft repair hangars.~~

910.2.2 (IBC [F] 910.2.2) Nonsprinklered high-piled combustible storage. Smoke and heat vents and draft curtains shall be installed in one story buildings or portions thereof containing high-piled combustible storage ~~stock~~ which is not protected by an automatic sprinkler system ~~or rack storage in any occupancy group~~ in accordance with Section 2306.7.

910.2.3 (IBC [F] 910.2.3) Sprinklered high-piled combustible storage. A mechanical smoke removal system shall be installed in one story buildings or portions thereof containing high-piled combustible storage which is protected by an automatic sprinkler system in accordance with Section 413 and the *International Fire Code*.

910.3 (IBC [F] 910.3) Design and installation. The design and installation of smoke and heat vents and draft curtains in buildings which are not protected by an automatic sprinkler system shall be ~~as specified in Sections 910.3.1 through 910.3.5.2 and Table 910.3.~~ in accordance with NFPA 204 and this section.

~~**TABLE 910.3 (IBC [F] TABLE 910.3)**~~
~~**REQUIREMENTS FOR DRAFT CURTAINS AND SMOKE AND HEAT VENTS[a]**~~
(Delete table and notes in their entirety)

910.3.1 (IBC [F] 910.3.1) Smoke boundary layer. Smoke and heat vents and draft curtain installations shall be designed to maintain the elevation of the smoke boundary layer as defined by NFPA 204 a minimum of 6 feet above the elevation of the means of egress for a period of 20 minutes after effective ignition.

~~**910.3.1 (IBC [F] 910.3.1) Design.**~~ **910.3.2 (IBC [F] 910.3.2) Listing and labeling.** Smoke and heat vents shall be listed and labeled to indicate compliance with UL 793 or FM 4430..

~~**910.3.2 (IBC [F] 910.3.2) Vent operation.** Smoke and heat vents shall be capable of being operated by approved automatic and manual means. Automatic operation of smoke and heat vents shall conform to the provisions of Sections 910.3.2.1 through 910.3.2.3.~~

~~**910.3.2.1 (IBC [F] 910.3.2.1) Gravity-operated drop-out vents.** Automatic smoke and heat vents containing heat-sensitive glazing designed to shrink and drop out of the vent opening when exposed to fire shall fully open within 5 minutes after the vent cavity is exposed to a simulated fire, represented by a time-temperature gradient that reaches an air temperature of 500°F (260°C) within 5 minutes.~~

~~**910.3.2.2 (IBC [F] 910.3.2.2) Sprinklered buildings.** Where installed in buildings provided with an approved automatic sprinkler system, smoke and heat vents shall be designed to operate automatically.~~

~~**910.3.2.3 (IBC [F] 910.3.2.3) Nonsprinklered buildings.** Where installed in buildings not provided with an approved automatic sprinkler system, smoke and heat vents shall operate automatically by actuation of a heat-responsive device rated at between 100°F (38°C) and 220°F (104°C) above ambient.~~

~~**Exception:** Gravity-operated drop-out vents complying with Section 910.3.2.1~~

~~**910.3.3 (IBC [F] 910.3.3) Vent dimensions.** The effective venting area shall not be less than 16 square feet (1.5 m^2) with no dimension less than 4 feet (1219 mm), excluding ribs or gutters having a total width not exceeding 6 inches (152 mm).~~

~~**910.3.4 (IBC [F]**~~ ~~**910.3.4**~~ <u>**910.3.3 (IBC [F] 910.3.3**</u> **Vent locations.** Smoke and heat vents shall be located 20 feet (6096 mm) or more from adjacent lot lines and fire walls and 10 feet (3048 mm) or more from fire barriers. ~~Vents shall be uniformly located within the roof in the areas of the building where the vents are required to be installed by Section 910.2 with consideration given to roof pitch, draft curtain location, sprinkler location and structural members~~.

~~**910.3.5 (IBC [F] 910.3.5)**~~ <u>**910.3.4 (IBC [F] 910.3.4**</u> **Draft curtains.** Where required by ~~Table 910.~~3 <u>NFPA 204</u>, draft curtains shall be installed on the underside of the roof in accordance with this section.

Exception: Where areas of buildings are equipped with ESFR sprinklers, draft curtains shall not be provided within these areas. Draft curtains shall only be provided at the separation between the ESFR sprinklers and the non ESFR sprinklers.

~~**910.3.5.1 (IBC [F]**~~ ~~**910.3.5.1**~~ <u>**910.3.4.1 (IBC [F] 910.3.4.1)**</u> **Construction.** Draft curtains shall be constructed of sheet metal, lath and plaster, gypsum board or other approved materials which provide equivalent performance to resist the passage of smoke. Joints and connections shall be smoke tight.

~~**910.3.5.2 (IBC [F] 910.3.5.2) Location and depth.** The location and minimum depth of draft curtains shall be in accordance with Table 910.3.~~

~~**910.4 (IBC [F] 910.4) Mechanical smoke exhaust.** Where approved by the fire code official, engineered mechanical smoke exhaust shall be an acceptable alternate to smoke and heat vents.~~
<u>**[F] 910.4. Mechanical smoke removal system.** Where required by Sections 910.2.1 and 910.2.3, a mechanical smoke removal system shall be provided in accordance with this section.</u>

<u>**Exception:** Buildings or portions thereof which are protected by ESFR sprinklers.</u>

~~**910.4.1 (IBC [F] 910.4.1) Location.** Exhaust fans shall be uniformly spaced within each draft-curtained area and the maximum distance between fans shall not be greater than 100 feet (30 480 mm).~~

<u>**910.4.1 (IBC [F] 910.4.1) Exhaust fan number and spacing.** A minimum of two exhaust fans shall be provided. The spacing between exhaust inlets shall be a minimum of 40 feet and not exceed 100 feet.</u>

~~**910.4.2 (IBC [F] 910.4.2) Size.** Fans shall have a maximum individual capacity of 30,000 cfm (14.2 m3/s). The aggregate capacity of smoke exhaust fans shall be determined by the equation:~~

~~$C=A\times 300$ **(Equation 9-10)**~~

~~where:~~

~~*C* = Capacity of mechanical ventilation required, in cubic feet per minute (m3/s).~~
~~*A* = Area of roof vents provided in square feet (m2) in accordance with Table 910.3.~~

<u>**910.4.2 (IBC [F] 910.4.2) Exhaust fan construction.** Exhaust fans which are part of the smoke removal system shall be rated for operation at ambient temperatures. Exhaust fan motors shall be located outside of the exhaust air stream.</u>

<u>**910.4.2 (IBC [F] 910.4.3) System design criteria.** The mechanical smoke removal system shall be sized to exhaust the building at a minimum rate of 4 air changes per hour based upon the volume of the building or portion thereof without contents. The capacity of each exhaust fan shall not exceed 30,000 cubic feet per minute. Adequate make-up air shall be available and approved.</u>

~~**910.4.3 (IBC [F] 910.4.3) Operation.** Mechanical smoke exhaust fans shall be automatically activated by the automatic sprinkler system or by heat detectors having operating characteristics equivalent to those described in Section 910.3.2. Individual manual controls of each fan unit shall also be provided.~~

910.4.4 (IBC [F] 910.4.4) Activation. The mechanical smoke removal system shall be activated by manual controls. The mechanical smoke removal system shall not be automatically activated.

910.4.5 (IBC [F] 910.4.5) Manual control location. Manual controls shall be located so as to be accessible to the fire service from the exterior of the building and be protected against interior fire exposure by not less than 1-hour fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both.

~~**[F] 910.4.4 Wiring and control.** Wiring for operation and control of smoke exhaust fans shall be connected ahead of the main disconnect and protected against exposure to temperatures in excess of 1,000°F (538°C) for a period of not less than 15 minutes. Controls shall be located so as to be immediately accessible to the fire service from the exterior of the building and protected against interior fire exposure by not less than 1-hour fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711, or both.~~

910.4.6 (IBC [F] 910.4.6) Wiring and control. Wiring for the operation and control of smoke removal system fans shall be connected ahead of the main disconnect and be protected by materials with a finish rating of 30 minutes.

~~**910.4.5 (IBC [F] 910.4.5) Supply air.** Supply air for exhaust fans shall be provided at or near the floor level and shall be sized to provide a minimum of 50 percent of required exhaust. Openings for supply air shall be uniformly distributed around the periphery of the area served.~~

~~**910.4.6 (IBC [F] 910.4.6) Interlocks.** In combination comfort air-handling/ smoke removal systems or independent comfort air-handling systems, fans shall be controlled to shut down in accordance with the approved smoke control sequence.~~

910.4.7 (IBC [F] 910.4.7) Interlocks. Where building air-handling and smoke removal systems are combined or where independent building air-handling systems are provided, fans shall automatically shut down in accordance with the *International Mechanical Code*. The manual controls provided for the smoke removal system shall have the cability to override the automatic shutdown of fans that are part of the smoke removal system.

TABLE 2306.2
GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

COMMODITY CLASS	**SIZE OF HIGH-PILED STORAGE AREA[a] (square feet) (see Sections 2306.2 and 2306.4)**	**ALL STORAGE AREAS (See Sections 2306, 2307 and 2308)[b]**				
		Automatic fire-extinguishing system (see Section 2306.4)	**Fire detection system (see Section 2306.5)**	**Building access (see Section 2306.6)**	**Smoke and heat ~~removal~~ venting (see Section 2306.7)**	~~**Draft curtains (see Section 2306.7)**~~
I-IV	0-500	Not Required[a]	Not Required	Not Required[e]	Not Required	~~Not Required~~
	501-2,500	Not Required[a]	Yes[i]	Not Required[e]	Not Required	~~Not Required~~
	2,501-12,000 Public accessible	Yes	Not Required	Not Required[e]	Not Required	~~Not Required~~
	2,501-12,000 Nonpublic accessible (Option 1)	Yes	Not Required	Not Required[e]	Not Required	~~Not Required~~
	2,501-12,000 Nonpublic accessible (Option 2)	Not Required[a]	Yes	Yes	Yes	~~Yes[j]~~

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA[a] (square feet) (see Sections 2306.2 and 2306.4)	ALL STORAGE AREAS (See Sections 2306, 2307 and 2308)[b]				
		Automatic fire-extinguishing system (see Section 2306.4)	**Fire detection system (see Section 2306.5)**	**Building access (see Section 2306.6)**	**Smoke and heat ~~removal~~ venting (see Section 2306.7)**	**~~Draft curtains (see Section 2306.7)~~**
	12,001-20,000	Yes	Not Required	Yes	Yes[j]	~~Not Required~~
	20,001-500,000	Yes	Not required	Yes	Yes[l]	~~Not required~~
	Greater than 500,000 [~~g~~ d]	Yes	Not required	Yes	Yes[l]	~~Not required~~
High hazard	0-500	Not Required[a]	Not Required	Not Required[e]	Not Required	~~Not Required~~
	501-2,500 Public accessible	Yes	Not Required	Not Required[e]	Not Required	~~Not Required~~
	501-2,500 Nonpublic accessible (Option 1)	Yes	Not Required	Not Required[e]	Not Required	~~Not Required~~
	501-2,500 Nonpublic accessible (Option 2)	Not Required[a]	Yes	Yes	Yes	~~Yes[i]~~
	2,501-300,000	Yes	Not required	Yes	Yes[j]	~~Not required~~
	300,001-500,000[~~g,~~ d,h]	Yes	Not required	Yes	Yes[l]	~~Not required~~

(Portions of table not shown remain unchanged)

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m^3 , 1 square foot = 0.0929 m^2 .

a. When automatic sprinklers are required for reasons other than those in Chapter 23, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 2307 and 2308.

b. For aisles, see Section 2306.9.

c. Piles shall be separated by aisles complying with Section 2306.9.

d. For storage in excess of the height indicated, and high hazard storage areas greater than 300, 000 square feet, ~~special fire protection~~ an approved engineering design such as fire protection of structural elements and enhanced fire suppression shall be provided ~~in accordance with Note g when required by the fire code official~~. See also Chapters 28 and 34 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. Section 503 shall apply for fire apparatus access.

f. For storage exceeding 30 feet in height, Option 1 shall be used.

~~g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided when required by the fire code official.~~

h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with the International Building Code shall be used to divide high-piled storage exceeding 500,000 square feet in area.

i. Not required when an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 2307 and 2308.

j. Smoke and heat venting shall not be ~~Not~~ required when storage areas are protected by early suppression fast response (ESFR) sprinkler systems installed in accordance with NFPA 13. Where a standard sprinkler system is installed in these locations, a mechanical smoke removal system shall be provided in accordance with Section 910.4. See Section 2306.7.

2306.7 Smoke and heat ~~removal~~ venting. Where smoke and heat ~~removal~~ venting ~~are~~ is required by Table 2306.2 in buildings not protected by an automatic sprinkler system, smoke and heat vents and draft curtains shall be provided in accordance with Section 910. Smoke and heat venting shall not be required where storage areas are protected by early suppression fast response (ESFR) sprinkler systems installed in accordance with NFPA 13. Where Table 2306.2

requires smoke and heat venting in a building with a standard sprinkler system, a mechanical smoke removal system shall be provided in accordance with Section 910.4. Where draft curtains are required by Table 2306.2, they shall be provided in accordance with Section 910.3.4.

2. Add new standards to Chapter 47 (IBC Chapter 35) as follows:

FM
4430-07 Approval Standard for Heat and Smoke Vents

NFPA
204-2010 Standard for Smoke and Heat Venting

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Balanced Fire Protection – Roof vents". The scope of the activity is noted as:

Review the current IBC/IFC requirements for smoke/heat vents and draft curtains relative to balanced fire protection**.**

The purpose of this code change is to update the provisions which mandate roof vents in one-story industrial and storage buildings. The code change will delete the specification-oriented provisions for roof vents and draft curtains for unsprinklered buildings and substitute a reference to NFPA 204. The code change will further require that a manually-operated mechanical smoke removal system be provided for large one-story industrial and storage buildings protected by a sprinkler system in lieu of the requirements for roof vents and draft curtains.

The first issue assigned by the ICC Board of Directors to the Code Technology Committee (CTC) in 2005 was the issue of "balanced" fire protection. As part of the CTC's review of the "balanced" fire protection issue, the CTC formed a Study Group to review the issue of whether or not smoke/heat vents were necessary in large buildings protected by a sprinkler system.

After reviewing the available research on the interaction of standard sprinklers and roof vents (NISTIR 6196-1), it was determined that individually-activated automatic roof vents are unlikely to activate automatically in buildings protected by standard spray sprinklers (provided that the sprinkler system is adequate for the hazard protected and is operational). Given this determination, it was concluded that the performance of individually-activated automatic roof vents is essentially the same as manually-operated roof vents in buildings protected by a sprinkler system.

The explanatory information provided in NFPA 204 indicates that the capabilities of roof vents to perform their function are dependent upon the depth of the smoke layer which develops and the temperature differential between the smoke layer and ambient temperature. Given that standard spray sprinklers are highly efficient in reducing ceiling temperatures due to the finely divided water spray produced by these types of sprinklers, the ceiling temperatures produced even in "high challenges" fires are rapidly reduced and, after about 10 minutes of sprinkler discharge, return to near ambient and continue to drop with additional time. Based upon this, it can be concluded that roof vents which are manually opened 10 minutes or more after sprinkler activation will not provide effective venting for the building.

Where the smoke layer temperature differentials are less than 110^{o}C (198^{o}F), NFPA 204 recommends that a powered (mechanical) exhaust system be provided in lieu of providing roof vents. Based upon the recommendations contained in NFPA 204, the provisions for providing roof vents have been deleted and a requirement for a manually-operated mechanical smoke removal system has been substituted.

The proposal requires that the manually-operated mechanical smoke removal system be sized to provide a minimum of 6 air changes per hour. Since the use of roof vents for the purpose of providing venting in sprinklered buildings has been acceptable for over 25 years, the sizing of the mechanical smoke removal system has been determined based upon the venting capabilities of roof vents at a time equal to the typical fire department response time, 10 minutes and beyond. Given that opened roof vents will provide little actual venting capability after the sprinkler system has been discharging water spray for 10 minutes, providing a mechanical smoke removal system which provides a minimum of 4 air changes an hour will be a substantial improvement over the presently acceptable venting capabilities for sprinklered buildings required by the IBC/IFC. The 4 air changes were viewed as a reasonable value when compared against the BOCA National Building Code which required 2 and the Uniform Building Code which required 6.

It should be noted that this code change proposal permits the mechanical smoke removal system to designed to operate at ambient temperatures. The rationale for this provision is that the ceiling temperatures throughout the building will be returned to close to ambient at between 10 and 15 minutes after the first sprinkler activates. Given that the typical response time for fire departments is roughly 10 minutes, and the ceiling temperatures expected after 10 minutes, there is no need to design the mechanical system to withstand temperatures higher than ambient.

In the opinion of the Study Group which has developed this code change proposal, the proposal is a vast improvement over the existing provisions for roof venting presently contained in the IBC/IFC.

It should be noted that simply making a reference to NFPA 204 as a substitute for the present specification-oriented provisions for roof vents/draft curtains contained in the IBC/ IFC is not an option because the current edition of NFPA 204 does not contain specific design provisions for the design of roof vent systems in buildings protected by a standard sprinkler system. Without specific provisions for roof vent system in sprinklered buildings, the requirements for roof vent systems in sprinklered buildings cannot be enforced in a uniform manner in all jurisdictions which utilize the IBC/IFC.

It should also be noted that the NFPA 204 committee is presently working developing provisions which address the design of roof venting systems in sprinklered buildings; however, these provisions have been under development for more than 30 years. It is the Study Group's opinion that the IBC/IFC should not be written based upon the assumption that the NFPA 204 committee will be able to develop provisions for the design of venting systems anytime in the near future.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, FM 4430-07, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009. Review of proposed new standard NFPA 204-2010 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

ICCFILENAME: HEILSTEDT-F1-910.1.DOC

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard NFPA 204-2010 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria in terms of the availability of a consensus draft for the committee hearing. Note that section 3.6.3.1 of CP28-05 requires that the standard be completed and readily available prior to Final Action Consideration. The final action of this proposal will occur May 14-23, 2010.

Review of the proposed standard FM 4430-07 indicated that in the opinion of ICC Staff the standard did not comply with ICC standards criteria. More specifically the standard did not meet the consensus process of requirement of Section 3.6.3.2 of CP28-05.

Committee Action: Approved as Modified

Modify proposal as follows:

910.2.1 (IBC [F] 910.2.1) Group F-1 or S-1 ~~.~~A mechanical smoke removal system shall be installed in ~~one story~~ buildings or portions thereof used as a Group F-1 or S-1 occupancy exceeding 50,000 square feet.

910.2.3 (IBC [F] 910.2.3) Sprinklered high-piled combustible storage~~.~~ A mechanical smoke removal system shall be installed in ~~one story~~ buildings or portions thereof containing high-piled combustible storage which is protected by an automatic sprinkler system in accordance with Section 413 and the *International Fire Code*.

[F] 910.4. Mechanical smoke removal system. Where required by Sections 910.2.1 and 910.2.3, a mechanical smoke removal system shall be provided in accordance with this section.

Exceptions:

1. Buildings or portions thereof which are protected by ESFR sprinklers.
2. Buildings equipped with smoke and heat vents designed in accordance with NFPA 204, when permitted by NFPA 13.

910.4.6 (IBC [F] 910.4.6) Wiring and control. Wiring for the operation and control of smoke removal system fans ~~shall be connected ahead of the main disconnect~~ provided with power in accordance with Section 909.11 and be protected by materials with a finish rating of ~~30 minutes~~ not less than 1 hour.

2306.7 Smoke and heat venting. Where smoke and heat venting is required by Table 2306.2 in buildings not protected by an automatic sprinkler system, smoke and heat vents and draft curtains shall be provided in accordance with Section 910. Smoke and heat venting shall not be required where storage areas are protected by early suppression fast response (ESFR) sprinkler systems installed in accordance with NFPA 13. Where Table 2306.2 requires smoke and heat venting in a building with a standard sprinkler system, ~~a mechanical~~ smoke removal ~~system~~ shall be provided in accordance with Section 910.4. Where draft curtains are required by Table 2306.2, they shall be provided in accordance with Section 910.3.4.

Revise Table 2306.2 Note j as follows:

j. Smoke and heat venting shall not be required when storage areas are protected by early suppression fast response (ESFR) sprinkler systems installed in accordance with NFPA 13. Where a standard sprinkler system is installed in these locations, ~~a mechanical~~ smoke removal ~~system~~ shall be provided in accordance with Section 910.4. See Section 2306.7.

NFPA

204-~~2010~~ 2007 Standard for Smoke and Heat Venting

(Portions of the proposal not shown remain unchanged)

Committee Reason: The committee approved the proposal with amendments as it was felt that a major revision to this section was necessary. The proposal essentially requires mechanical smoke removal in sprinklered buildings and using smoke and heat vents in unsprinklered buildings. There were four major modifications to this code change. The first removed the phrase “one-story” from sections 910.2.1 and 910.2.3 as mechanical smoke removal does not need to be limited to ‘one story” buildings as smoke and heat venting is limited. The second modification increases the rating of the wiring for the smoke removal system from 30 minutes to 1 hour and also requires standby power and some associated passive protection of such power supplies in accordance with Section 909.11. Members of the committee felt smoke removal systems are critical emergency systems that need additional protection even in buildings where sprinklers are operating. The third modification recognizes some situations that are permitted by NFPA 13 to allow smoke and heat vents in sprinklered buildings. Allowing smoke and heat vents as an option when appropriate was felt to be necessary. This revision adds a new exception to Section 910.4 to allow this in lieu of smoke removal systems. In addition, Section 2306.7 and footnote j to Table 2306.2 makes the reference to smoke removal more general to be inclusive of mechanical smoke removal and smoke and heat vents. The fourth modification changes the referenced edition of NFPA 204 from the 2010 edition to the 2007 edition. The reason for the change of edition years relates to the fact that the 2010 edition is likely not to be available prior to the final action hearings.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Richard Schulte representing Schulte & Associates, requests Approval as Submitted.

Commenter's Reason: The reason for submitting this public comment is that it is Schulte & Associates' opinion that testimony heard in support of the modification to this code change proposal made by William Koffel, Koffel & Associates, was factually in error and, hence, the code changes committee was misled into believing that it is the intent of the 2010 edition of NFPA 13 to consider that the installation of roof vents "***is a viable technology in sprinklered buildings***".

It is also Schulte & Associates' opinion that the code changes committee was further misled by testimony provided by William Koffel that the next edition of NFPA 204 will contain a "methodology" for designing roof vent/draft curtain systems in buildings protected by a sprinkler system.

The text of William Koffel's testimony on the modification to code change proposal F144-09/10 is as follows:

> *"To the modification. As Carl* [Baldassarra] *said, the name of this committee is Code Technology Committee, but their proposal is eliminating a technology that has been used for years without adequate substantiation. So, the nature of our modification is merely in sprinklered buildings to give the option using mechanical system or to use vents as we've used for a number of years.*
>
> *Now, in their supporting statement, they identify several reasons for doing this. In the second to the last paragraph on the first page of their substantiation, they indicate that the differential on the smoke temperatures will be approximately 198°F. I don't see where they came up with that. In fact, Carl stood here earlier and said that the test to determine adequate sprinkler performance is that temperatures do not threaten the structural steel system. That's substantially higher than the temperatures that they just referenced here. And in fact, NFPA 13 encourages the use of high temperature, 286°F sprinklers, in this type of occupancy. So, we clearly could have temperatures in excess of what they've identified. Secondly, they talk about a recommendation of the NFPA 204 committee. I sit on the NFPA smoke management committee responsible for 204. I'm not representing that committee here. I sit on NFPA 13 discharge criteria committee which is responsible for Chapter 12. I'm not representing that committee. But I think this committee needs to know that NFPA 13 now allows vents and draft curtains in buildings protected throughout with a sprinkler system. In fact, they've even gone so far to allow it in a building with ESFR sprinklers, smoke vents that is, if the vents have a certain criteria. That's in Chapter 12 of the 2010 edition of NFPA 13.* ***So the 13 committee recognizes that this is a viable technology in sprinklered buildings.*** [Emphasis added.] *204 has a proposal, or a comment, that is being balloted now that has a new chapter for designing smoke vents in buildings protected with a sprinkler system, so the technology is being addressed by the appropriate NFPA committees. Thank you.*

The issue of whether roof vents should be required in buildings protected by a sprinkler system was first discussed at the Code Technology Committee (CTC) meeting held in Detroit in late September 2005. The CTC voted to form a study group on the issue of roof vents as part of the CTC's study of the "balanced fire protection" issue at its meeting in Kansas City in October 2006. The study group began its work in January 2007 and it quickly became apparent (in my opinion) that the representatives of the Smoke Vent Task Group, Dr. Craig Beyler and Rick Thornberry, intended to delay the work of the study group for as long as possible.

At the CTC meeting held in Cincinnati in June 2007, the CTC voted to hold a debate over the issue of the use of roof vents in buildings protected by a sprinkler system in order to "break the logjam" created by Messrs. Thornberry and Beyler. Each side in the debate was given 30 minutes to make a presentation to the CTC. The debate before the CTC took place in Baltimore in late May 2008. Given the lack of time available for discussion at the meeting in Baltimore, the debate was repeated at the next CTC meeting held in Chicago in November 2008.

Speaking for the Smoke Vent Task Group, Dr. Craig Beyler, Hughes Associates, Inc. (HAI), presented HAI's research on the concept of the automatic "ganged" operation of roof vents (60 seconds after sprinkler system water flow is detected) to the CTC. This research relied on a fire modeling study of the interaction between sprinklers and roof vents. The "validation" of the fire model used in HAI's research was challenged and it was eventually determined that the use of the fire model, the Fire Dynamics Simulator (FDS), was not "validated" for the purpose the model was utilized by HAI. In a Smoke Vent Task Group teleconference held on March 24, 2009, the SVTG characterized HAI's fire modeling study as "***worthless***" and both of the SVTG's representatives to the CTC Roof Vent Study Group appear to have been dismissed by the Smoke Vent Task Group some time during 2009.

(**Source:** Minutes of the Smoke Vent Task Group Conference Call-Tuesday, March 24, 2009; 2009 AAMA 72nd Annual Conference, February 22-25, 2009-Revised as of May 11, 2009. See the notes at the end of this comment for the exact text indicating that the research work done by Hughes Associates, Inc. is "***worthless***".)

Based upon direction by the CTC provided at its November, 2008 meeting, the Roof Vent Study Group developed what became code change F144-09/10. The CTC's direction to the Study Group was that the code change proposal should reference NFPA 204.

Given that the latest edition of NFPA 204, the 2007 edition, does not contain any mandatory provisions for the design of roof vent/draft curtain systems in buildings protected by a sprinkler system, the Study Group developed a code change proposal which references NFPA 204 for the design of roof vent/draft curtain systems in buildings which are not protected by a sprinkler system and requires a manually-activated mechanical smoke removal system for buildings protected by a sprinkler system. Providing a mechanical smoke removal system is in accordance with the provisions contained in NFPA 204 which state that a mechanical smoke removal system should be considered, rather than roof vents, where the differential between the (**average**) temperature of the smoke layer and ambient temperature is less than 100^{o}C (198^{o}F).

The code change proposal developed by the Roof Vent Study Group/CTC contains no provisions for the use of roof vent systems in buildings protected by a sprinkler system. **Over the course of the three years in which the Roof Vent Study Group has been in existence, neither the Smoke Vent Task Group, the consultants retained by the SVTG or other interested parties submitted any documentation or testing which demonstrated that roof vent systems in buildings protected by a sprinkler system actually "work".**

In 1997/1998, a research study of the interaction between sprinklers and roof vents funded by the National Fire Protection Research Foundation (NFPRF) and conducted at Underwriters Laboratories (UL) determined that it was unlikely that thermally-activated automatic roof vents would open if the temperature rating of the activating device was the same (or greater than the) temperature rating of the sprinklers. More specifically, **Test P-2** in a series of five large-scale fire tests which were conducted as part of this research demonstrated that even if the ignition point of the fire was directly beneath an automatic roof vent, a vent may fail to open due to the activation of sprinklers in the vicinity of the vent. (The final report on this research can be found in a document referred to as **NISTIR 6196-1** dated September 1998. The title of this report is "Sprinkler, Smoke & Heat Vent, Draft Curtain Interaction-Large Scale Experiment and Model Development". The authors of this report were Kevin B. McGrattan, Anthony Hamins and David Stroup of NIST. The summary and discussion of Test P-2 begins on page 42 of this report.)

In response to the published report on the UL/NFPRF research, the chairman of the Smoke Vent Task Group, Paul Simony, issued a memorandum in early September 1999 which made a commitment to fund additional research into the interaction of sprinklers and roof vents. After 10-1/2 years, the research announced in September 1999 has yet to begin.

In the Summer 2006 issue of the AAMA newsletter, AAMAnet.work, the Smoke Vent Task Group announced that a contract had been awarded to Hughes Associates, Inc. to conduct fire modeling "***to concretely demonstrate the value of S&HV*** [smoke and heat vents] ***in terms of property protection, occupant safety, firefighter safety, and firefighter effectiveness***". The findings of this research were released in a report titled

"*Analysis of the Performance of Ganged Operation of Smoke and Heat Vents with Sprinklers and Draft Curtains*" dated February 18, 2008, however, the "validation" of the fire model, the Fire Dynamics Simulator (FDS), for the purposes utilized in the research was challenged (by Schulte & Associates and others) and Hughes Associates, Inc. was unable to demonstrate that the FDS has been "validated" for the purposes which the FDS was used. Hence, Hughes Associates, Inc.'s client, the Smoke Vent Task Group has characterized the fire modeling study which was to *"concretely demonstrate the value of S&HV*" as "***worthless***".

(**Source:** Minutes of the Smoke Vent Task Group Conference Call-Tuesday, March 24, 2009; 2009 AAMA 72nd Annual Conference, February 22-25, 2009-Revised as of May 11, 2009. See the notes at the end of this comment for the exact text indicating that the research work conducted by Hughes Associates, Inc. is "***worthless***".)

In a meeting of the CTC Balanced Fire Protection Study Group held at the Orange County Fire Authority (OCFA) in January 2007, Rick Thornberry, representing the Smoke Vent Task Group, announced that the SVTG would conduct testing of the concept of the "ganged" operation of roof vents in an aircraft hangar scheduled for demolition located on the Marine Corps Base in Orange County, California in conjunction with the OCFA. Later in 2007, Rick Thornberry announced that the planned research had been cancelled because of a lack of agreement regarding the use of the aircraft hangar with the United States Navy and that there were no other plans to conduct further research due to the problem of finding a suitable building and compliance with air pollution regulations.

In summary, in the 11-1/2 years since the findings of the UL/NFPRF study were published, the manufacturers of roof vents have made three commitments to conduct additional studies and research on the interaction of roof vents and sprinklers, but have not honored any of these commitments. (One of those commitments did result in "***worthless***" research, however.) In other words, the 1998 finding that the operation of sprinklers interferes with the openings of roof vents remains uncontested by any additional research. Further, Dr. Craig Beyler, formerly a representative for the Smoke Vent Task Group, has stated on a number of occasions since September 1998 that the number of thermally-activated roof vents which will open automatically in a fire in a building protected by a sprinkler system will be either 0 or 1 (if the sprinkler system effectively controls the fire).

Recently, the NFPA 13 committee has addressed the issue of the installation of roof vents in buildings protected by a sprinkler system. The original proposal considered by the NFPA 13 subcommittee published in the ROP document dated **October 20, 2007** reads as follows:

"**12.1.1** *Roof Vents and Draft Curtains. Roof vents and draft curtains shall* ***not*** *be used in conjunction with the sprinkler protection criteria for storage in this standard.*

This original 2007 proposal was amended to its final form for inclusion in the 2010 edition of NFPA 13. The substantiation for the provisions addressing roof vents included in the 2010 edition of NFPA 13 reads as follows:

"**Substantiation:** *The intent of the standard is that roof vents and draft curtains should* ***not*** *be used in conjunction with storage protection. Previous language was unenforceable.*"

In addition to the above, an "Explanation of Negative" comment submitted on the proposal which addresses the use of roof vent systems in buildings protected by a sprinkler system reads as follows:

MULTER, T.: *The following original proposal on ROP documents dated 10/20/2007 should be accepted as proposed but with a change to the annex statement. . . .*

A.12.1.1 *The design parameters in NFPA 13 were developed based upon the absence of roof vents or draft curtains. (See Annex C.6) Fire tests for sprinklers specifically listed for storage applications are tested without vents or draft curtains. References to control mode sprinklers in other building standards pertain to standard spray sprinklers that were not specifically tested by the laboratories for storage applications. With the advent of K-11.2 and larger sprinklers for storage applications and now Specific Application Control Mode sprinklers (being revised to CMSA), we need to realize that ESFRs are not the only storage sprinklers and that* ***the use of smoke vents and draft curtains can be detrimental to all sprinklers that are specifically tested for storage applications.*** *FM Global's recommended storage protection designs are based upon vents not being provided and that the use of automatic vents may increase the sprinkler water demand.*"

(**Source:** [NFPA] 13-325 Log #CP43 AUT-SSD Final Action: Accept; **Submitter:** *Technical Committee on Sprinkler System Discharge Criteria*)

Given all of the information above, it would be difficult to conclude anything but that William Koffel's statement that ***"this is a viable technology in sprinklered buildings"*** in his testimony at the code development hearings in Baltimore was misinformation. Given the fact that William Koffel is (and was) a member of the NFPA 13 sub-committee which developed the NFPA 13 provisions addressing roof vents and that he cast ballots on these proposals, it is also not too difficult to conclude that William Koffel's statement was intentional disinformation. (It should be noted that an ethics complaint against William Koffel based upon his testimony in the code development hearings in Baltimore was filed with the ICC in January, 2010.)

Regarding William Koffel's statements that "***204 has a proposal, or a comment, that is being balloted now that has a new chapter for designing smoke vents in buildings protected with a sprinkler system, so the technology is being addressed by the appropriate NFPA committees"***, two special expert members of the NFPA Smoke Management Committee submitted the following comments regarding the proposed "methodology" for utilizing roof vents/draft curtains in buildings protected by a sprinkler system:

DILLON, M.: *The document* ***prematurely and improperly*** *requires and relies upon unproven methods of calculation for the effectiveness of smoke and heat vents in the presence of automatic water-based sprinkler protection systems.* ***It also relies on calculations of questionable accuracy to determine activation times for the vents and the sprinklers.***

WOLIN, S.: *While the proposal would substantially increase the amount of text in Chapter 11, I do not believe that the proposed revisions provide any significant guidance on the use of smoke and heat vents in sprinklered buildings that would not otherwise be addressed in the performance analysis that is already required*. . . .

(Source: [NFPA] 204-1 Log #5, Report on Comments, June 2010.)

While the comments above made by Messrs. Dillon and Wolin were published after William Koffel's testimony, these comments are essentially the same comments made 6 months prior to the code development hearings in Baltimore by Messrs. Kenneth Isman, representing the National Fire Sprinkler Association (NFSA), and Richard Schulte, Schulte & Associates.

The following are excerpts from comments made by Messrs. Isman and Schulte in the spring of 2009:

ISMAN, K.: *We have seen extremely knowledgeable and experienced users of FDS be completely incapable of correctly predicting the number of sprinklers that would open and the opening time of these sprinklers in dry-pipe systems prior to arrival of water. If experienced users of FDS can't predict the situation correctly with no water flowing, how can we rely on data generated after water flow has arrived?*

Even if Dr. Beyler is capable of making sufficient adjustments to the FDS program to correctly predict sprinkler response times and locations, we have concerns about the average user of FDS being able to make this technological leap. According to the proposed section 11.3.2, the FDS model (or something equivalent) needs to be used to make section 11.2 work. ***We question whether the state-of-the-art in fire protection is ready for this step.***

SCHULTE, R.: *The capabilities of the Fire Dynamics Simulator to accurately predict the activation times of multiple sprinklers and the number of sprinklers which will activate is certainly questionable at best. At this point in time, it appears that the only "expert" who contends that these capabilities of the FDS have been "totally" validated (validation without any limitations) is Dr. Craig Beyler of Hughes Associates. To my knowledge, no other researcher or user of the FDS, including other employees of Hughes Associates, such as Dr. Jason Floyd, have come forward to support Dr. Beyler's assertions regarding the validation of these capabilities of the Fire Dynamics Simulator since late May, 2008 (when the question regarding validation of the FDS for the purpose used in the research first surfaced).*

With respect to the issue of validation of the FDS to accurately predict the activation times of multiple sprinklers and the number of sprinkler activations, Dr. Kevin McGrattan of the Building and Fire Research Laboratories (BFRL) at NIST responded to questions regarding the validation of the FDS for these purposes on the FDS Bulletin Board on February 17, 2009 as follows:

". . . . *there is* ***no consensus*** *metric in fire protection engineering by which a model is considered validated or not for a particular application. . . .All large scale fire experiments have a considerable amount of uncertainty in the reported heat release rate, environmental conditions, sprinkler characteristics (like droplet size, RTI, etc), and various other parameters that are input into the fire model. Because of the complexity of the experiments and simulations of fires in large warehouse type facilities, especially those involving multiple sprinkler activations, we do not have a good way (yet) of quantifying the experimental uncertainty. It might be as hard to do that as to predict the experimental results themselves. . . .****But I hope you understand that I simply cannot make a blanket statement like "FDS is validated for predicting multiple sprinkler activations.***"

(**Source:** [NFPA] 204-6 Log #1; Report on Comments A2010)

Given that William Koffel is a member of the NFPA Smoke Management Committee and is listed on the roster of committee members as representing the Smoke Vent Task Group, there can be little doubt that William Koffel reviewed the comments by Messrs. Isman and Schulte. Hence, it seems reasonable to assume that William Koffel is and was aware that the "methodology" for utilizing roof vent systems in building protected by a sprinkler system was considered to be questionable at the time of his testimony in the code development hearings. Once again, the above demonstrates that William Koffel's testimony was at best misinformation and, more than likely, intentional disinformation.

Subsequent to the code development hearings held in Baltimore, William Koffel has now been named as the representative of the Smoke Vent Task Group for purposes of participation in the ICC code development process. In the latest two teleconferences, one held on January 22, 2010 and another held on February 2, 2010, William Koffel no longer asserts that roof vents "work" in buildings protected by a sprinkler system, however, William Koffel has asserted that manually-activated roof vents can be used as a source of make-up air for exhaust fans provided and deployed by the fire service and that manually-activated roof vents are equivalent to the manually-activated smoke removal system proposed in code change proposal F144-09/10. (It should be noted that William Koffel has yet to concede that roof vents do **not** "work" in buildings protected by a sprinkler system, at least in the two teleconferences addressed above.)

Are manually-operated roof vents really the equivalent of a manually-activated smoke removal system? In order to open manually-activated roof vents, it is necessary for fire fighters to go onto the roof and individually open each roof vent and, since cold smoke does not rise, fire fighters must also deploy portable exhaust fans at the floor of the building (or attempt positive pressure ventilation). A manually-activated mechanical smoke removal system is activated by a switch located in an approved location and does not require that fire fighters go onto the roof or deploy portable exhaust fans. Obviously, from the standpoint of fire fighter safety, the level of safety provided by a manually-activated mechanical system far exceeds that provided by manually-operated roof vents. Given this, William Koffel's assertion that these two systems provide an e-quivalent level of fire fighter safety is obviously in error.

The public comment submitted by the ICC Code Technology Committee (CTC) will address other modifications approved to code change proposal F144-09/10. The public comment submitted by the CTC will provide the rationale and justification for providing 30 minute finish rating protection for the wiring for the mechanical smoke removal system and for not including a requirement for standby power. Hence, this comment will not address these issues.

The modifications to code change F144-09/10 approved by the code changes committee do not improve the original proposal and, in my opinion, the committee's decision to allow the use of roof vents was based upon hearing the misinformation included in William Koffel's testimony in the code development hearing. Given this, it is requested that code change proposal F144 be approved "as submitted".

The probability that code change F144 being approved as "as submitted" is essentially nil. Given this, I would like to urge that the membership give consideration to the "as further modified" proposal submitted by the ICC Code Technology Committee. While I find any provisions which permits manually-activated roof vents to be provided, and to be considered to be equivalent to the manually-activated mechanical smoke removal system proposed, to be objectionable, the CTC's "as further amended" proposal is at least a first step in recognizing that roof vents do not perform as claimed by the vent manufacturers and their highly-paid consultants/lobbyists.

If the manufacturers of roof vents want to claim that their product does indeed "work" in buildings protected by a sprinkler system, then the further testing and research that was promised by the manufacturers 11-1/2 years ago should be conducted. The membership should not continue to "fall prey" to promises of imminent testing and research made time and again by a trade association with a long history of making false commitments to conducting further testing and research. It is time for the ICC membership to demand to see the research and testing from the vent manufacturers' trade association that conclusively demonstrates that roof vents will make "cold and wet smoke" defy the laws of physics and actually rise.

For more than 30 years now, the vent manufacturers have claimed that roof vents cause "cold and wet smoke" to defy the laws of physics and many in the fire service have fallen for this ruse. The "**laws of physics**" are referred to as laws because they have been proven over and over again to be true. The vent manufacturers cannot point to a single test or study that demonstrates that their product causes "cold and wet smoke" to rise. Why do so many in the fire service continue to believe the manufacturers claims without any evidence?

A vote for "as submitted" will force the manufacturers of vents to either do the testing and research to prove their claims or to stop making unsubstantiated claims. A vote for "as further modified" as proposed by the CTC will also do the same, but in a less forceful manner. Adopting this public comment or the CTC's public comment is far more preferable than the present code provisions or the original CTC proposal as modified by the code changes committee.

Notes: Excerpt from AAMA Smoke Vent Task Group (SVTG) Teleconference Minutes-March 24, 2009:

> "*. . . .The concern remains that if C. Beyler is not willing to support the $100K SVTG Modeling Study, then the study is **worthless**. The members questioned why no other groups, organizations, or Fire Protection Engineers have come forward to defend the FDS program, particularly, Kevin McGratten* [McGrattan]*, from NIST, who wrote the original version of FDS, and has been intimately involved in it since its development. B.Sampson will contact K. McGratten* [McGrattan] *to obtain his thoughts on this.*"

Public Comment 2:

Paul K. Heilstedt, PE, HonAIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

910.2.1 (IBC [F] 910.2.1) Group F-1 or S-1 -A mechanical smoke removal system shall be installed in buildings or portions thereof used as a Group F-1 or S-1 occupancy exceeding 50,000 square feet <u>in undivided area.</u>

[F] 910.4. Mechanical smoke removal system. Where required by Sections 910.2.1 and 910.2.3, a mechanical smoke removal system shall be provided in accordance with this section.

Exception<u>s</u>:

1. Buildings or portions thereof which are protected by ESFR sprinklers.
2. Buildings equipped with smoke and heat vents ~~designed in accordance with NFPA 204, when permitted by NFPA 13.~~ <u>where approved by the code official. Where installed in buildings provided with an approved automatic sprinkler system, the operation of smoke and heat vents shall be in accordance with NFPA 13.</u>

910.4.6 (IBC [F] 910.4.6) Wiring and control. Wiring for the operation and control of smoke removal system fans shall be <u>connected ahead of the main disconnect</u> <u>installed in an approved location.</u> ~~provided with power in accordance with Section 909.11~~ and be protected by materials with a finish rating of <u>30 minutes</u> ~~not less than 1 hour~~.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The CTC studied available information and conducted numerous public meetings on this subject through a study group representing various interests, including building officials, fire officials, manufacturers, architects, engineers and consultants. The intent of the original proposal was to provide reasonable smoke removal provisions for post-fire fighting considerations. The IFC committee, via the modifications that were approved in Baltimore, has taken the original proposal in a direction for which the CTC is in significant disagreement. In effect, the modification took the proposal in a direction not intended by the original code change. This was evidenced by testimony at the hearings themselves where the CTC representative spoke against the modifications. Further, upon confusion of the committee action for "As Modified"; the CTC representative made a floor motion for "As Submitted" as the modified change is not consistent with the intent of the original proposal. The following is a discussion of the modifications approved by the IFC committee and how this public comment intends to direct the code change more closely back to the original intent.

Section 910.2.1:
IFC Modification: The IFC committee modification extends the application of the present smoke venting requirements from being limited to one-story buildings to buildings of any story height.

CTC's evaluation of the IFC modification:

The modification lacks technical substantiation;
This is a post fire fighting operation, not involving life safety;

CTC Public comment: As a post fire fighting system, CTC has not proposed to revise the requirements back to one story buildings. If the system is necessary and works for a single story, it will work for buildings having multiple stories. The public comment proposes to clarify that the 50,000 square feet area is a contiguous area and not the entire area of the building.

Section 910.4:
IFC Modification: The IFC committee modification allows the continued use of smoke and heat vents in sprinklered buildings.

CTC evaluation of the IFC modification:

After studying this issue for 2-1/2 years, the CTC concluded that there is no technical basis for vents in sprinklered buildings and proposed to remove the requirement;
Mechanical systems should be required for sprinklered buildings because any smoke removal must deal with cool smoke; reference is made to NFPA 204 for unsprinklered buildings only;
A review of the rationale included in the recent change to NFPA 13 includes recognition by the NFPA 13 technical committee that vents are mandated by other regulations, e.g., the IBC, and the standard actually includes precautionary measures for the use of vents in sprinklered buildings;
NFPA 204 -2010; CTC's original code change proposed a reference to the 2010 edition of NFPA 2010 which is not yet complete:

- o The draft of NFPA 204 – 2010 does not provide design criteria for vents in a sprinklered building; the draft of NFPA 204 includes vague guidance formerly included in the Annex of the standard;
- o The draft of NFPA 204 - 2010 does not include a design goal for the system (unlike the the criteria for mechanical systems), nor one which can be evaluated by an AHJ.

NFPA 204 – 2007: The modification by the IFC committee changed the referenced edition of NFPA 204 to the 2007 edition because this edition was complete and the 2010 edition (which may not be published until 2011) will not be available by the May/2010 Final Action Hearings:

- The 2007 edition of the standard includes only an Annex which is not part of the standard for smoke and heat vent design.

CTC public comment: Due to a lack of comprehensive design criteria in the 2007 edition of NFPA 204, the decision to allow smoke and heat vents needs to rest with the code official in terms of an assessment of the building in question. The added text to Exception 2 is taken from current section 910.3.2 which stipulates that the vents must be operational in accordance with NFPA 13.

Section 910.4.6:
IFC Modification: The IFC committee modification requires standby-power and one-hour rated electrical service to the ventilation equipment.

CTC evaluation of the IFC modification:

The mechanical smoke venting system is not an emergency system for "defend-in-place" strategy;
Smoke venting is a post fire fighting operation, not involving life safety of occupants or fire fighters;
It is unlikely there would be a need to intentionally cut power during fire fighting operations in a sprinklered building;
Other systems that are considered critical are not required to have standby power: the fire pump for the sprinklers, and general lighting needed for fire fighting operations;
Supporting one-hour power conductors by an unrated building structure presents a conflict with general fire protection philosophy.

CTC public comment: The mechanical smoke exhaust system is not an emergency smoke control system. A smoke control system is an active system designed to be used during fire conditions. The smoke exhaust system proposed by CTC is intended to be a post-fire system for use by the fire-service. As such, it need not be provided with emergency power. The finish rating originally proposed for 30 minutes is adequate since we are dealing with fully sprinklered buildings and is reasonably accomplished in buildings of all construction types. As a rule of thumb, membranes of one hour fire resistance rated assemblies will provide a 30 minute finish rating. CTC believes that this provides a reasonable level of protection for the circuits and that it should be acceptable to route the conductors within the cavities of one hour assemblies.

This public comment retains the committee modification to reference the 2007 edition of NFPA 204 as the standard is published because the 2010 edition will not be available by the 2010 May Final Action Hearings.

Public Comment 3:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

910.2.1 (IBC [F] 910.2.1) Group F-1 or S-1. A mechanical smoke removal system shall be installed in buildings or portions thereof used as a Group F-1 or S-1 occupancy exceeding 50,000 square feet.

Exception: Group S-1 aircraft repair hangars.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The purpose of Item F144-09/10 was to update the provisions that mandate roof vents in industrial and storage buildings. The code change requires that a manually-operated mechanical smoke removal system be provided for large industrial and storage buildings protected by a sprinkler system in lieu of the requirements for roof vents and draft curtains. Formerly, smoke and heat vents were not required in Group S-1 aircraft repair hangars due to an exception to Section 910.2.1. This exception was based on the fact that aircraft hangars are designed in accordance with the provisions of NFPA 409. IBC or IFC fire protection features should not be overlaid on that comprehensive standard.

This public comment for approval as modified reinstates the status quo for aircraft repair hangars. Inasmuch as aircraft repair hangars were exempt from smoke and heat vent requirements, it stands to reason that they should also be exempt from the provisions that replaced them. As was previously the case, NFPA 409 provisions should be allowed to stand on their own merit for these highly specialized buildings. The absence of loss history would indicate that current provisions are very adequate and additional fire protection features are not necessary and are unjustified.

Public Comment 4:

Tracey D. Bellamy, Telgian Corporation, representing self, requests Disapproval.

Commenter's Reason: The provisions of the proposal contain substantial design criteria changes that have not been supported by any technical data. The proposed criteria for design of mechanical exhaust systems using 4 air changes per hour is indicated in the original substantiation as being a reasonable value; however, no technical support is provided other than an indication that it is an average value between 2 and 6 air changes per hour. This change is premature at this time as efforts to develop a consensus design criteria for mechanical exhaust systems in a sprinklered building has not been completed. The far reaching impact of such criteria without sound technical justification is not acceptable.

Final Action: AS AM AMPC____ D

F146-09/10

910.5 (New) [IBC ([F] 910.5 (New)], Chapter 47

Proposed Changes as Submitted

Proponent: Justin H. Beal, representing the City of Fresno, CA, Fire Department

1. Add new text as follows:

<u>**910.5 (IBC [F] 910.5) Maintenance.** Smoke and heat vents and mechanical smoke exhaust systems shall be maintained in an operative condition in accordance with NFPA 204. Fusible links shall be promptly replaced whenever fused, damaged or painted. Smoke and heat vents and mechanical smoke exhaust systems shall not be modified.</u>

2. Add new standard to Chapter 47 as follows:

NFPA
<u>204-2007</u> <u>Standard for Smoke and Heat Venting</u>

Reason: The maintenance of heat and smoke vents and mechanical smoke exhaust systems is not clearly addressed within the model International Fire Code. Installation and design criteria for smoke and heat vents can be found in I.F.C. section 910.3.1 (U.L. 793), however, maintenance provisions for these systems should be included within section 910 to provide clarity for the end user of the code. This proposal incorporates National Fire Protection Association Standard 204, Standard for Smoke and Heat Venting, 2007 edition, as the referenced standard for the maintenance of smoke and heat vents and mechanical smoke exhaust systems.

Routine inspection, testing and maintenance of these devices is essential for several reasons: These devices are typically only found in the largest commercial structures, and within these structures, the amount of fire loading is usually very high, to include high piled combustible storage.

Ensuring that these devices are inspected, tested and maintained in proper working order by the building owner (as specified in the new referenced standard) will have several positive effects for firefighter safety. These benefits include: easy identification of the location of the fire within the structure, the release of excess heat within the structure decreasing fire severity, increased visibility for firefighters within the structure, and the reduction of toxic products of combustion within the structure.

Additionally, the maintenance of these devices will have a mitigating effect on damage to the structure and/or its contents should a fire occur. These include: decreased likelihood of structural failure from heat retained within the structure and reduced damage to the structure and stored materials from smoke.

Finally, these devices are considered “fire protection systems” as noted in the I.F.C. section 902.1, and as such, a provision requiring specified inspection, testing and maintenance intervals via a referenced standard should be included within the body of the code.

The language of this section has been developed to follow (and is substantially similar to, and consistent with) the format found within the International Fire Code, Section 703.2.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard NFPA 204-2007 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

ICCFILENAME: BEAL-F1-910.5.DOC

<u>Public Hearing Results</u>

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf

Analysis: Review of proposed new standard NFPA 204-2007 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria. Note that section 3.6.3.1 of CP28-05 requires that the standard be completed and readily available prior to Final Action Consideration. The final action of this proposal will occur May 14-23, 2010.

Committee Action: **Approved as Modified**

Modify proposal as follows:

NFPA

204-~~2007~~<u>2010</u> Standard for Smoke and Heat Venting

(Portions of the proposal not shown remain unchanged.)

Committee Reason: The committee approved the proposal as it provides the necessary maintenance requirement for smoke and heat vents that the code currently lacks. The modification simply revises the standard edition of NFPA 204 to the 2010 edition.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment:

Justin Beal representing the City of Fresno, CA, Fire Department and Marcelo M. Hirschler, GBH International, request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

NFPA

204-~~2010~~ 2007 Standard for Smoke and Heat Venting

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason (Beal): I am the original proponent of this code change proposal. During the code development hearings held in October 2009, a floor modification to this proposal was made and approved by the committee. The modification to the proposal consisted of changing the referenced standard to the 2010 edition of National Fire Protection Association Standard 204 – Standard for Smoke and Heat Venting (NFPA 204), from the 2007 edition of the same document. At the time of the code development hearings, it was generally thought that the 2010 edition of the standard would be readily available before the final action hearings, as those hearings had tentatively been scheduled for October 2010. Based upon the facts known at the time, this modification was acceptable.

However, as the final action hearing schedule has been revised, it has become apparent that the 2010 edition of NFPA 204 will not be readily available before the final action hearings as required by I.C.C. policy.

To ensure this proposal is included in the upcoming edition of the International Fire Code, it must be modified back to its original configuration to specify the 2007 edition of NFPA 204 as the referenced standard for the code section.

Commenter's Reason (Hirschler): The public comment simply revises the edition of the standard to 2007 as the 2010 edition will not be available prior to the final action hearings in Dallas. The ICC Code Development Policy Section 3.6.3.1 of CP28-05 requires that the standard be completed and readily available prior to Final Action Consideration.

Final Action: AS AM AMPC____ D

F147-09/10
912.4 (IBC [F] 912.4)

Proposed Change as Submitted

Proponent: Joshua D. Smith, New York State Department of State, Office of Fire Prevention and Control

Revise as follows:

912.4 ~~Signs~~ Markings. A metal sign with raised letters at least 1 inch (25 mm) in size shall be mounted on all fire department connections ~~serving automatic sprinklers, standpipes or fire pump connections~~ to indicate their function. The caps of fire department connections shall also be color-coded to indicate their function. ~~Such signs shall read: AUTOMATIC SPRINKLERS or STANDPIPES or TEST CONNECTION or a combination thereof as applicable.~~ Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served. The signs and the caps shall be marked as follows:

1. For a connection serving only a standpipe the sign shall read STANDPIPE and the cap shall be colored red.
2. For a connection serving a combination automatic sprinkler and standpipe system the sign shall read COMBINATION STANDPIPE AND SPRINKLER and the cap shall be colored yellow. If the automatic sprinkler system only covers a portion of the building the sign shall also indicate where the protected areas are located in the building.
3. For a connection serving an automatic sprinkler system only the sign shall read SPRINKLER or AUTOMATIC SPRINKLER and the cap shall be colored green. If the automatic system only covers a portion of the building the sign shall also indicate where the protected areas are located in the building.
4. For a connection serving a systems other than an automatic sprinkler system the sign shall read NON-AUTOMATIC SPRINKLER and the cap shall be colored silver.
5. Test connections shall have signs that read TEST CONNECTION and the caps shall be colored black.

Reason: There are often signs installed for fire department connections that are often a single color, such as chrome or brass signs, that are not easily read from the point where a fire apparatus will be able to first see the connection. The color coding of the caps will make identifying the function of the fire department connection more easily discernable from a greater distance for fire apparatus fire fighters.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: SMITHJ-F1-912.4.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal as there are already so many labels involved with the building and often times the caps on fire department connections go missing. Additionally, colors often cannot be seen at night. Other comments addressed the fact that the methodology of labeling may vary from jurisdiction to jurisdiction.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joshua D. Smith, New York State Dept. of State – Office of Fire Prevention and Control, requests Approval as Submitted.

Commenter's Reason: The committee stated several reasons for disapproving this proposal to which I would like to answer.

The first comment being that there are already many marking systems in place. The 2009 fire coder does make mandatory the use if signs to indicate the type of system being fed by the fire department connection as well as an additional sign for indicating areas that are protected when a system does not provide full building protection. In my experience in fire fighting and inspections it is often these signs are all one color, often the signs are chrome or brass to match the connections. Unless the responder is at the connection it is often difficult to determine what the FDC is feeding. The color coding provides an often faster means of determining what the FDC feeds.

The committee further stated that FDC caps often go missing. NFPA 25 states that the FDC plugs or caps are to remain in place and be undamaged. Even if a cap does go missing as part of keeping the system compliant the missing caps have to be replaced.

The committee also stated that colors cannot be seen at night. Neither can the signs that are already required. The only way to solve this would be to require the area the FDC is located be lighted on a continuous basis whether or not the caps are colored.

The committee further stated that coding systems may vary from jurisdiction to jurisdiction. The more common use of mutual aid agreements between jurisdictions, and the push to standardize equipment and terminology for NIMS compliance would be of benefit from a standardized color coding system. With this in mind, no matter where a fire department or personnel may be from when they have to respond to a call when covering another jurisdiction's response area the markings of a FDC will all mean the same and the mutual aid departments can still operate efficiently.

Final Action: AS AM AMPC____ D

F152-09/10
1206.2, 1206.2.1 (New), 1206.3, 1206.4

Proposed Change as Submitted

Proponent: David W. Dawson, R. R. Street & Co. Inc.

1. Revise as follows:

1206.2 ~~Type~~ <u>Class</u> I solvents. The maximum quantity of ~~Type I~~ <u>Class I</u> solvents permitted at any work station shall be 1 gallon (4 L). ~~Class I solvents shall be stored in approved safety cans or in sealed DOTn-approved metal shipping containers of not more than 1-gallon (4 L) capacity. Dispensing shall be from approved safety cans.~~ <u>Spotting or pre-spotting shall be permitted to be conducted with Class I solvents where they are stored in and dispensed from approved safety cans or in sealed DOT-approved shipping containers of not more than 1 gallon (4 L) capacity</u>.

2. Add new text as follows:

<u>**1206.2.1 Spotting and pre-spotting.** Spotting and pre-spotting shall be permitted to be conducted with Class I solvents where dispensed from plastic containers of not more than 1 pint (0.5 L) capacity.</u>

3. Revise as follows:

1206.3 ~~Type~~ <u>Class</u> II and III solvents. Scouring, brushing, and spotting and pretreating shall be <u>permitted to be</u> conducted with Class II or III solvents. The maximum quantity of ~~Type~~ <u>Class</u> II or III solvents permitted at any work station shall be 1 gallon (4 L). In other than Group H-2 occupancy, the aggregate quantities of solvents shall not exceed the maximum allowable quantity per control area for use-open system.

1206.4 Type IV systems. Flammable and combustible liquids used for spotting operations shall be stored in approved safety cans or in sealed DOT~~n~~-approved ~~metal~~ shipping containers of not more than 1 gallon (4 L) in capacity. ~~Dispensing shall be from approved safety cans.~~ Aggregate amounts shall not exceed 10 gallons (38 L).

Reason: The purpose of the change is to revise outdated material. The proposed wording is intended to recognize the wide use of DOT-approved plastic containers to ship and store chemicals used in dry cleaning plants, including spotting chemicals. Use of these containers is permitted by OSHA for the storage of flammable and combustible liquids under conditions described in OSHA Directive STD 01-05-014. Equivalent changes have been made to NFPA 32.

Bibliography: 29 CFR 1910.106 Flammable and combustible liquids; OSHA Directive STD-01-05-014; NFPA 32.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DAWSON-F2-1206.2.DOC

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with and approved the proposal based on the proponent's reason statement. The revised requirements will be less restrictive that those required by the OSHA directive listed in the bibliography, which requires fire detection at such work stations.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene representing Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1206.2 Class I solvents. The maximum quantity of Class I solvents permitted at any work station shall be 1 gallon (4 L). Spotting or pre-spotting shall be permitted to be conducted with Class I solvents where they are stored in and dispensed from approved safety cans or in sealed DOT-approved <u>metal</u> shipping containers of not more than 1 gallon (4 L) capacity.

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason: NFPA 32 clearly requires approved safety cans or DOT-approved metal shipping containers of not more than 1-gallon capacity for spotting or pre-spotting of Class I solvents.

NFPA 32-2007: 5.1.2 Spotting or prespotting shall be permitted to be conducted with Class I solvents if they are stored in and applied from sealed DOT-approved metal shipping containers of not more than 3.8 L (1 gal) capacity or approved safety cans.

Final Action: AS AM AMPC____ D

F153-09/10
1208.2

<u>Proposed Change as Submitted</u>

Proponent: David W. Dawson, R. R. Street & Co. Inc., representing Textile Care Allied Trades Association (TCATA) and Drycleaning and Laundry Institute (DLI).

Revise as follows:

1208.2 Automatic sprinkler system. An automatic sprinkler system shall be installed in accordance with Section 903.3.1.1 throughout dry cleaning plants containing Type II, Type III-A or Type III-B dry cleaning systems.

Exceptions:

1. An automatic sprinkler system shall not be required in Type III-A dry cleaning plants where the aggregate quantity of Class III-A solvent in dry cleaning machines and storage does not exceed 330 gal (1250 L) and dry cleaning machines are equipped with a feature that will accomplish any one of the following:
   - 1.1. Prevent oxygen concentrations from reaching 8 percent or more by volume.
   - 1.2. Keep the temperature of the solvent at least 30ºF (16.7ºC) below the flash point.
   - 1.3. Maintain the solvent vapor concentration at a level lower than 25 percent of the lower explosive limit (LEL).
   - 1.4. Utilize equipment approved for use in Class I, Division 2 hazardous locations in accordance with NFPA 70.
   - 1.5. Utilize an integrated automatic fire-extinguishing system complying with Section 4.6 of NFPA 32.
2. An automatic sprinkler system shall not be required in Type III-B dry cleaning plants where the aggregate quantity of Class III-B solvent in dry cleaning machines and storage does not exceed 3300 gal (12,490 L).

Reason: The purpose of this proposed code change is to eliminate the overly restrictive requirements for automatic sprinkler systems in dry cleaning facilities using modern dry cleaning equipment. Modern Type IIIA dry cleaning machines have intrinsic safety features that prevent fires from starting within the dry cleaning machine. It is preferable to prevent fires from starting in the first place, rather than extinguishing ones that have already started. NFPA 32 already allows these safety features to be used in lieu of automatic sprinkler systems.

Bibliography: NFPA 32

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: The action on this proposal should be consistent with the action on Code Change F154-09/10.

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee agreed with the proponent's reason statement and preferred this proposal over F154-09/10, which its proponent offered to withdraw in favor of this proposal. It was felt that new dry cleaning equipment addresses the safety hazards adequately. Also, stating the exceptions in the code text is preferable to requiring the inspector to carry the referenced standard into the field as code change F154-09/10 would do. It was also noted that California and several other states have banned perchlorethylene which requires that operators purchase new equipment and the committee felt that adding a sprinkler requirement on top of that capital expense would be a hardship.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Abraham B. Cho requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1208.2 Automatic sprinkler system. An automatic sprinkler system shall be installed in accordance with Section 903.3.1.1 throughout dry cleaning plants containing Type II, Type III-A or Type III-B dry cleaning systems.

Exceptions:

1. An automatic sprinkler system shall not be required in Type III-A dry cleaning plants where the aggregate quantity of Class III-A solvent in dry cleaning machines and storage does not exceed 330 gal (1250 L) and employing dry cleaning machines listed by an approved testing agency, provided it is equipped with a feature that will accomplish any one of ~~the following~~ items 1.1 through 1.5 and each of items 1.6 through 1.8 :
   - 1.1. Prevent oxygen concentrations from reaching 8 percent or more by volume.
   - 1.2. Keep the temperature of the solvent at least 30ºF (16.7ºC) below the flash point.
   - 1.3. Maintain the solvent vapor concentration at a level lower than 25 percent of the lower explosive limit (LEL).
   - 1.4. Features that limit solvent vapor concentration at or below 60 percent of the LEL where automatic instrumentation with safety interlocks is provided in accordance with NFPA 69,
   - 1.5. Utilize equipment approved for use in Class I, Division 2 hazardous locations in accordance with NFPA 70.
   - 1.6. Utilize an integrated automatic fire-extinguishing system complying with Section 4.6 of NFPA 32.
   - 1.7. Utilize two sprinklers overhead using a domestic water line that releases water directly onto the outside of the dry cleaning machine.

1.8. Utilize a computer controlled maintenance and record keeping system to perform periodical maintenance, that also controls the dry cleaning machine to shut down.

2. An automatic sprinkler system shall not be required in Type III-B dry cleaning plants where the aggregate quantity of Class III-B solvent in dry cleaning machines and storage does not exceed 3300 gal (12,490 L).

Commenter's Reason: The purpose of this proposed code change is to eliminate the overly restrictive requirements for automatic sprinkler systems in dry cleaning facilities using modern dry cleaning equipment. Modern Type IIIA dry cleaning machines have intrinsic safety features that prevent and respond to fires within and surrounding the dry cleaning machine. It is preferable to prevent fires from starting in the first place, rather than extinguishing ones that have already started. NFPA 32 2007 Edition already allows some of these safety features to be used in lieu of automatic sprinkler systems.

(1)This proposal is missing 1.4 of the exception paragraph from NFPA 2007 edition. (2)There are two kinds of fire protection systems. One kind is fire prevention system that has features 1.1 thru 1.5 and 1.8 . The other system is a fire responding system as stated above in 1.6 and 1.7.

In order to have fire protection from inside and outside of a dry cleaning machine, the dry cleaning machine must be equipped with 1.6, thru 1.8 and any one of the following between 1.1 thru 1.5.

Bibliography: NFPA 32 2007 Edition

Public Comment 2:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1208.2 Automatic sprinkler system. An automatic sprinkler system shall be installed in accordance with Section 903.3.1.1 throughout dry cleaning plants containing Type II, Type III-A or Type III-B dry cleaning systems.

Exceptions:

1. An automatic sprinkler system shall not be required in Type III-A dry cleaning plants where the aggregate quantity of Class III-A solvent in dry cleaning machines and storage does not exceed 330 gal (1250 L) and dry cleaning machines are equipped with a feature that will accomplish any one of the following:
   1.1. Prevent oxygen concentrations from reaching 8 percent or more by volume.
   1.2. Keep the temperature of the solvent at least 30ºF (16.7ºC) below the flash point.
   1.3. Maintain the solvent vapor concentration at a level lower than 25 percent of the lower explosive limit (LEL).
   1.4. Utilize equipment approved for use in Class I, Division 2 hazardous locations in accordance with NFPA 70.
   1.5. Utilize an integrated dry chemical, clean agent or water mist automatic fire extinguishing system ~~complying with Section 4.6 of NFPA 32~~ designed in accordance with Chapter 9.
2. An automatic sprinkler system shall not be required in Type III-B dry cleaning plants where the aggregate quantity of Class III-B solvent in dry cleaning machines and storage does not exceed 3300 gal (12,490 L).

Commenter's Reason: This proposal was Approved as Submitted at the Code Development Hearing. The purpose of this Public Comment is to clarify the types of extinguishing systems which will provide compliance with Exception Item 1.5.

The original code change referenced NFPA 32 Section 4.6 in Item 1.5. Since the requirements in Item 1.5 are substituting a fixed extinguishing for the building sprinkler system, it is preferable to identify the acceptable types of fire extinguishing systems. The reference to NFPA is replaced with a list of the specific types of automatic fire extinguishing systems allowed by NFPA 32 Section 4.6.

This Public Comment specifies that the extinguishing system must be either a dry-chemical system, a clean agent system, or a water mist system in order to be substituted for the fire sprinkler system. Chapter 9 provides design and installation criteria and references the correct NFPA standard for each type of extinguishing system.

Final Action: AS AM AMPC____ D

F155-09/10
1501.1, 1501.2; IBC [F] 416

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman - Joint Fire Service Review Committee

1. Revise IFC as follows:

1501.1 Scope. This chapter shall apply to locations or areas where any of the following activities are conducted:

1. The application of ~~flammable or combustible paint, varnish, lacquer, stain, fiberglass resins or other flammable or combustible liquid applied~~ flammable finishes to articles or materials by means of spray apparatus ~~in continuous or intermittent processes~~.

2. ~~Dip-tank operations in which articles or materials are passed through contents of tanks, vats or containers of flammable or combustible liquids, including coating, finishing, treatment and similar processes.~~ The application of flammable finishes by dipping or immersing articles or materials into the contents of tanks, vats or containers of flammable or combustible liquids for coating, finishing, treatment or similar processes.
3. The application of flammable finishes by applying combustible powders to articles or materials utilizing ~~when applied by~~ powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.
4. Floor surfacing or finishing operations using Class I or II liquids in areas exceeding 350 square feet (32.5 m^2).
5. The application of flammable finishes consisting of dual-component coatings or Class I or II liquids when applied by brush or roller in quantities exceeding 1 gallon (4 L).
6. ~~Spraying and dipping operations.~~

1502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

FLAMMABLE FINISHES. ~~Material coatings~~ Coatings to articles or materials in which the material being applied is a flammable liquid, combustible liquid, combustible powder, fiberglass resin or flammable or combustible gel coating.

2. Revise IBC as follows:

SECTION 416
SPRAY APPLICATION OF FLAMMABLE FINISHES

[F] 416.1 General. The provisions of this section shall apply to the construction, installation and use of buildings and structures, or parts thereof, for the spraying of flammable ~~paints, varnishes and lacquers~~ finishes ~~or other flammable materials or mixtures or compounds used for painting, varnishing, staining or similar purposes~~. Such construction and equipment shall comply with the International Fire Code.

[F] 416.2 Spray rooms. *(No change to current text.)*

[F] 416.2.1 Surfaces. *(No change to current text.)*

[F] 416.2.2 Ventilation. Mechanical ventilation and interlocks with the spraying operation shall be in accordance with the International Fire Code.

[F] 416.3 Spraying spaces. *(No change to current text.)*

[F] 416.3.1 Surfaces. *(No change to current text.)*
[F] 416.4 Spray booths. *(No change to current text.)*

[F] 416.5 Fire protection. An automatic fire-extinguishing system shall be provided in all spray~~, dip and immersing spaces and storage~~ rooms and shall be installed in accordance with Chapter 9.

Reason: Item 1 – IFC: The revisions in this section are intended to clarify the application of Chapter 15. There is no change in application of this Chapter or the requirements therein.

First, the Scope is revised using the defined term of "flammable finishes".
1. Item #1 covers spray operations
2. Item #2 covers dipping operations
3. Item #3 covers electrostatic and fluidized beds
4. Item #4 specifies the limitation of Class I or II liquids when conducting floor surfacing
5. Item #5 covers dual-component coatings
6. Item #6 is deleted since it is covered in Items #1 and #2.

Second, the definition of "flammable finishes" is revised to include the coatings that are already regulated in Chapter 15.

These revisions are essentially editorial changes that will add clarity in the application of Chapter 15.

Item 2 – IBC: This proposal is designed to correlate the requirements for spray operations found in the IBC and the IFC.
Section 416 is revised to specify spray application of materials. This is consistent with the wording in Section 416.1 which limits the application of these requirements to spray operations.
Section 416.1 is revised to provide consistency with the scope in IFC Section 1501.1. This revision will include all of the operations that would be regulated within a spray room or spray booth.
Section 416.2.2 is added to reference the IFC which contains requirements for ventilation velocities and for interlocking the ventilation system with the spraying apparatus.
Section 416.5 is revised to be consistent with IFC Section 1505.4. A fire extinguishing system is not required for all dipping operations. For example, when using dip tanks of less than 150 gallons, a fire extinguishing system is an optional method of protection.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LARIVIERE-F17-1501.1-G2-IBC416.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee had concerns about combustible finishes being deleted and disagreed with the blanket removal of dipping operations from IBC Section 416.5 since the IFC does require fire protection for some dipping operations.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1501.1 Scope. This chapter shall apply to locations or areas where any of the following activities are conducted:

1. The application of *flammable finishes* to articles or materials by means of spray apparatus.
2. The application of a *flammable finishes* by dipping or immersing articles or materials into the contents of tanks, vats or containers of flammable or combustible liquids for coating, finishing, treatment or similar processes.
3. The application of *flammable finishes* by applying combustible powders to articles or materials utilizing powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.
4. Floor surfacing or finishing operations using Class I or II liquids in areas exceeding 350 square feet (32.5 m^2).
5. The application of *flammable finishes* consisting of <u>organic peroxides,</u> dual-component coatings or Class I or II liquids when applied by brush or roller in quantities exceeding 1 gallon (4 L).

1502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

(Portions of the proposal not shown, remain unchanged.)

FLAMMABLE FINISHES. Coatings to articles or materials in which the material being applied is a flammable liquid, combustible liquid, combustible powder, fiberglass resin, <u>organic peroxide,</u> or flammable or combustible gel coating.

Commenter's Reason: This proposal was Disapproved at the Code Change Hearing because it needed clarification in the proposed text for both the IFC and IBC. The original item has been split into two Public Comments; one addressing the IBC and the other addresses the IFC. This Public Comment is intended to only address the revisions to the IFC. The revisions in this section are intended to clarify the application of IFC Chapter 15. There is no change in the requirements of this Chapter or the requirements therein.

The Scope has been revised by replacing the defined term of "flammable finishes" for the laundry list of processes the can be considered application of flammable finishes. This simple reference to flammable finishes, rather than the list, reduces the chance of leaving out a possible operation that should be regulated by this Chapter but not included in the list.

The arrangement of processes in 1501.1 is as follows:
Item 1 – spraying operations
Item 2 – dipping operations
Item 3 – electrostatic and fluidized beds
Item 4 – floor surfacing and floor refinishing
Item 5 – dual-component coatings and organic peroxides

Organic peroxides has been added to Item 5. Use of organic peroxides is already regulated in Section 1508 and now it will included in the scope of the Chapter.

Also, the definition of "flammable finishes" is revised to include the organic peroxide materials which are used as a flammable finish and are regulated in Chapter 15 as a flammable finish.

Public Comment 2:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[F] SECTION 416 ~~SPRAY~~ APPLICATION OF FLAMMABLE FINISHES

416.1 General. The provisions of this section shall apply to the construction, installation and use of buildings and structures, or parts thereof, for the ~~spraying~~ <u>application</u> of flammable finishes. Such construction and equipment shall comply with the *International Fire Code*.

416.2 Spray rooms. *(No change to text)*

416.2.1 Surfaces. *(No change to text)*

416.2.2 Ventilation. Mechanical ventilation and interlocks with the spraying operation shall be in accordance with the *International ~~Fire~~ <u>Mechanical</u> Code*.

416.3 Spraying spaces. *(No change to text)*

416.3.1 Surfaces. *(No change to text)*

416.4 Spray booths. *(No change to text)*

416.5 Fire protection. An *automatic fire-extinguishing system* shall be provided in all spray<u>, dip and immersing spaces and storage</u> rooms and shall be installed in accordance with Chapter 9.

(Portions of the proposal not shown, remain unchanged.)

Commenter's Reason: This proposal was Disapproved at the Code Change Hearing because it needed clarification in the proposed text for both the IFC and IBC. The original item has been split into two Public Comments; one addressing the IBC and the other addresses the IFC. This Public Comment is intended to only address the revisions to the IBC. The revisions in this section are intended to clarify the application of IBC Section 416.

Section 416.1 is revised to cover the "application of flammable finishes" rather than just the spray operations of flammable finishes. Spray application is not the only method of applying flammable finishes. This revision will allow all of those other methods to be covered in this section.

Section 416.2.2 is revised to reference the IMC which contains requirements for ventilation velocities and for interlocking the ventilation system with the spraying apparatus.

Section 416.5 is revised by reverting back to the original text currently in the 2009 IBC. This wording includes dipping and immersing operations, and storage rooms where fire protection systems are required. Since the scope of Section 416 is revised to cover methods of application other than just spraying, it is appropriate to leave the reference to these other operations in this section.

Final Action: AS AM AMPC____ D

F156-09/10
1504.6.1.2.1

<u>Proposed Change as Submitted</u>

Proponent: Geoff Raifsnider, Global Finishing Solutions, representing self

Revise as follows:

1504.6.1.2.1 Interlocks. The spraying apparatus, drying apparatus and ventilating system for the spray booth or spray room shall be equipped with interlocks arranged to:

1. Prevent operation of the spraying apparatus while drying operations are in progress.
2. <u>Prevent operation of the drying appratus until a timed purge of spray vapors from the spray booth or spray room is complete. This purge time shall be based upon introducing at least 4 standard cubic feet of fresh air per cubic foot of spray booth or spray room volume.</u> ~~Purge spray vapors from the spray booth or spray room for a period of not less than 3 minutes before the drying apparatus is rendered operable.~~
3. Have the ventilating system maintain a safe atmosphere within the spray booth or spray room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.
4. Shut off the drying apparatus automatically if the air temperature within the booth exceeds 200°F (93°C).

Reason: Although "not less than" implies that the value could be more, the current language does not state how the value is calculated. The proposed language clarifies how to calculate the purge time and bases it upon the amount of fresh air introduced. This proposal also eliminates the 3 minute minimum. There are applications where the delay in proceeding to curing can affect the quality of the product finish. In these applications the heating apparatus is often the same industrial heater that maintains the temperature during painting and the apparatus is outside the spray area and not subject to exposure to overspray. It should be acceptable to have a design where the purge time is a function of air flow.

Cost Impact: Any additional cost would be justified based upon the importance of the reduced purge time to achieve the quality of the product. This additional cost may be offset by the reduction in operating cost.

ICCFILENAME: RAIFSNIDER-F2-1504.6.1.2.1.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee did not feel that it had adequate information to properly evaluate the proposal and that there was inadequate justification provided. It was unclear as to how the 4 scf per cubic foot of booth volume was determined. The current time-out interlock is straight forward and easy to inspect while the volume-based interlock would be difficult to inspect.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Geoff Raifsnider, Global Finishing Solutions, representing self, requests Approval as Submitted.

Commenter's Reason: Original proposal was rejected for lack of "adequate information to properly evaluate the proposal and that there was inadequate justification provided". The following comments are intended to serve as the additional information and justification requested during the code development hearings:

- A purge interval is a function of the spray booth size (cubic feet) and the ventilation rate (cubic feet per minute). Both of these values are documented and measurable for a given spray booth.
- The original proposal is based upon the language in NFPA 86 Standard for Ovens and Furnaces 2007 Edition. The idea is to replace the air in the booth at least four times (4 ft^3 of air/ft^3 of booth) to ensure that the concentration at the end of the purge interval is less than 25% of the lower flammable limit.
- To verify that the purge time is sufficient to meet the code, multiply the volume of the booth by four (4) and divide by the exhaust flow rate. An example would be a spray booth that measures 10 ft wide x 10 ft high x 14 ft long (volume = 1,400 ft3). If this booth was designed for 100 feet per minute downdraft the exhaust flow rate would be 14,000 ft3/min (10 ft x 14 ft x 100 fpm). To calculate the minimum purge time you would multiply 1400 ft3 by four (4) and divide by 14,000 ft3/min. The resulting minimum purge time would be 0.4 minutes (1400x4/14000=0.4).
- To address the comments that the proposed changes would be difficult to inspect. The IFC (1506.1.2) currently requires compliance with Chapter 21 when utilizing drying in a spray booth. Section 2107.2 states that a nameplate shall be provided that, among other information, indicates the required purge time (2107.2(3)). The code official can initially verify that the purge timer is set to this value. If there is cause to doubt this information the calculations mentioned can be performed to verify the minimum purge time.
- There are many paint finishing operations, typically in the automotive refinish industry, that are negatively affected by the delay between painting and curing at an elevated temperature. By allowing the proposed changes, the spray booth designer can take into account the importance the purge interval may have on the process. By designing for the correct air flow, both a safe environment for energizing the drying apparatus and a minimum time between spray and cure can be achieved.

Final Action: AS AM AMPC____ D

F157-09/10
1504.7.3

Proposed Change as Submitted

Proponent: Geoff Raifsnider, Global Finishing Solutions, representing self

Revise as follows:

1504.7.3 Air velocity. Ventilation systems shall be designed, installed and maintained to be capable of confining and removing overspray and vapors. The vapor concentration in the exhaust air stream shall be less than 25 percent of the lower flammable limit. ~~such that the average air velocity over the open face of the booth, or booth cross section in the direction of airflow during spraying operations, shall not be less than 100 feet per minute (0.51 m/s).~~

Reason: This proposal eliminates the 100 fpm minimum air velocity. The proposed language removes the specific value while still stating the required performance. There are many types of booths and rooms in which the 100 fpm value would be detrimental to the quality of the product and is well in excess of the minimum dilution air needed to keep the space and exhaust below 25% of the LFL. This extra air also increases the operating costs. The air velocities for a specific spray booth or spray room should be specific to the individual design that accomplishes the desired performance (ie. 25% LFL or containment of overspray at openings). Chapter 13.75 of Industrial Ventilation – A Manual of Recommended Practice 26th Edition Published by ACGIH, lists many air velocity ranges for various painting operations, some above and some below 100 fpm. This publication could be included in the standard as reference material.

Cost Impact: The code change proposal would decrease the construction and operating costs.

ICCFILENAME: RAIFSNIDER-F1-1504.7.3.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee did not feel that it had adequate information to properly evaluate the proposal and that there was inadequate justification provided. The current stated air velocity is straight forward and easy to measure, whereas determining 25% of the LFL would require expensive equipment and it is unclear as to who would be responsible to provide such equipment.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Geoff Raifsnider, Global Finishing Solutions, representing self, requests Approval as Submitted.

Commenter's Reason: Original proposal was rejected for lack of "adequate information to properly evaluate the proposal and that there was inadequate justification provided". The following comments are intended to serve as the additional information and justification requested during the code development hearings:

Comments

- The original proposal is based upon language in NFPA 33 Standard for Spray Application Using Flammable or Combustible Materials 2007 Edition.
- The intent of the original proposal was to establish a performance requirement. The desired consequences of ventilation in an open spray booth are to confine the overspray to the booth and to ensure that the concentration level does not reach the flammability limit. To assign a fixed value to all spray booth configuration may not provide for a safe and efficient piece of equipment.
- Confinement by velocity is unnecessary in a totally enclosed spray booth.
- Concentration levels can be calculated based upon the material feed rate and quantity of the spray guns and the exhaust flow rate.
- It was not the intent of the proposal to add requirements for equipment to monitor the concentration of flammable vapors in the booth or booth exhaust. With regards to ventilating spray areas, rooms, and booths, NFPA 33 and the IFC already have similar language stating that the concentration of flammable materials in the exhaust system must be kept below 25 percent of the lower flammable limit (LFL).[1, 2]
- The minimum velocity in a paint spray booth could be calculated based upon the requirement to keep the exhaust below 25 of the LFL. However, there are additional performance requirements that may increase this value. NFPA 33 describes the objective of the ventilation system as being capable of confining and removing flammable and combustible materials without prescribing a minimum value of air flow or velocity.[1] It becomes the responsibility of the equipment manufacturer to adequately design the ventilation system to achieve the stated objective based upon conditions such as the type of enclosure and paint application devices.
- Chapter 13.75 of Industrial Ventilation – A Manual of Recommended Practice 26th Edition Published by ACGIH, lists many air velocity ranges for various painting operations, some above and some below 100 fpm. This publication could be included in the standard as reference material. Some examples from this reference are:
  - Large Paint Booth, Cross Draft, Walk-in, Airless Electrostatic or HVLP Spray = 60 cfm/sq ft
  - Open Face Booth, Over 4 sq ft, Airless Electrostatic or HVLP Spray = 100 cfm/sq ft
  - Vehicle Paint Booth, Cross Draft, W x H >150 sq ft = 50 cfm/sq ft

References

1 Chapter 7.2, NFPA 33, Standard for Spray Application Using Flammable or Combustible Materials 2007 Edition
"Each spray area shall be provided with mechanical ventilation that is capable of confining and removing vapors and mists to a safe location and is capable of confining and controlling combustible residues, dusts, and deposits. The concentration of the vapors and mists in the exhaust stream of the ventilation system shall not exceed 25 percent of the lower flammable limit."

2 Chapter 510.3, 2009 International Mechanical Code® 2009 Edition
"The design and operation of the exhaust system shall be such that flammable contaminants are diluted in noncontaminated air to maintain concentrations in the exhaust flow below 25 percent of the contaminant's lower flammability limit."

Final Action: AS AM AMPC____ D

F163-09/10

1803.16 (New), 1802.1, 3704.1.2, 3704.1.3

Proposed Change as Submitted

Proponent: Ron Fuhrhop, Praxair, Inc.

1. Add new text as follows:

1803.16 Sub-atmospheric Gas Systems (SAGS) Type 1 and Type 2. The storage and use of Sub-atmospheric Gas Systems (SAGS) shall be in accordance with Sections 1803.16.1 through 1803.16.1.3.
1803.16.1 General. Sub-atmospheric Gas Systems (SAGS) gas source packages shall meet all of the requirements for compressed gases and gases except as provided for in 1803.16.1.1 through 1803.16.1.3.

1803.16.1.1 Incompatible gases. Sub-atmospheric Gas Systems (SAGS) gas source packages with a water volume of 2.64 gallons (10 L) or less containing incompatible gases shall be permitted to occupy the same gas cabinet or exhausted enclosure.

1803.16.1.2 Ventilation. For Sub-atmospheric Gas Systems (SAGS), gas source packages, ventilation in gas cabinets and exhausted enclosures shall be sufficient to maintain vapors below 25 percent of LFL and below the IDLH concentration.

1803.16.1.3 Overpressure protection. The gas distribution system to which Sub-atmospheric Gas Systems (SAGS) are connected shall be equipped with an approved method of protection against components exceeding their pressure rating in the event of a failure in a SAGS.

1802.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

SUB-ATMOSPHERIC GAS SYSTEM (SAGS) Type 1. A gas source package that stores and delivers gas at sub-atmospheric pressure and includes a container (e.g., gas cylinder and outlet valve) that stores and delivers gas at a pressure of less than 14.7 psia at a package temperature of less than 110^{o} F.

SUB-ATMOSPHERIC GAS SYSTEM (SAGS) Type 2. A gas source package that stores compressed gas and delivers gas sub-atmospherically and includes a container (e.g., gas cylinder and outlet valve) that stores gas at a pressure greater than 14.7 psia and delivers gas at a pressure of less than 14.7 psia at a package temperature of less than 110^{o} F.

2. Revise as follows:

3704.1.2 Gas cabinets. Gas cabinets containing highly toxic or toxic *compressed gases* shall comply with Section 2703.8.6 and the following requirements:

1. The average ventilation velocity at the face of gas cabinet access ports or windows shall not be less than 200 feet per minute (1.02 m/s) with a minimum of 150 feet per minute (0.76 m/s) at any point of the access port or window.
2. Gas cabinets shall be connected to an exhaust system.
3. Gas cabinets shall not be used as the sole means of exhaust for any room or area.
4. The maximum number of cylinders located in a single gas cabinet shall not exceed three, except that cabinets containing cylinders not over 1 pound (0.454 kg) net contents are allowed to contain up to 100 cylinders.
5. Gas cabinets required by Section 3704.2 or 3704.3 shall be equipped with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. Alternative fire-extinguishing systems shall not be used.

   Exception: Sub-atmospheric Gas Systems (SAGS) Type 1 and Type 2 shall be in accordance with Section 1803.16.1.2

3704.1.3 Exhausted enclosures. 3704.1.3 Exhausted enclosures. Exhausted enclosures containing highly toxic or toxic *compressed gases* shall comply with Section 2703.8.5 and the following requirements:

1. The average ventilation velocity at the face of the enclosure shall not be less than 200 feet per minute (1.02 m/s) with a minimum of 150 feet per minute (0.76 m/s).
2. Exhausted enclosures shall be connected to an exhaust system.
3. Exhausted enclosures shall not be used as the sole means of exhaust for any room or area.

4. Exhausted enclosures required by Section 3704.2 or 3704.3 shall be equipped with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. Alternative fire-extinguishing systems shall not be used.

   Exception: Sub-atmospheric Gas Systems (SAGS) Type 1 and Type 2 shall be in accordance with Section 1803.16.1.2.

Reason: This code change proposal adds definitions and requirements to address the technology of sub-atmospheric gas systems (SAGS), which are not currently found in the code. This new language is proposed for Chapter 18, since SAGS's are exclusively used in Semiconductor Fabs.

A primary goal of SAGS is to improve safety by reducing the risk of a gas release. The risk is reduced, because SAGS only deliver gas when a vacuum is applied to the cylinder connection. In a SAGS, the cylinder valve can be opened, but no gas is released until the pressure downstream of the outlet connection is below atmospheric pressure. This is in contrast to a typical gas cylinder, which releases gas when the cylinder valve is opened. The semiconductor industry has used SAGS successfully for ten years.

1802.1: The proposed definitions are similar to the definitions in the 2009 Edition of NFPA 318, Standard for the Protection of Semiconductor Fabrication Facilities. However, one change was made (110 ^{o} F is referenced instead of NTP). To meet the SAGS definition in NFPA 318, the pressure in a SAGS container must be sub-atmospheric at or below NTP, which is a temperature of 70 ^{o} F. SAGS used in semiconductor tools are located in exhausted enclosures with internal temperatures of 86^o F to 104^o F (above 70^o F). SAGS stored outside may reach temperatures of 110^o F (above 70^o F). So, to meet this proposed definition for SAGS, the container pressure should be sub-atmospheric at temperatures up to 110^o F. If NTP is used as a reference, some Type 1 SAGS could go "above" atmospheric pressure under these normal storage and use conditions.

1803.16.1: All SAGS shall meet the requirements for gases and compressed gases set forth throughout the IFC & IBC, with the specific exceptions allowed in the new SAGS section. Treating SAGS as compressed gases or gases maintains risk-mitigating controls that are well-established in safety and fire protection standards.

1803.16.1.1: This section will allow the placement of SAGS containers with incompatible gases in the same exhausted enclosure, such as containers of arsine and boron trifluoride. IFC Section 1804.3.3 requires the separation of these containers. This separation does not reflect current industry practice and is not necessary with the enhanced safety provided by SAGS. It should be noted, this exception is limited to small cylinders of 10 L of water volume or less. This limits the quantity of material and covers current semiconductor tool applications where SAGS are used.

1803.16.1.2: Ventilation is still required for SAGS. Potential releases from SAGS are very small. For this reason lower ventilation rates are acceptable. The performance standard (maintain vapors below 25 percent of LFL and below IDLH) was used instead of velocity or other prescribed values.

1803.16.1.3: Overpressure protection is standard practice for piping systems. Since SAGS delivery piping systems normally operate in a vacuum, this requirement was added to clarify that overpressure condition could result from potential failure scenarios. There are several methods used today to address this issue. It is also a performance based requirement.

3704.1.2 and 3704.1.3: These additions eliminate a conflict in Chapter 37 that would be created by adopting the new language of 1803.16.1.2. They refer the code user back to Chapter 18 to determine exhaust requirements for SAGS.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: The action on this proposal should be consistent with the action on Code Change F164-09/10.

ICCFILENAME: FUHRHOP -F1-1802.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee preferred code change F164-09/10 over this proposal to avoid conflicting requirements with NFPA 318.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ron Fuhrhop representing Praxair Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1803.16 Sub-atmospheric Gas Systems (SAGS) ~~Type 1 and Type 2~~. The storage and use of Sub-atmospheric Gas Systems (SAGS) shall be in accordance with Sections 1803.16.1 and 1803.16.1.1 ~~through 1803.16.1.3~~.

1803.16.1 General. Sub-atmospheric Gas Systems (SAGS) gas source packages shall meet all of the requirements for compressed gases and gases except as provided for in 1803.16.1.1 ~~through 1803.16.1.3~~.

~~**1803.16.1.1 Incompatible gases.** Sub-atmospheric Gas Systems (SAGS) gas source packages with a water volume of 2.64 gallons (10 L) or less containing incompatible gases shall be permitted to occupy the same gas cabinet or exhausted enclosure.~~

1803.16.1.~~2~~.1 Ventilation. For Sub-atmospheric Gas Systems (SAGS), gas source packages, ventilation in gas cabinets and exhausted enclosures shall be sufficient to maintain vapors below 25 percent of LFL and below the IDLH concentration.

~~**1803.16.1.3 Overpressure protection.** The gas distribution system to which Sub-atmospheric Gas Systems (SAGS) are connected shall be equipped with an approved method of protection against components exceeding their pressure rating in the event of a failure in a SAGS.~~

1802.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

<u>**SUB-ATMOSPHERIC GAS SYSTEM (SAGS)** Sub-atmospheric Gas Storage and Delivery System. A system that includes a gas container (e.g., gas cylinder or authorized DOT gas receptacle) which under normal operation allows for gas flow from a container only when the container valve outlet is exposed to a pressure of less than one atmosphere pressure (760 Torr).</u>

~~**SUB-ATMOSPHERIC GAS SYSTEM (SAGS) Type 1.** Sub-atmospheric Gas Storage and Delivery System. A gas source package that stores and delivers gas at sub-atmospheric pressure and includes a container (e.g., gas cylinder and outlet valve) that stores and delivers gas at a pressure of less than 14.7 psia at a package temperature of less than 110°F.~~

~~**SUB-ATMOSPHERIC GAS SYSTEM (SAGS) Type 2.** Sub-atmospheric Gas Delivery System. A gas source package that stores compressed gas and delivers gas sub-atmospherically and includes a container (e.g., gas cylinder and outlet valve) that stores gas at a pressure greater than 14.7 psia and delivers gas at a pressure of less than 14.7 psia at a package temperature of less than 110°F.~~

3704.1.2 Gas cabinets. Gas cabinets containing highly toxic or toxic *compressed gases* shall comply with Section 2703.8.6 and the following requirements:

1. The average ventilation velocity at the face of gas cabinet access ports or windows shall not be less than 200 feet per minute (1.02 m/s) with a minimum of 150 feet per minute (0.76 m/s) at any point of the access port or window.

   <u>**Exception:** Sub-atmospheric Gas Systems (SAGS) shall be in accordance with Section 1803.16.1.1.</u>

2. Gas cabinets shall be connected to an exhaust system.
3. Gas cabinets shall not be used as the sole means of exhaust for any room or area.
4. The maximum number of cylinders located in a single gas cabinet shall not exceed three, except that cabinets containing cylinders not over 1 pound (0.454 kg) net contents are allowed to contain up to 100 cylinders.
5. Gas cabinets required by Section 3704.2 or 3704.3 shall be equipped with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. Alternative fire-extinguishing systems shall not be used.

   ~~**Exception:** Sub-atmospheric Gas Systems (SAGS) Type 1 and Type 2 shall be in accordance with Section 1803.16.1.2~~

3704.1.3 Exhausted enclosures. Exhausted enclosures containing highly toxic or toxic *compressed gases* shall comply with Section 2703.8.5 and the following requirements:

1. The average ventilation velocity at the face of the enclosure shall not be less than 200 feet per minute (1.02 m/s) with a minimum of 150 feet per minute (0.76 m/s).

   <u>**Exception:** Sub-atmospheric Gas Systems (SAGS) shall be in accordance with Section 1803.16.1.1.</u>

2. Exhausted enclosures shall be connected to an exhaust system.
3. Exhausted enclosures shall not be used as the sole means of exhaust for any room or area.
4. Exhausted enclosures required by Section 3704.2 or 3704.3 shall be equipped with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. Alternative fire-extinguishing systems shall not be used.

   ~~**Exception:** Sub-atmospheric Gas Systems (SAGS) Type 1 and Type 2 shall be in accordance with Section 1803.16.1.2.~~

Commenter's Reason: The following reason was prepared by William Winslow. Sub-atmospheric gas systems (SAGS) are used primarily in the semiconductor industry. As such, the issues regarding SAGS are not well understood by some fire protection officers (FPO). After a number of code development cycles where SAGS proposals were discussed and disapproved, the Fire Code Committee voted to wash its hands of the issue by disapproving Item 163 and adopting Item 164. Item 164 references NFPA 318, Standard for the Protection of Semiconductor Facilities, for the regulation of SAGS. Many jurisdictions and organizations routinely involved with the semiconductor industry and the use of SAGS, including the California Fire Chiefs Association (Cal Chiefs), don't agree with the Committee's action. Adoption of NFPA 318 eliminates safety controls required for the prudent use of toxic and highly toxic gases in SAGS containers, including automatic shutoff valves, gas treatment systems and incompatible gases in the same enclosure. On the other hand, approving Item 163, as modified by this public comment, will maintain all of the existing safety controls, with the exception of allowing a small reduction in exhaust ventilation. I have worked for and regulated the semiconductor industry for many years. I agree with the Cal Chiefs that the best course of action is to approve Item 163, as modified by this public comment, and disapprove Item 164. This will keep the technical safety issues regarding the use of SAGS in the hands of FPOs, where they belong. William Winslow CIH, CFI, CMI, previous member of the Fire Code Committee and past National Codes Director for the Washington State Association of Fire Marshals.

Cost Impact: The code change proposal may reduce the cost of construction and operation.

Final Action: AS AM AMPC____ D

F164-09/10
1803.16 (New), Chapter 47

Proposed Change as Submitted

Proponent: James McManus, ATMI, Inc.

1. **Add new text as follows:**

1803.16 Sub-atmospheric pressure gas systems. Sub-atmospheric pressure gas systems (SAGS) shall be in accordance with NFPA 318.

2. Add new standard to Chapter 47 as follows:

NFPA
318—09 Standard for the Protection of Semiconductor Fabrication Facilities

Reason: Sub-atmospheric pressure gas systems (SAGS) are the preferred method for storing and delivering the toxic and corrosive dopant gases used in ion implantation processes worldwide. Other uses include solar and electronics. SAGS operate by either removing pressure [Type 1] or internally controlling gas pressure [Type 2]. Both require a vacuum [sub-atmospheric condition, < 14.7 psia] before flow from a cylinder will occur. SAGS significantly reduce the risk associated with Hazardous Production Materials because they mitigate the likelihood and magnitude of a gas release and their use is becoming more common. As such, provisions regulating SAGS should be included in the code.

NFPA 318 already defines and addresses these systems so there is no reason to reinvent provisions for these systems. This proposal recommends that provisions for SAGS be adopted by reference as shown. It is the intent of this code change to adopt only the provisions relating to SAGS within NFPA 318. Those sections are: Section 3.3.28.5 for the definition, and Section 8.6.2 addressing uses and controls. It is not the intent of this proposal to adopt NFPA 318 in total. The charging statement of this proposal clearly indicates that only SAGS be in accordance with NFPA 318.

The definition and controls for use of SAGS are the work-product of a lengthy public debate and consensus building effort undertaken by knowledgeable ESH and risk management professionals. The NFPA 318 Technical Committee approved the language unanimously and it was adopted by a substantial majority at the NFPA annual meeting in June 2008.

Using the NFPA definition in section 3.3.28.5 incorporates language that most accurately defines SAGS and avoids possible conflicts that may be inadvertently introduced with alternative language.

Systems fitting this description include:
Sub-atmospheric Gas System. [Type 1/SAGS] A gas source container where the contents are at sub-atmospheric pressure [<14.7 psia] at NTP* [21ºC and 1 atmosphere]. Type 1/SAGS are not compressed gases.

Vacuum Initiated Gas Cylinder. [Type 2/SAGS] A compressed gas cylinder, modified internally using pressure and flow components to limit and control delivery pressure to sub-atmospheric pressure operation [<14.7 psia]. Today such systems are *designed to fail* in a closed [no-flow] position.

Section 8.6.2 contains requirements consistent with the risk reduction afforded by the SAGS technology. Local jurisdictions may, at their discretion, further modify the uses and controls based on existing ordinances or practice, or exceptions to the provisions could be added to this proposal.

Recognizing SAGS in the code helps officials and users ensure uniform application and understanding of this important risk reduction technology.

*NTP—see 2702.1

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, NFPA 318—09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009. The action on this proposal should be consistent with the action on Code Change F163-09/10.

ICCFILENAME: MCMANUS-F1-1803.16.DOC

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard NFPA 318-09 indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Approved as Submitted

Committee Reason: The committee preferred this proposal over F163-09/10 because it is more comprehensive in its approach to the subject matter by referencing a nationally recognized standard that SAGS facilities will be required (by insurers) to comply with anyway. Also, F163-09/10 would only regulate ventilation whereas NFPA 318 regulates the entire concept of SAGS.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ron Fuhrhop representing Praxair Inc, requests Disapproval.

Commenter's Reason: Recommend disapproval of F164 and approval of Item 163, as modified by the public comment. See Reason statement in F163 comment.

Final Action: AS AM AMPC____ D

F166-09/10

1805.2.3.4

Proposed Change as Submitted

Proponent: Patrick A. McLaughlin, McLaughlin & Associates, representing The Semiconductor Industry Association

Revise as follows:

1805.2.3.4 Pyrophoric liquids and Class 3 water-reactive liquids. Pyrophoric liquids and Class 3 water-reactive liquids in containers greater than 0.5-gallon (2 L) but not exceeding 5.3-gallon (20 L) capacity shall be allowed at workstations when located inside cabinets and the following conditions are met:

1. Maximum amount per cabinet: The maximum amount per cabinet shall be limited to 5.3 gallons (20L).
2. Cabinet construction: Cabinets shall be constructed in accordance with the following:
   - 2.1. Cabinets shall be constructed of not less than 0.097-inch (2.5 mm) (12 gage) steel.
   - 2.2. Cabinets shall be permitted to have self-closing limited access ports or noncombustible windows that provide access to equipment controls.
   - 2.3. Cabinets shall be provided with self- or manual-closing doors. Manual-closing doors shall be equipped with a door switch that will initiate local audible and visual alarms when the door is in the open position.
3. Cabinet exhaust ventilation system: An exhaust ventilation system shall be provided for cabinets and shall comply with the following:
   - 3.1. The system shall be designed to operate at a negative pressure in relation to the surrounding area.
   - 3.2. The system shall be equipped with ~~a pressure monitor and a flow switch alarm monitored~~ <u>monitoring equipment to ensure exhaust flow and alarmed</u> at the on-site *emergency control station*.
4. Cabinet spill containment: Spill containment shall be provided in each cabinet, with the spill containment capable of holding the contents of the aggregate amount of liquids in containers in each cabinet.
5. Valves: Valves in supply piping between the product containers in the cabinet and the workstation served by the containers shall fail in the closed position upon power failure, loss of exhaust ventilation and upon actuation of the fire control system.
6. Fire detection system: Each cabinet shall be equipped with an automatic fire detection system complying with the following conditions:
   - 6.1. Automatic detection system: UV/IR, highsensitivity smoke detection (HSSD) or other *approved d*etection systems shall be provided inside each cabinet.
   - 6.2. Automatic shutoff: Activation of the detection system shall automatically close the shutoff valves at the source on the liquid supply.
   - 6.3. Alarms and signals: Activation of the detection system shall initiate a local alarm within the *fabrication area* and transmit a signal to the *emergency control station*. The alarms and signals shall be both visual and audible.

Reason: Several commercially available bulk liquid pyrophoric cabinets are designed to meet the requirements of the IFC Chapter 18 section 1805.2.3.5 Pyrophoric Liquids and Class 3 water-reactive liquids. Typical pyrophoric cabinets are designed with nitrogen gas (N_2) fire protection systems to meet the requirements for pyrophoric liquids as outlined in Chapter 18 Table 1805.2.2 note d "Allowed only in workstations that are internally protected with an approved automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of the materials in use at the workstation." In order for an N_2 fire suppression system to be effective it must displace the O_2 within the cabinet. In order to displace O_2 within the cabinet and still maintain at a negative exhaust pressure within the cabinet in relation to the surrounding area, these cabinets must be airtight. Airtight indicates that these cabinets will operate under static only, when exhaust is applied, however, there will be no exhaust flow because there is no mechanism for make-up air into the cabinet. Design criteria are currently specified for liquid pyrophoric cabinets on site to meet O_2 levels below 1% within 60 seconds during discharge of the N_2 fire suppression system, which again requires these cabinets to be airtight. The current exhaust flow within these cabinets with the doors closed is effectively zero and to low for commercially available exhaust flow meters to detect. Cabinet exhaust is monitored with an exhaust pressure switch to detect available exhaust static. Some facilities currently monitor cabinet exhaust static within cabinets with a Neo-Dyn pressure switch (part#142P80CC3443) or a Dwyer (part#1910-1) and alarm for exhaust static below 1" w.c. The installation of a flow switch in addition to the pressure switch is redundant to the pressure switch. The installation of a flow switch is also ineffective due to the zero exhaust flow condition based on the cabinet design. Therefore requirements for exhaust flow monitoring are being changed to a performance requirement.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee agreed with the proponent's reason statement and felt that the proposal provides a needed update to current performance-based technology.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Patrick A. McLaughlin, McLaughlin & Associates, representing The Semiconductor Industry Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1805.2.3.4 Pyrophric liquids and Class 3 Water-reactive liquids. Pyrophoric liquids and …

1. through 2.3. (No change)
3. Cabinets exhaust ventilation system: An exhaust ventilation system shall be provided for cabinets and shall comply with the following:
   3.1. The system shall be designed to operate at a negative pressure in relation to the surrounding area.
   3.2. The system shall be equipped with monitoring equipment to ensure that required exhaust flow or static pressure is provided and that low flow or static pressure conditions send an alarm~~ed~~ ~~at~~ to the on-site emergency control station.
4. through 6.3. (No change)

Commenter's Reason: To clarify that exhaust static will be monitored if there is no exhaust flow. That was the intent of the original proposal. SIA was made aware of the potential confusion at the Code Development Hearings and committed to correct it.

Public Comment 2

Joe Pierce (Chairman), Dallas Fire Department representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1805.2.3.4 Pyrophoric liquids and Class 3 water-reactive liquids. Pyrophoric liquids and Class 3 water-reactive liquids in containers greater than 0.5-gallon (2 L) but not exceeding 5.3-gallon (20 L) capacity shall be allowed at workstations when located inside cabinets and the following conditions are met:

1. through 2.3. *(No change)*
3. Cabinet exhaust ventilation system: An exhaust ventilation system shall be provided for cabinets and shall comply with the following:
   3.1. The system shall be designed to operate at a negative pressure in relation to the surrounding area.
   3.2. The system shall be equipped with monitoring equipment to ensure that required exhaust flow or static pressure is provided. ~~and~~
   3.3. Low flow or static pressure conditions shall send an alarm~~ed~~ ~~at~~ to the on-site emergency control station. The alarm shall be both visual and audible.
4. through 6.3 (No change)

Commenter's Reason: This Public Comment revises Item 3 to clarify and separate the issues of monitoring and the resultant alarms associated with exhaust monitoring.

Item 3.2 is revised to clarify that exhaust static will be monitored when there is no exhaust flow. That was the intent of the original proposal and this proposal states it clearly.

Item 3.3 addresses the action when there is low flow or failure of the exhaust system. The requirement that the alarm must be audible and visual is also included. Currently, Item 6.3 requires an audible and visual alarm for the fire detection system. The failure of the exhaust ventilation system on a cabinet containing pyrophoric materials deserves the same level of notification. Therefore, the language from Item 6.3 is duplicated in Item 3.3 to require audible and visual alarms when the exhaust ventilation system fails.

Final Action: AS AM AMPC____ D

F173-09/10
2206.8.1, 2206.8.2 (New), 2202.1

Proposed Change as Submitted

Proponent: Ken Boyce, Underwriters Laboratories, representing Doug Horne, Clean Vehicle Education Foundation; Wendy Clark, National renewable Energy Laboratory

1. Revise as follows:

2206.8.1 Approval of equipment. Dispensers, hoses, nozzles, breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol blended fuel-dispensing systems shall be listed or approved for the specific purpose.

2. Add new text as follows:

2206.8.2 Material compatibility. Tanks and fluid handling components that contact alcohol blended fuels shall be fabricated from corrosion resistant materials that mitigate galvanic action and resist corrosion from internal and external sources. Dissimilar metallic parts that promote galvanic action shall not be joined.

(Renumber subsequent sections)

3. Revise definition as follows:

2202.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

ALCOHOL BLENDED FUELS. Alcohol blended fuels, including those containing nominally 85-percent ethanol 15-percent unleaded gasoline (E85), are flammable liquids consisting of ethanol or other alcohols blended greater than ~~15~~10-percent by volume.

Reason: This proposal updates E85 and other alcohol blended fuel dispensing requirements. Specifically, the proposal:
1. Revises the definition of alcohol blended fuels that was introduced into the 2006 IFC. The proposed revision clarifies that these are fuels containing between 10 and 85% ethanol by volume. Presently, gasoline blends containing up to 10% ethanol (also known as "gasohol") are permitted to be dispensed into conventional (non-flex fuel) vehicles, although there the possibility in the near-term that blends containing more that 10% ethanol may be permitted for conventional vehicles. Clarifying the limit from 15 to 10% is necessary and will help the IFC address potential near-term deployment of fuels with more ethanol.
2, Adds leak detection devices to the types of equipment specifically requiring approval for use with alcohol blended fuels. Practical experience has shown that leak detection equipment needs to be compatible for use with alcohol blended fuels or it may not be able to perform its intended function.
3. Adds a new section 2606.8.2 with requirements covering the compatibility of the fuel containment systems materials with the alcohol blended fuels. The wording for this section is similar to wording currently in Section 3403.6.5, which addresses external corrosion, not internal corrosion. Alcohols are polar compounds that exhibit increased moisture absorption, water solubility, polar solvency and solution conductivity relative to gasoline, and can cause increased corrosion.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: BOYCE-F1-2206.8.1.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement and felt that the code change better accommodates alcohol-blended fuels.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Richard S Kraus representing American Petroleum Institute (API) and Jeffrey Shapiro, International Code Consultants representing Steel Tank Institute, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**2206.8.2 Material compatibility.** Tanks and fluid handling components that contact alcohol blended fuels shall be fabricated from corrosion resistant materials that mitigate galvanic action and resist corrosion from internal and external sources. Dissimilar metallic parts that promote galvanic action shall not be joined.~~

(Portions of the proposal not shown remain unchanged.)

Commenter's Reason (KRAUS): This comment is to delete a new added section 2606.8.2. The proposed requirements would severely restrict the use if existing tanks and piping. There have been no reported serious problems due to the supposedly incompatibility of the fuel containment systems materials with alcohol blended fuels.

(1) The wording for this section is similar to the wording proposed in F202-09/10 which was DISAPPROVED by the Committee because "this proposal would limit the use of all aboveground and underground, inside and outdoor steel tanks or require them to be lined, including retroactivity".

The change would require the exclusive use of gold or gold lined tanks and components as gold is the ONLY metal that resists galvanic corrosion. Additionally, although the IFC Committee stated the action denying F202 was not in conflict with the action taken in F173, it obviously has now created a potential conflict in code requirements.

(2) The proponent stated that this change would increase the cost of construction. This is more than true. Requiring gold or other inert material and/or requiring lined tanks and components or other approved means of galvanic action mitigation (such as cathodic protection systems) particularly if applied retroactively, and replacing or retrofitting all existing tanks, piping and associated equipment is COST PROHIBITIVE.

Proponent also stated that this change is similar to wording in 3403.6.5. However 3603.6.5 only covers piping for which EXTERNAL corrosion protection has always been required. This proposal would require INTERNAL corrosion protection (gold plated or linings) and extends coverage to ALL tanks, piping, dispensers, hoses, pumps, connectors, nozzles and any other fluid handling equipment and devices NOT just to piping. .

(3) A Task Group assigned to study a similar issue at the last NFPA 30 Committee meeting in December 2010, reached the following conclusions supporting the position that galvanic act ion with blended fuels is not a substantive problem:

(a) The Steel tank Institute reported they could not recollect any piece of equipment that could not be subject to galvanic corrosion or cracking, whether it be steel, plastic, or elastomeric, (only gold is not afflicted). Therefore, if the new Section 2206.8.2 remains in the code, all existing tanks, equipment and appurtenances handling blended fuels would have to be replaced and all new items would have to be gold or lined with . .

(b) IFC already requires inspection, monitoring and maintenance of tanks and appurtenances and NFPA 30 has similar requirements in Sections 21.8, 22.17, and 23.17. These requirements assure corrosion is monitored and controlled. Additionally, EPA has strict requirements for monitoring leakage (and to take subsequent corrective action). These requirements have been effective to date in controlling corrosion related leakage.

(c) There is a lack of known failures with existing E85 tanks. The only cracking of steel tanks systems where alcohol content exceeds 10% is with denatured ethanol (approximately 97% ethanol) in large terminal tank facilities and loading racks. API has a document 939 (D and E) that discusses this phenomenon. It is not occurring in shop-fabricated tanks, or with E85 storage tanks in the existing marketplace, or at ethanol producers facilities, or in transport barges with steel tanks, or in railroad transport containers. So it has been a very isolated event, and certainly not worthy of an annual inspection on all tank systems and all tank equipment.

(4) NFPA 30 23.3.4, 23.3.4.1 and 23.3.4.2 (2008) which covers protection of tanks and piping, allows the AHJ to waive requirements where engineering evaluations have evidenced that corrosion does not occur. Information is available from industry studies, surveys and testing conducted by the API (American Petroleum Institute), STI (Steel Tank Institute) and other industry associations to assist AHJs in their determination. These all indicate that corrosion in tanks and piping containing alcohol based fuels is minimal.

(5) Section 2206.8.1 already requires equipment to be listed or approved. UL has a listing for dispensers using E85 fuels. AHJ approval can be similar to that initiated by the State of Illinois Fire Marshal, as follows (in part):

"The agency will only permit the distribution of a blended fuel in those tanks and piping that have been certified by the manufacturer or registered professional engineer as compatible with the blended fuel that will be stored"

"In lieu of such certification from the manufacturer or registered professional engineer, the OSFM will permit a blended fuel to be stored in steel tanks, single wall and double wall fiberglass tanks manufactured after 1991, or any tank that has been certified by a registered professional engineer as compatible with the blended fuel".

"The associated piping must be steel, fiberglass piping manufactured after 1991 or piping that was certified by a registered professional engineer as compatible with the blended fuel."

"In lieu of such certification from the manufacturer or registered professional engineer as to the compatibility of the material, the OSFM will permit the use of such ancillary equipment provided the equipment is inspected on a yearly basis by a licensed contractor."

"The owner/operator must also maintain at the facility location maintenance and inspection documentation from the licensed contractor that the ancillary equipment has been inspected and in good operating condition for use with the blended fuel being distributed"

(6) The proposed change is totally unnecessary. The majority of service stations are independently owned (or leased) and owners and operators are responsible for tanks, piping, dispensers, hoses, nozzles and appurtenances. This totally unnecessary proposed change would place a tremendous burden on these small business men and women as there is no way that they could comply (gold plated or lined equipment, indeed) and remain in business. The adherence of these responsible service station owners and operators to existing fire code, regulatory and industry requirements to monitor, inspect and maintain equipment and to control and mitigate any leakage has been commendable over the past years.

Commenter's Reason (SHAPIRO): Material compatibility is not an issue that should be dealt with uniquely in Chapter 22. The general requirements for material compatibility to prevent excessive corrosion are contained in Section 3403.6.5, where they apply to all piping systems.

As written, the proposed Section 2206.8.2 suggests that a tank in contact with an alcohol blended fuel must be fabricated from corrosion resistant materials, which essentially eliminates the permissible use of steel tanks for these fuels unless they are lined to prevent fluid contact with the tank shell. In addition, the text considered in Baltimore also prohibits steel tanks because they are subject to corrosion from external sources. Such corrosion can be (and is routinely) limited and controlled by cathodic protection and other methods, but these other methods are not recognized or permitted by the proposed text (note that the IFC addresses corrosion protection methods for all tanks in 3404.2.7.9, so there is no need for unique treatment in Chapter 22).

In discussion with the proponent, I was told that the main concern is preventing excessive corrosion that may occur when dissimilar metals are joined in the presence of a conductive liquid. This is certainly a valid issue for the code to deal with, but the code already addresses it in Section 3403.6.5, which regulates fuel dispensing systems along with all other flammable liquid piping.

Public Comment 2:

Jeffrey Shapiro, International Code Consultants representing Steel Tank Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

ALCOHOL BLENDED FUELS. ~~Alcohol blended fuels, including those containing nominally 85-percent ethanol 15-percent unleaded gasoline (E85), are f~~ Flammable liquids consisting of 10-percent or greater, by volume, ethanol or other alcohols blended with gasoline ~~greater than 10-percent by volume~~.

(Portions of the proposal not shown remain unchanged.)

Commenter' s Reason: This comment is provided as an editorial rewrite of the definition, which is not in proper definition format as it was approved in Baltimore (or for that matter, in the 2009 code). There is no intent to change the technical provisions from what was approved in Baltimore. The current reference to E85 (85-percent alcohol and 15 percent gasoline) in the definition has been deleted because it is unneeded and potentially confusing. The definition states that any alcohol-gasoline mixture with 10-percent or more alcohol is an “alcohol blended fuel.” With E85 being 85-percent alcohol (well above the 10-percent threshold), it makes no sense to specifically name E85 in the definition versus other ethanol blends, such as E15.

Final Action: AS AM AMPC____ D

F175-09/10

2209.2.2, Table 2209.2.2 (New), Chapter 47

Proposed Change as Submitted

Proponent: Julie Cairns, CSA America, Inc., representing CSA America Automotive Technical Committee

1. Revise as follows:

2209.2.2 Listed equipment. Hoses, hose connections, compressors, hydrogen generators, dispensers, detection systems and electrical equipment used for hydrogen shall be *listed* for use with hydrogen in accordance with the applicable standard in Table 2209.2.2. Hydrogen motor fueling connections shall be *listed* and *labeled* for use with hydrogen.

TABLE 2209.2.2
HYDROGEN HANDLING COMPONENT STANDARDS

HYDROGEN HANDLING COMPONENT	STANDARD
Compressed Hydrogen Dispensers	CSA America HGV 4.1
Hoses and Hose Assemblies for Gaseous Hydrogen Vehicles and Dispensing Systems	CSA America HGV 4.2
Breakaway Devices for Hoses Used in Compressed Hydrogen Vehicle Fueling Stations	CSA America HGV 4.4
Priority and Sequencing Equipment for Gaseous Hydrogen Dispensing Systems	CSA America HGV 4.5
Manually Operated Valves Used in Gaseous Hydrogen Vehicle Fueling Stations	CSA America HGV 4.6
Standard for Automatic Pressure Operated Valves for Use in Gaseous Hydrogen	CSA America HGV 4.7

Vehicle Fueling Stations	
Hydrogen Gas Vehicle Fueling Station Compressor	CSA America HGV 4.8
Fittings for Compressed Hydrogen Gas and Hydrogen Rich Gas Mixtures	CSA America HGV 4.10

2. Add new standards to Chapter 47 as follows:

CSA America, Inc.
8501 E. Pleasant Valley Rd.
Cleveland, OH 44131

HGV 4.1 Compressed Hydrogen Dispensers
HGV 4.2 Hoses and Hose Assemblies for Gaseous Hydrogen Vehicles and Dispensing Systems
HGV 4.4 Breakaway Devices for Hoses Used in Compressed Hydrogen Vehicle Fueling Stations
HGV 4.5 Priority and Sequencing Equipment for Gaseous Hydrogen Dispensing Systems
HGV 4.6 Manually Operated Valves Used in Gaseous Hydrogen Vehicle Fueling Stations
HGV 4.7 Standard for Automatic Pressure Operated Valves for Use in Gaseous Hydrogen Vehicle Fueling Stations
HGV 4.8 Hydrogen Gas Vehicle Fueling Station Compressor
HGV 4.10 Fittings for Compressed Hydrogen Gas and Hydrogen Rich Gas Mixtures

Reason: The proposal is to reference CSA America documents used by industry for certification of the dispenser and related equipment.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, CSA HGV 4.1, 4.2, 4.4, 4.5, 4.6, 4.7, 4.8 and 4.10, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: CAIRNS-F1-2209.2.2

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Drafts of the proposed CSA HGV 4 standards were not submitted for review.

Committee Action: Disapproved

Committee Reason: The documents proposed as referenced standards are still in draft form and were not submitted to staff or the committee for review.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment:

Robert W. Boyd, The Linde Group, representing the Hydrogen Industry Panel on Codes; Julie Cairns, CSA America, Inc, representing CSA America, Automotive Technical Committee; and Larry Fluer, Fluer, Inc. and Pat McLaughlin, McLaughlin & Associates, representing the Compressed Gas Association, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

2209.2.2 Listed or approved equipment. Hoses, hose connections, compressors, hydrogen generators, dispensers, detection systems and electrical equipment used for hydrogen shall be *listed* or approved for use with hydrogen ~~in accordance with the applicable standard in Table 2209.2.2.~~ Hydrogen motor fueling connections shall be *listed* and *labeled* or approved for use with hydrogen.

~~TABLE 2209.2.2~~
~~HYDROGEN HANDLING COMPONENT STANDARDS~~

~~HYDROGEN HANDLING COMPONENT~~	~~STANDARD~~
~~Compressed Hydrogen Dispensers~~	~~CSA America HGV 4.1~~

~~Hoses and Hose Assemblies for Gaseous Hydrogen Vehicles and Dispensing Systems~~	~~CSA America HGV 4.2~~
~~Breakaway Devices for Hoses Used in Compressed Hydrogen Vehicle Fueling Stations~~	~~CSA America HGV 4.4~~
~~Priority and Sequencing Equipment for Gaseous Hydrogen Dispensing Systems~~	~~CSA America HGV 4.5~~
~~Manually Operated Valves Used in Gaseous Hydrogen Vehicle Fueling Stations~~	~~CSA America HGV 4.6~~
~~Standard for Automatic Pressure Operated Valves for Use in Gaseous Hydrogen Vehicle Fueling Stations~~	~~CSA America HGV 4.7~~
~~Hydrogen Gas Vehicle Fueling Station Compressor~~	~~CSA America HGV 4.8~~
~~Fittings for Compressed Hydrogen Gas and Hydrogen Rich Gas Mixtures~~	~~CSA America HGV 4.10~~

~~CSA America, Inc.~~
~~8501 E. Pleasant Valley Rd.~~
~~Cleveland, OH 44131~~

~~HGV 4.1 Compressed Hydrogen Dispensers~~
~~HGV 4.2 Hoses and Hose Assemblies for Gaseous Hydrogen Vehicles and Dispensing Systems~~
~~HGV 4.4 Breakaway Devices for Hoses Used in Compressed Hydrogen Vehicle Fueling Stations~~
~~HGV 4.5 Priority and Sequencing Equipment for Gaseous Hydrogen Dispensing Systems~~
~~HGV 4.6 Manually Operated Valves Used in Gaseous Hydrogen Vehicle Fueling Stations~~
~~HGV 4.7 Standard for Automatic Pressure Operated Valves for Use in Gaseous Hydrogen Vehicle Fueling Stations~~
~~HGV 4.8 Hydrogen Gas Vehicle Fueling Station Compressor~~
~~HGV 4.10 Fittings for Compressed Hydrogen Gas and Hydrogen Rich Gas Mixtures~~

Commenter's Reason (BOYD/CAIRNS): Equipment used for hydrogen may not always be listed or listed and labeled given the evolving nature of hydrogen technologies. An alternate provision that the equipment be approved provides the fire code official with a means to regulate hydrogen equipment installations and is consistent with section 2703.2.3 which provides that equipment and machinery associated with the use of hazardous materials be listed or approved. The original proposal attempted to provide both the code official and industry tools to use for the installation of hydrogen motor fuel facilities, however, the standards listed have not completed the consensus process. This public comment will allow code officials and industry to apply the standards once they have completed the process by inserting the words "or approved" to match existing language for other hazardous material activities.

The original proponent of F175, Julie Cairns of CSA International, is in support of this public comment. In addition, HIPOC has been in contact with CGA who submitted an identical public comment. We are in support of this change and wish to reflect that CGA, CSA, and HIPOC all support this public comment.

Commenter's Reason (FLUER/McLAUGHLIN): The proposed new CSA standards are not yet standards so they were removed from the proposal. Currently there are no listing standards for many of the items included in the list of equipment which may be utilized in this application, including, compressors, generators and dispensers. On the other hand, motor fueling connections are listed. This modification resolves the lack of listing standards by adding "or approved", and thus will accomplish the submitter's intent by allowing the local authority to approve the equipment using CSA America, Inc. HGVs or other approved standards when they are ultimately published.

Final Action: AS AM AMPC____ D

F179-09/10
2301.5 (New), 2302 (New), 2303.2, 2303.6, 2308.2.1, Chapter 47

Proposed Change as Submitted

Proponent: Jimbo Schifiliti, Fire Safety Consultants, Inc., representing self

1. Add new text as follows:

2301.5 Pallets. All pallets shall be wooden as defined by this Chapter or shall be *listed* and *labeled* in accordance with UL 2335 or FM 4996

SECTION 2302
DEFINITIONS

2302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

WOODEN PALLET. A wooden pallet is defined as a 42 in. x 42 in., 2-way entry Stringer Pallet constructed from hardwood as described in ASME MH1.

2. Revise as follows:

2303.2 Class I commodities. Class I commodities are essentially noncombustible products ~~on wooden or nonexpanded polyethylene solid deck~~ <u>with or without pallets</u> , in ordinary corrugated cartons with or without single-thickness dividers, or in ordinary paper wrappings with or without pallets. Class I commodities are allowed to contain a limited amount of Group A plastics in accordance with Section 2303.7.4. Examples of Class I commodities include, but are not limited to, the following:

Alcoholic beverages not exceeding 20-percent alcohol
Appliances noncombustible, electrical
Cement in bags
Ceramics
Dairy products in nonwax-coated containers (excluding bottles)
Dry insecticides
Foods in noncombustible containers
Fresh fruits and vegetables in nonplastic trays or containers
Frozen foods
Glass
Glycol in metal cans
Gypsum board
Inert materials, bagged
Insulation, noncombustible
Noncombustible liquids in plastic containers having less than a 5-gallon (19 L) capacity
Noncombustible metal products

2303.6 High-hazard commodities. High-hazard commodities are high-hazard products presenting special fire hazards beyond those of Class I, II, III or IV. Group A plastics not otherwise classified are included in this class. Examples of high-hazard commodities include, but are not limited to, the following:

Aerosol, Level 3 (see Chapter 28)
Alcoholic beverages, exceeding 80-percent alcohol, in bottles or cartons
Commodities of any class in plastic containers in carousel storage
Flammable solids (except solid combustible metals)
Glycol in combustible containers (50 percent or greater)
Lacquers, which dry by solvent evaporation, in metal cans or cartons
Lubricating or hydraulic fluid in plastic containers
Mattresses, foam rubber or foam plastics
~~Pallets and flats which are idle combustible~~
Paper, asphalt, rolled, horizontal storage
Paper, asphalt, rolled, vertical storage
Paper and pulp, rolled, in vertical storage which is unbanded or not protected with an *approved* wrap
Pillows, foam rubber and foam plastics
Pyroxylin
Rubber tires
Vegetable oil and butter in plastic containers

2308.2.1 Plastic ~~pallets and~~ shelves. Storage on ~~plastic pallets or~~ plastic shelves shall be protected by *approved* specially engineered *fire protection systems*.

> ~~**Exception:** Plastic pallets listed and labeled in accordance with UL 2335 shall be treated as wood pallets for determining required sprinkler protection~~.

3. Add new standards to Chapter 47 as follows:

<u>ANSI/FM 4996-2007</u>	<u>American National Standard for Classification of Idle Plastic Pallets as Equivalent to Wood Pallets</u>
<u>ASME MH1-2005</u>	<u>Pallets, Slip Sheets, and Other Bases for Unit Loads</u>

Reason: Over the years the types of pallets utilized in day to day commerce has changed. When the density requirements relative to the impact pallets have on commodity classification and as idle pallet storage the standard wooden pallet was the hardwood, stringer type. Today a wooden pallet may be a 9-block, 4-way, softwood type or other variations including “one-way” pallets of a mixture of wood and composites. Some pallets are plastic, some are a combination of plastic and wood products.

NFPA 13 has undergone revisions over the last several cycles to increase density requirements based upon test data for the newer wood pallets. In addition, NFPA 13 added definitions as follows:

> “3.10.12 Wood Pallet. A wood pallet is defined as a pallet constructed entirely of wood with metal fasteners.”
>
> “3.10.13 Plastic Pallet. A plastic pallet is defined as a pallet having any portion of its construction consisting of a plastic material.”

The new definitions serve as a partial solution in that the pallet is either wood or plastic, and if classified as plastic verification of whether or not it is a listed and labeled plastic pallet can be made.

But the changes in NFPA 13 do not address the entire problem. Though the more recent additions of NFPA 13 have had increases made to density requirements to handle the challenge of some of the newer wood pallet types or new construction projects, those densities do not cover all of the newer types of materials in use in pallets and do not address the fact that the pallets are in use in facilities built under early editions of NFPA 13 and as a result do not have the needed water flow densities.

We have an additional problem in Chapter 23. Whereas NFPA 13 addresses the impact of pallets at “5.6.2 Pallet Types”, (which may require a one or two class commodity increase or specific laboratory testing), and at “12.12 Protection of Idle Pallets” regardless or storage method, (solid pile versus rack storage), the IFC only addresses the issue in relation to rack storage and by classifying “*Pallets and flats which are idle combustible*” as a High-hazard commodities.

> “2308.2.1 Plastic pallets and shelves. Storage on plastic pallets or plastic shelves shall be protected by approved specially engineered fire protection systems.
>
> Exception: Plastic pallets listed and labeled in accordance with UL 2335 shall be treated as wood pallets for determining required sprinkler protection”

This presents the real possibility that a building designed under the IFC did not have the correct commodity class for determining sprinkler density assigned unless the designer, plan reviewer and/or field inspector was aware of this issue and applied NFPA 13 to this topic even though classification is covered by the IFC.

In a practical sense, we cannot expect every existing building containing pallets with a fire suppression system installed prior to the 2002 edition of NFPA 13 to have the systems retroactively reassessed by a design professional and upgraded to handle the increased sprinkler demands of a violating product introduced after the building was constructed. It is easier and more cost effective to address the offending product, i.e., the unlisted or labeled pallet.

This proposal addresses the issue by requiring all pallets other than the hardwood, stringer type to be listed and labeled in accordance with the existing UL or FM standards. There is already one wood pallet provider that had their “yellow pine, 9-block” pallet tested for listed under the standards documenting that it can be done. In fact, it was some of those tests that identified the need to make changes to NFPA 13.

By requiring all pallets to be listed or labeled it will ensure that the pallets present can be handled by the existing suppression systems including those designed under the IFC where the required commodity class increase may have been missed and provide the code official with an effective tool to apply during maintenance inspections by spot checking for labels. It will also serve the building owner/operator by making it easy for him/her to verify that the pallets entering their facility do not place it at risk from a damaging fire.

Cost Impact: The code change will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, ANSI/FM 4996-2007 and ASME MH1-2005, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: SCHIFILITI-F1-2301.5.DOC

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard FM 4996-07 indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.2.1. ASME MH1-2005 was not submitted for review.

Committee Action: Disapproved

Committee Reason: The committee disapproved the proposal as it would severely limit the types of pallets allowed. A more generic approach was preferred versus allowing wood pallets in all cases but limiting other types of pallet through a testing procedure. In addition, the standard FM 4996 was noted by staff as not complying with the CP28 and ASME MH1 was not provided for review. This proposal would also remove idle pallets from the high hazard category which created concern for some committee members.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bruce Torrey, representing Intelligent Global Pooling Systems, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

Add new definition to Section 2302.1 as follows:

WOODEN PALLET. A nominal 42 x 42 x 5 inch (1.07 x1.07 x 0.13 m) 2-way hardwood pallet.

Revise as follows:

2308.2.1 ~~Plastic~~ Pallets and shelves. Storage on combustible non-wooden ~~plastic~~ pallets or plastic shelves shall be protected by approved specially engineered fire protection systems .

> **Exception:** ~~Plastic~~ Pallets listed and labeled in accordance with UL 2335 shall be treated as wooden pallets for determining required sprinkler protection.

Commenter's Reason: The 42 x 42 x 5 inch (1.07 x 1.07 x 0.13 m) 2-way hardwood pallet has and continues to be the standard test pallet used as the baseline pallet for virtually all Sprinkler and Commodity Classification testing [1]. Standard test commodities used for sprinkler and commodity fire testing/research are also configured to fit the 42 x 42 inch wood pallet footprint [2]. Since sprinkler design and commodity classification fire tests are based on the fire input of this particular pallet it is by default the baseline pallet; in the same manner that test commodities have been standardized. Changes in pallet material compositions, dimensions, and geometries beyond this standard "conventional pallet" can, and often do, introduce variables that change the standard fire exposure baseline for commodity and sprinkler testing, causing test failures [3]. Sprinkler design and protection based on the conventional 42 x 42 –inch 2-way pallet must take into account the variability in fire exposures by the use of untested pallets.

The use of the term "non-wood" provides definition for code application regarding untested plastic, and the growing number of hybrid pallets on the market. The term "combustible" differentiates between metal (steel/aluminum) pallets and combustible ones.

[1] [2]
National Quick Response Sprinkler Research Project: Large-Scale Fire Test Evaluation of Early Suppression Fast Response (ESFR) Automatic Sprinklers, NFPA, National Fire Protection Research Foundation, Factory Mutual Research Corporation.
http://www.nfpa.org/assets/files//PDF/Research/Group_1_Large-Scale_Fire_Tests_ESFR_Sprinkler.pdf, 4.1 Test Commodity, page 24 ("42-in x 42-in. x 5-in. high, ordinary, two-way, slatted hardwood pallet")

Underwriters Laboratories Inc., Report of In-Rack Sprinkler Comparison Fire Tests, NC183897NK31099, May,22 1999
http://fire.nist.gov/bfrlpubs/testdata/PDF/td005.pdf, 4.0 Test Commodity, page 5, pallet description, "42 by 42 x 5 in. high hardwood pallet"

LARGE SCALE TESTS OF SPRINKLER, VENT, DRAFT CURTAIN INTERACTION, National Institute of Standards and Technology, Underwriters Laboratories, Inc., http://fire.nist.gov/bfrlpubs/fire99/PDF/f99135.pdf, Page 3, (Pallet Description), "Two-way, 1.06 m by 1.06 m by 0.13 m (42 in by 42 in by 5 in) slatted deck hardwood pallets" supported the loads.

Using Large K-Factor Sprinklers For High-Challenge Fires, http://www.pmengineer.com/Articles/Feature_Article/BNP_GUID_9-5-2006_A_10000000000000167315, *Kerry M. Bell P.E., September 1, 2007,* "…..placed on a hardwood pallet." The two cartons have a combined nominal thickness of 1 inch and the nominal measurements for the outside carton are 42x42x42 inches.

Underwriters Laboratories, Inc., FIRE TESTS OF STORAGE PALLETS - UL 2335
http://ulstandardsinfonet.ul.com/tocs/tocs.asp?doc=s&fn=2335.toc
4 Commodity Storage Test, 4.1.2, "Each of the eight cartons shall measure 42 x 42 x 42 ±1 inch (1.1 x 1.1 x 1.1 ±0.02 m)". "The Class II commodity shall have a documented class rank between 1.75 and 2.25 when tested on 42 x 42 x 5 inch (1.07 x 1.07 x 0.13 m) 2-way hardwood pallets."

Factory Mutual, FM 4995 Approval Standards for Classification of Idle Plastic Pallets" Appendix A, pg. 17, "A typical pallet is made from hardwood and measure approximately 42 in. x 42 in. x 5 in…." http://www.fmglobal.com/assets/pdf/fmapprovals/4995.pdf

National Wholesale/Retail Occupancy Fire Research Project, Technical Report, Task 1, National Fire Protection Research Foundation, 1993, Underwriters Laboratories Project 92NK9354/NC987, pg. 4, 5 http://www.nfpa.org/assets/files//PDF/Research/Wholesale-Retail_Occupancy_Flammable_Liquids.pdf

Controlling Parameters Involved in the Burning of Standard Storage Commodities: A fundamental approach towards fire-hazard classification, Department of Mechanical & Aerospace Engineering University of California, San Diego
http://maeresearch.ucsd.edu/~mgollner/publications/2009_CSSCIpaper_Gollner.pdf

[3]
National Oxidizing Pool Chemicals Storage Fire Test Project, National Fire Protection Research Foundation, Underwriters Laboratories, Inc., pg. 21-22, http://www.nfpa.org/assets/files//OxidizingPoolChemicals.pdf

National Institute of Standards and Technology, HSB Industrial Risk Insurers, CHEP, Underwriters Laboratories, Inc., NC1838-97NK31290, 1998, Fire Tests on Wooden Pallets, http://www.fire.nist.gov/bfrlpubs/testdata/art003.html

Supporting Data Needs for NFPA Automatic Sprinkler Committees Research Project, pg. 15, "However, multiple variables were changed as slave type pallet were also used (standard configuration used standard pallets)", http://www.nfpa.org/assets/files//PDF/Research/Single_Point_Sprinkler.pdf

Final Action: AS AM AMPC____ D

F180-09/10
2302.1

Proposed Change as Submitted

Proponent: Ron Clements, Chesterfield County Virginia Building Inspection Department, representing self

Revise as follows:

2302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

HIGH-PILED STORAGE AREA. An area within a building which is designed, intended, proposed or actually used for high-piled combustible storage. The area of aisles is not included in the determination of the size of the high-piled storage area.

Reason: There is some ambiguity regarding if the area of aisles within high piled storage areas is to be included in the high-piled storage area value used by this chapter per this definition. Section 2306.9.1.1 bases some required aisle widths on the high-piled storage area. If the aisle widths area required to be included in the high piled storage area by definition, then it would be mathematically impossible to calculate the high-piled storage area because you cannot determine the aisle widths needed to calculate the aisle areas without the high-piled storage area. Additionally it does not make sense to include large aisles widths of 20', 30' or more between storage racks as part of the storage area. Clearly the intent is to measure the actual area of floor that is covered by the stored commodity.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CLEMENTS-F1-2302.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it was felt that aisles are an integral part of the fire protection in a warehouse and should not be excluded in the definition.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Ron Clements, Chesterfield County Virginia Building Inspection Department, representing self, requests Approval as Submitted.

Commenter's Reason: The Committee Reason was **"**The proposal was disapproved as it was felt that aisles are an integral part of the fire protection in a warehouse and should not be excluded in the definition." Clearly that reason does not address the issue raised by my original reason statement. Yes the aisles are part of the overall design but Section 2306.9.1.1 bases some required aisle widths on the high-piled storage area. If the aisle widths area required to be included in the high piled storage area by definition, then it would be mathematically impossible to calculate the high-piled storage area because you cannot determine the aisle widths needed to calculate the aisle areas without the high-piled storage area. The committee reasoning also did not address the issue of large spaces between aisles as discussed in the original reason statement.

Final Action: AS AM AMPC____ D

F183-09/10
2308.2.1, Chapter 47

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing FM Approvals

1. Revise as follows:

2308.2.1 Plastic pallets and shelves. Storage on plastic pallets or plastic shelves shall be protected by approved specially engineered fire protection systems.

> **Exception:** Plastic pallets listed and labeled in accordance with UL 2335 <u>or ANSI/FM 4996</u> shall be treated as wood pallets for determining required sprinkler protection.

2. Add new standard to Chapter 47 as follows:

FM
<u>ANSI/FM 4996-2007</u> <u>American National Standard for Classification of Idle Plastic Pallets as Equivalent to Wood Pallets</u>

Reason: The purpose of this code change is to include reference to ANSI/FM 4996 as an alternate to UL 2335 in the International Fire Code. ANSI/FM 4996 is an ANSI approved standard.

The inclusion of this alternate test method would provide the authority having jurisdiction with the flexibility to accept listed and labeled products evaluated in accordance with either UL 2335 or ANSI/FM 4996. This will also assist pallet manufacturers by providing two sources of listings and also not require pallet manufacturers currently listed with FM to have to retest and co-list with another laboratory/agency.

Both standards are similar in that they require full-scale fire tests and they address the issue of appropriate sprinkler protection for plastic pallets.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ANSI/FM 4996-2007, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: BEITEL-F1-2308.2.1.DOC

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: Review of the proposed new standard FM 4996-07 indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Section 3.6.2.1.

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based both upon the action on code change F179-09/10 and also per the proponents request. Additionally, the standard was noted by staff as not complying with ICC CP28.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jesse J. Beitel, Hughes Associates, Inc., representing FM Approvals, requests Approval as Modified.

Modify the proposal as follows:

ANSI/FM 4996-<u>2010</u> ~~2007~~ American National Standard for Classification of Idle Plastic Pallets as Equivalent to Wood Pallets

(Portions of the proposal not shown remain unchanged)

Commenter's Reason: Since the submitted edition of ANSI/FM Standard 4996 did not meet the ICC Standard's criteria, this proposal was disapproved. It is anticipated that the ANSI/FM 4996, 2010 edition will be revised in early April, 2010 and be published and be available for review prior to the Final action hearings.

The standard will be provided for review as soon as possible.

Analysis: Note that section 3.6.3.1 of CP28-05 requires that the standard be completed and readily available prior to Final Action Consideration. The final action of this proposal will occur May 14-23, 2010.

Public Comment 2:

Bruce Torrey representing Intelligent Global Pooling Systems, requests Disapproval.

Commenter's Reason: The recognition of ANSI/FM 4996 as an alternate test protocol to ANSI/UL 2335 is not appropriate. Industry testing has demonstrated that plastic pallets can, and often do, influence commodity classification by one, two or more classes [1]. NFPA 13 also recognizes the importance of commodity class testing by penalizing plastic pallets in commodity classification unless testing is performed on the commodity unit, Chapter 5 of NFPA 13. The ANSI/FM 4996 test protocol does not evaluate the influence of plastic pallets on commodities. As stated in section 1,1 Purpose, of ANSI/FM 4996, "This standard states test requirements for fire hazard classification of idle plastic pallets as equivalent to wood pallets." More specifically this standard evaluates the fire performance of idle plastic pallets in racks; which is addressed in Chapter 12, section 12.12.2.3.1 of NFPA 13 [2], "When specific test data and a product listing are available, the data shall take precedence in determining the required protection of idle plastic pallets stored in racks."

The title and purpose statement within FM 4996 states the limitation of the standard to the assessment of idle plastic pallets [3]. ANSI/UL 2335 however, addresses both commodity classification jump potential as well as idle stacked plastic pallets for proper sprinkler protection [4]. ICC Policy, Section 3.6.2.2 also states - The standard shall be appropriate for the subject covered. ANSI/FM 4996 only assesses the idle rack storage of plastic pallets and should not be referenced as an equivalent to UL 2335.

[1] Material Handling Industry of America, RCPA Fire Test Task Group Report, http://www.mhia.org/industrygroups/rpcpa/firesafety

[2] National Fire Protection Association, NFPA 13 – 2007, Section 12.12.2.3, "Idle plastic pallets shall be stored only in racks where protected in accordance with the requirements of Table 12.12.2.1.", Section 12.12.2.3.1 states, "When specific test data and a product listing are available, the data shall take precedence in determining the required protection of idle plastic pallets stored in racks".

[3] American National Standard for Classification of Idle Plastic Pallets as Equivalent to Wood Pallets, ANSI/FM Approvals 4996, 2007, pg 1, 1.1, Purpose: "This standard states test requirements for fire hazard classification of idle plastic pallets as equivalent to wood pallets." http://www.fmglobal.com/assets/pdf/fmapprovals/4996ansi.pdf

[4] UL 2335 Fire Tests of Storage Pallets, ANSI/UL 2335, 2004, pg. 5 Scope: "This standard measures the fire performance of pallets in idle palletized and rack storage arrangements."

Final Action: AS AM AMPC____ D

F184-09/10
2308.3.1 (New)

Proposed Change as Submitted

Proponent: Amber Anderson/Stuart Tom, Cosumnes CSD Fire Department, representing California Fire Chief's Association

Add new text as follows:

2308.3.1 Flue space protection. Where required by the fire code official, flue spaces required by Table 2308.3, in single, double or multiple row rack storage installations shall be equipped with approved devices to protect the required flue spaces. Such devices shall not be removed or modified.

Reason: This proposal authorizes the enforcing agency to require devices, when appropriate, to maintain the required flue spaces in rack storage systems found in IFC Section 2308 and IFC Table 2308.3. It is not the intent of this proposal to require such devices in each instance, but rather when the business practice has established a history of poor flue space maintenance.

Approved devices to protect required flue spaces may be any of the following: brackets, cables or other elements that are securely fastened to the load bearing columns of racks, which control the depth or width to which a product, pallet or similar material can be stored in the rack system thereby preventing obstruction of the required flue space.

Once approved devices are installed, most business owner confusion regarding flue space requirements are removed. Other benefits include; property loss reduction through quick activation of the fire protection system; improved penetration of extinguishing agent through the rack system to the seat of the fire; faster activation of smoke and heat vent systems, improved employee safety, public safety and firefighter safety.

Cost Impact: The code change proposal will increase the cost of construction

ICCFILENAME: ANDERSON-TOM-F1-2308.3.1.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved as it provides a necessary tool to address an ongoing problem of maintaining flue spaces in a rack configuration in high-piled storage applications.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tracey D. Bellamy, Telgian Corporation, representing self, requests Disapproval.

Commenter's Reason: Without the existence of a specific directive as to appropriate measures upon which approval can be based or consensus design application for such devices, the section is subject to substantial misapplication. This could potentially give rise to other unintended material handling issues or misguided installations.

Final Action: AS AM AMPC____ D

F186-09/10

Table 2703.1.1(1) [IBC [F] Table 307.1(1)]; 3302.1 (IBC [F]307.2)

Proposed Change as Submitted

Proponent: Glenn A. Dean, Virginia State Fire Marshal's Office

Revise as follows:

TABLE 2703.1.1(1) [IBC TABLE [F] 307.1(1)]
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a,j,n,p]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEM[b]			USE-OPEN SYSTEMS	
			SOLID POUNDS (CUBIC FEET)	LIQUID GALLONS (POUNDS)	GAS (CUBIC FEET AT NTP)	SOLID POUNDS (CUBIC FEET)	LIQUID GALLONS (POUNDS)	GAS (CUBIC FEET AT NTP)	SOLID POUNDS (CUBIC FEET)	LIQUID GALLONS (POUNDS)
~~Consumer fireworks (Class C, Common)~~	~~1.4G~~	~~H-3~~	~~125[d,e,l]~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~

(Portions of table and notes not shown remain unchanged)

3302.1 (IBC [F]307.2) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

FIREWORKS, 1.4G. (Formerly known as Class C, Common Fireworks.) Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion or deflagration that complies~~. Such 1.4G fireworks which comply~~ with the construction, chemical composition and labeling regulations of the DOTn for Fireworks, UN 0336, and the U.S. Consumer Product Safety Commission as set forth in CPSC 16 CFR: Parts 1500 and 1507~~, are not explosive materials for the purpose of this code~~.

(Portions of definition of "Fireworks" not shown remain unchanged)

Reason: The intent of this change is to revert to language stating consumer fireworks are explosive in nature.

The IFC definition language denoting that consumer fireworks would not be considered "explosive materials for the purpose of this code" originated through IFC code change F97-99. The proponent at the time stated the change was to "revise the definitions for consumer fireworks and display to be more closely aligned with the definitions contained in the 1997 IFCI Uniform Fire Code including 1999 Accumulative Supplement and the 1999 BOCA National Fire Prevention Code.“

In looking back for the UFC and BOCA fire codes that were referenced in the F97-99 change to the IFC, code change B3-97 introduced language through the BOCA building code claiming consumer fireworks are not explosive materials and did not provide any technical substantiation to support the claim. I would accept the proponent was making the claim as a means to justify reclassifying the storage and/or sale of consumer fireworks from an H-1 to an H-3 building. For that, I would agree somewhat with the proponent in saying that it “appears reasonable” given the comparison for other H-3 commodities but that is not the issue in this proposed change.

The next BOCA cycle saw the introduction of F18-98 changing the definition of consumer fireworks, 1.4G as “not explosive materials for the purpose of this code”. The committee hearing the change at the time denied the proposal with a conference action to amend. Subsequently the proponent brought the issue back in the form of an amendment. But here again, a technical substantiation was not provided.

This same F18-98 change, as amended, carved out consumer fireworks from BOCA’s MAQ table to “correlate with code change B3-97 to the 1996 BOCA National Building Code” to be shown as a Group H-3 building instead of a Group H-1. The proponent also stated that it was to “correlate definitions used in the BOCA National Fire Prevention Code and Building Code with terminology used in the new DOTn/UN classifications and regulations and NFPA standards.” That may be true to a point and it’s that point that gets to the heart of the reason behind this proposed change, which is, DOTn 49 CFR Parts 100-178, U.S Consumer Products Safety Commission as set forth in CPSC 16 CFR, UN 0336, NFPA standards 495, 1123, 1124, and 1126 **do not** contain language saying consumer fireworks are not explosive, at least not that I found. I went so far as to check pamphlets published by the Institute of Makers of Explosives; the U.S. Department of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives, AFT Publication 5400.7; the American Pyrotechnics Association Standard 87-1, and found nothing in that respect. In fact, everything found labels fireworks as “explosive” without distinction for 1.4G “consumer fireworks” versus a 1.4G professional pyrotechnic device such as the “gerb” that was used and ignited The Station nightclub fire in Rhode Island.

It is the accumulative results of B3-97 and F18-98 that lent itself to the reference in IFC code change F97-99 supporting statement.

That portion of the proposed definition change to include “deflagration” is a resurrection of a previously used descriptor and is to more accurately reflect the functioning of some consumer fireworks. While a sparkler or fountain may operate through combustion, simple combustion does not necessarily mean enough force will be produced quickly enough for the device to function in a desired manner. If the pyrotechnic material does not deflagrate, the flaming balls of roman candles may not launch; aerial devices may not have enough expelling force to obtain the needed altitude.

The change to Table 2703.1.1(1) is a change to reflect that consumer fireworks are indeed properly classified as an Explosive 1.4G and it’s not necessary to have a separate line with identical threshold values, including all footnotes, to determine at what point a building would be classified as a Group H-3. It’s redundant within the same table. In reality, at the model code level, other than the deletion of language saying consumer fireworks are not explosive, the net effect of this change will be zero to what is taking place in the world of consumer fireworks manufacturing, storage, sale and use.

At the time of this submission I have not located copies of the UFC code changes referenced above but I suspect the supporting statements closely resembled those submitted to BOCA.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DEAN-F1-TABLE 2703.1.1(1).DOC

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

3302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, igniters and display fireworks, 1.3G (Class B, Special).

~~The term “Explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G (Class C, Common) by the hazardous materials regulations of DOTn 49 CFR Parts 100-185.~~

(Portions of the proposed code change not shown remain unchanged.)

Committee Reason: The committee agreed with the proponent's reason statement and felt that the proposal removes an unnecessary redundancy in the table. The modification completes the code change since the 2009 edition was not available when the proponent prepared the code change and also removes potential conflict between the fireworks and explosives definitions.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rick Thornberry, PE, The Code Consortium, Inc. representing American Pyrotechnics Association (APA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

TABLE 2703.1.1(1) [IBC TABLE [F] 307.1(1)]
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a,j,n,p]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEM[b]			USE-OPEN SYSTEMS	
			SOLID POUNDS (CUBIC FEET)	LIQUID GALLONS (POUNDS)	GAS (CUBIC FEET AT NTP)	SOLID POUNDS (CUBIC FEET)	LIQUID GALLONS (POUNDS)	GAS (CUBIC FEET AT NTP)	SOLID POUNDS (CUBIC FEET)	LIQUID GALLONS (POUNDS)
Consumer fireworks	1.4G	H-3	125[d,e,f]	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(Portions of table and notes not shown remain unchanged)

3302.1 (IBC [F]307.2) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, igniters and display fireworks, 1.3G ~~(Class B, Special)~~.

The term "Explosive" includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G (Class C, Common) by the hazardous materials regulations of DOTn 49 CFR Parts 100 – 185.

FIREWORKS, 1.4G. ~~(Formerly known as Class C, Common Fireworks.)~~ Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion ~~or deflagration that complies~~. Such 1.4G fireworks which comply with the construction, chemical composition and labeling regulations of the DOTn for Fireworks, UN 0336 as set forth in DOTn 49 CFR: Part 172, and the U.S. Consumer Product Safety Commission as set forth in CPSC 16 CFR: Parts 1500 and 1507, are not explosive materials for the purpose of this code.

(Portions of the definition of "Fireworks" not shown remain unchanged)

Commenter's Reason: This Public Comment basically reinstates the current definitions for "Explosive" and "Fireworks, 1.4G" with some additional revisions to further clarify them to make them more consistent with the DOTn regulations for them.

This Public Comment also reinstates the entry in Table 2703.1.1(1) for Consumer Fireworks, 1.4G based on it being a defined term that is distinctive from Explosives, 1.4G by its definition.

It should also be noted that a very significant, unintended consequence will result if Code Change F186-09/10 is approved as modified by the Committee without further modification by this Public Comment regarding the definition for "Explosive" because of the deletion of the second paragraph of the definition which currently includes materials within the scope of USC Title 18: Chapter 40, as well as materials classified as an explosive by the Hazardous Materials Regulations of DOTn 49 CFR: Parts 100 – 185. The inclusion of that paragraph within the definition for "Explosive" is also consistent with the definition for "Explosive Material" found in Section 3.3.98 of the 2009 NFPA 1 Fire Code including the Annex Note A.3.3.98, as well as with the definition for "Explosive" in Section 3.3.18 of NFPA 495 Explosive Materials Code (2006) including the Annex Note A.3.3.18. This paragraph is important to complete the definition for "Explosive" to be consistent with federal regulations.

This Public Comment also further revises the current definition for "Fireworks, 1.4G" to include a reference to DOTn 49 CFR: Part 172 which makes the definition consistent with the definition currently contained in NFPA 1124, Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic Articles (2006), as well as with the definition for "Consumer Fireworks" in the Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF) Federal Explosives Law and Regulations, ATF Publication 5400.7 (November 2007). Contrary to the proponent's Reason Statement, the current definition for "Fireworks, 1.4G" is totally consistent with the definitions in NFPA 1123 and NFPA 1124. And as noted previously, although not mentioned in the submitter's statement, the definition is also totally consistent with that contained in the NFPA 1 Fire Code (2009) including the Annex Note. The definition in NFPA 1123 is extracted from NFPA 1124 and the Annex Note to that definition in Section A.3.3.15.1 includes the following: "Consumer fireworks contain limited quantities of pyrotechnic composition per unit and do not pose a mass explosion hazard where stored. Therefore, they are not required to be stored in a magazine." The Annex Note to the definition for "Consumer Fireworks" in NFPA 1124-2006 in Section A.3.3.30.1 states: "Consumer fireworks… are not considered to be explosive materials for the purposes of this code." Similarly, the Annex Note to the definition for "Consumer Fireworks" in the NFPA 1 Fire Code (2009) Section A.3.3.115.1 contains the same statement. Also, the Annex Note to the definition for "Explosive Material" in the NFPA 1 Fire Code Section A.3.3.98 contains the following statement: "The term explosive includes any material determined to be within the scope of Title 18, United States Code, Chapter 40, and also includes any material classified as an explosive, other than consumer fireworks, 1.4G, by the Hazardous Materials Regulations of the U.S. Department of Transportation in 49 CFR."

The proponent's Reason Statement also states that the following regulations, standards and codes do not contain language saying that consumer fireworks are not explosive:

DOTn 49 CFR: Parts 100 – 178
US CPSC 16 CFR, UN0336

NFPA 495 Explosives Materials Code (2006)
NFPA 1123 Code for Fireworks Display (2010)
NFPA 1126 Standard for the Use of Pyrotechnics Before a Proximate Audience (2006)

The following discusses why that is or is not the case.

The regulations in DOTn 49 CFR: Parts 100 – 178 establish the UN classification scheme for explosives as the basis of the DOTn regulations for the transportation of explosives in the United States. In that classification scheme consumer fireworks in the U.S. are classified as fireworks, 1.4G (UN0336) for the purposes of regulating these devices in transportation. The International Fire Code (IFC) has also utilized the UN classification scheme for explosives for regulating explosives in other uses and applications, as well as in transportation. Because of this, it was necessary to adapt the classification scheme for consumer fireworks, 1.4G for regulating those devices in other than transportation since they are truly not explosive within the context of the IFC requirements for explosives. Even the BATF exempts consumer fireworks from their Federal Explosives Law and Regulations (2007) which establish requirements for explosives. The BATF Federal Explosives Law and Regulations define consumer fireworks as follows: "Any small firework device designed to produce visible effects by combustion and which must comply with the construction, chemical composition, and labeling regulations of the U.S. Consumer Products Safety Commission, as set forth in Title 16, Code of Federal Regulations, Parts 1500 and 1507. Some small devices designed to produce audible effects are included, such as whistling devices, ground devices containing 50 mg or less of explosive materials, and aerial devices containing 130 mg or less of explosive materials. Consumer fireworks are classified as fireworks UN0336 and UN0337 by the U.S. Department of Transportation at 49 CFR 172.101. This term does not include fused setpieces containing components which together exceed 50 mg of salute powder."

The US CPC 16 CFR, UN0336 contains the regulations for the construction, chemical composition, and labeling of consumer fireworks (UN0336) which establish the basis for regulating consumer fireworks in the U.S. Therefore, those regulations are not concerned with the need to indicate that consumer fireworks are not considered explosives. They simply establish the criteria for what makes a pyrotechnic device a consumer fireworks regulated by the CPSC which are the only types of consumer fireworks allowed to be sold for use by consumers in the U.S.

NFPA 495 Explosive Materials Code (2006) does not contain such a statement since the application of that code does not apply to consumer fireworks. In fact, Section 1.3.4 states: "This code shall not apply to pyrotechnics such as flares, fuses, and railway torpedoes. It also shall not apply to fireworks and pyrotechnic special effects as defined in NFPA 1123, Code for Fireworks Display; NFPA 1124, Code for the Manufacture, Transportation, Storage, and Retail Sales of Pyrotechnic Articles; and NFPA 1126 Standard for the Use of Pyrotechnics Before a Proximate Audience."

Similarly, the scope of NFPA 1123 Code for Fireworks Display (2010) in Section 1.1.2 states: "This code shall not apply to the following: (3) Use of consumer fireworks by the public." The same is true for NFPA 1126 Standard for the Use of Pyrotechnics Before a Proximate Audience (2006) which states in Section 1.38: "This standard shall not apply to the use of consumer fireworks by the general public."

In conclusion, it becomes readily apparent when the proper research is conducted in a thorough manner of all of the applicable codes, standards, and regulations for consumer fireworks, 1.4G that approving this code change as modified by the Committee would make the IFC inconsistent with all the previously noted regulations, standards, and codes. However, approving this code change as modified by the Committee as further modified by this Public Comment will maintain the IFC consistent with those regulations, standards, and codes regarding consumer fireworks, 1.4G. Therefore, we urge the Class A voting members to vote for Approval as Modified by this Public Comment to obtain the necessary two-thirds majority vote to approve this Public Comment.

Public Comment 2:

Rick Thornberry, PE, The Code Consortium, Inc. representing American Pyrotechnics Association (APA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

IBC [F] TABLE 414.5.1
EXPLOSION CONTROL REQUIREMENTS[a]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS: Barricade construction	EXPLOSION CONTROL METHODS: Explosion (deflagration) venting or explosion (deflagration) prevention systems[b]
HAZARD CATEGORY			
Combustible dusts[c]	–	Not Required	Required
Cryogenic flammables	–	Not Required	Required
Explosives	Division 1.1 Division 1.2 Division 1.3 Division 1.4[h] Division 1.5 Division 1.6	Required Required Not Required Not Required Required Required	Not Required Not Required Required Required Not Required Not Required
Flammable gas	Gaseous Liquefied	Not Required Not Required	Required Required
Flammable liquid	IA[d] IB[e]	Not Required Not Required	Required Required
Organic peroxides	U I	Required Required	Not Permitted Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	–	Not Required	Required
Unstable (reactive)	4 3 Detonable 3 Nondetonable	Required Required Not Required	Not Permitted Not Permitted Required
Water-reactive liquids and solids	3	Not Required	Required

	2[g]	Not Required	Required
SPECIAL USES			
Acetylene generator rooms	–	Not Required	Required
Grain processing	–	Not Required	Required
Liquefied petroleum gas-distribution facilities	–	Not Required	Required
Where explosion hazards exist[f]	Detonation Deflagration	Required Not Required	Not Permitted Required

a. See Section 414.1.3.
b. See the International Fire Code.
c. As generated during manufacturing or processing. See definitions of "Combustible dust" in Chapter 3.
d. Storage or use.
e. In open use or dispensing.
f. Rooms containing dispensing and use of hazardous materials when an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.
g. A method of explosion control shall be provided when Class 2 water-reactive materials can form potentially explosive mixtures.
h. This table shall not apply to consumer fireworks, 1.4G.

IBC [F] 415.3.1 Group H occupancy minimum fire separation distance. Regardless of any other provisions, buildings containing Group H occupancies shall be set back to the minimum fire separation distance as set forth in Items 1 through 4 below. Distances shall be measured from the walls enclosing the occupancy to lot lines, including those on a public way. Distances to assumed lot lines established for the purpose of determining exterior wall and opening protection are not to be used to establish the minimum fire separation distance for buildings on sites where explosives are manufactured or used when separation is provided in accordance with the quantity distance tables specified for explosive materials in the International Fire Code.

1. Group H-1. Not less than 75 feet (22 860 mm) and not less than required by the International Fire Code.

   Exceptions:

   1. Fireworks manufacturing buildings separated in accordance with NFPA 1124.
   2. Buildings containing the following materials when separated in accordance with Table 415.3.1:
      2.1. Organic peroxides, unclassified detonable.
      2.2. Unstable reactive materials, Class 4.
      2.3. Unstable reactive materials, Class 3.
      2.4. Detonable pyrophoric materials.

2. Group H-2. Not less than 30 feet (9144 mm) where the area of the occupancy exceeds 1,000 square feet (93 m^2) and it is not required to be located in a detached building.
3. Groups H-2 and H-3. Not less than 50 feet (15 240 mm) where a detached building is required (See Table 415.3.2).
4. Groups H-2 and H-3. Occupancies containing materials with explosive characteristics shall be separated as required by the International Fire Code. Where separations are not specified, the distances required shall not be less than the distances required by Table 415.3.1.

   Exception: Consumer fireworks, 1.4G.

IBC [F] TABLE 415.3.2
DETACHED BUILDING REQUIRED

A DETACHED BUILDING IS REQUIRED WHEN THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN			
Material	**Class**	**Solids and Liquids (tons)[a, b]**	**Gases (cubic feet)[a, b]**
Explosives	Division 1.1 Division 1.2 Division 1.3 Division 1.4 Division 1.4[c] Division 1.5 Division 1.6	Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity 1 Maximum Allowable Quantity Maximum Allowable Quantity	Not Applicable
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3 Class 2	1,200 2,000	Not Applicable Not Applicable
Organic peroxides	Detonable Class I Class II Class III	Maximum Allowable Quantity Maximum Allowable Quantity 25 50	Not Applicable Not Applicable Not Applicable Not Applicable
Unstable (reactives) nondetonable	Class 3 Class 2	1 25	2,000 10,000
Water reactives	Class 3 Class 2	1 25	Not Applicable Not Applicable
Pyrophoric gases	Not Applicable	Not Applicable	2,000

For SI: 1 ton = 906 kg, 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg.
a. For materials that are detonable, the distance to other buildings or lot lines shall be as specified in Table 415.3.1 based on trinitrotoluene (TNT) equivalence of the material. For materials classified as explosives, see Chapter 33 the International Fire Code. For all other materials, the distance shall be as indicated in Section 415.3.1.
b. "Maximum Allowable Quantity" means the maximum allowable quantity per control area set forth in Table 307.7(1).
c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco and Firearms (BATF) regulations or unpackaged articles used in process operations that do not propagate a detonation or

deflagration between articles, providing the net explosive weight of individual articles does not exceed 1 pound. <u>This table shall not apply to consumer fireworks, 1.4G.</u>

(Portions of proposal not shown, remain unchanged.)

Commenter's Reason: This Public Comment proposes revisions to several sections of the International Building Code (IBC) that will end up regulating consumer fireworks, 1.4G if this Code Change F186-06/10 as modified by the Committee is approved. That is because consumer fireworks, 1.4G will be considered to be an explosive by the International Fire Code (IFC) due to the revisions made to the definitions for "Explosive" and "Fireworks, 1.4G" by Code Change F186-09/10. We have conducted an extensive evaluation and analysis of the requirements in the IBC and the IFC regulating explosives to determine those sections that would subsequently apply to consumer fireworks, 1.4G based on approval as modified of this Code Change. The result is that the following tables and section would be applicable to consumer fireworks, 1.4G, although they are not currently:

[F] Table 414.5.1 Explosion Control Requirements
[F] 415.3.1 Group H Occupancy Minimum Fire Separation Distance
[F] Table 415.3.2 Detached Building Required

The proponent's Reason Statement contains the following: "In reality, at the model code level, other than the deletion of language saying consumer fireworks are not explosive, the net effect of this change will be zero to what is taking place in the world of consumer fireworks manufacturing, storage, sales and use." In other words, the proponent is indicating that his code change should not change the application of the requirements of the IBC and the IFC for explosives regarding consumer fireworks, 1.4G. So we are proposing revisions to the above noted section and tables to implement that intent as follows.

We have proposed to add a new Footnote h to Table 414.5.1 to indicate that the entry for Explosives, Division 1.4 does not apply to consumer fireworks, 1.4G for explosion control requirements.

We have also proposed a revision to Item 4 of Section [F] 415.3.1 to add an Exception for consumer fireworks, 1.4G. This is necessary since this item specifies that Group H-3 occupancies (which consumer fireworks, 1.4G are classified as) are required to be separated in accordance with the IFC, but where those separations are not specified, the distances shall not be less than those distances required by Table 415.3.1 Minimum Separation Distances for Buildings Containing Explosive Materials. In reviewing the separation requirements in Chapter 33 of the IFC, consumer fireworks, 1.4G have been exempt from Table 3301.8.1(3) Application of Separation Distance (Q-D) Tables – Division 1.4 Explosives by Footnote d and Table 3304.5.2(3) Table of Distances (Q-D) For Buildings Containing Explosives – Division 1.4 by Footnote c. Therefore, the Exception we are proposing to Item 4 of Section 415.3.1 is needed so that the separation distances in Table 415.3.1 Minimum Separation Distances for Buildings Containing Explosive Materials are not applied to consumer fireworks, 1.4G.

And, finally, we have proposed a revision to Footnote c to Table 415.3.2 to indicate that the Table does not apply to consumer fireworks, 1.4G similar to the exemptions indicated above to the Tables in Chapter 33 of the IFC. In fact, Footnote c with the proposed revision is identical to Footnote c to Table 3304.5.2(3).

In conclusion, if the Class A voting members approve Code Change F186-09/10 as modified by the International Fire Code Committee, then the members should also vote to approve this Public Comment to further modify that Code Change to implement the intent of the original Code Change not to change the application of the explosive materials requirements of the IBC and IFC to consumer fireworks, 1.4G by simply changing the definition for "Explosive" and "Fireworks, 1.4G."

Final Action: AS AM AMPC____ D

F190-09/10
2703.8.3.2 (IBC [F] 414.2.2); 2702.1 (IBC [F] 307.2)

<u>Proposed Change as Submitted</u>

Proponent: Sarah A. Rice, CBO, representing self

Revise as follows:

2703.8.3.2 (IBC [F] 414.2.2) Percentage of maximum allowable quantities. The percentage of maximum allowable quantities of hazardous materials per *control area* allowed at each floor level within a building hall be in accordance with Table 2703.8.3.2. <u>Where the quantity of hazardous material stored in the building is equal to or less than the maximum allowable quantity per control area in Tables 2703.1.1(1) and 2703.1.1(2), the entire building shall be considered a single control area and the maximum allowable quantity of hazardous material shall be permitted to be located anywhere in the building subject to the per-floor limitations of Table 2703.8.3.2.</u>

2702.1 (IBC [F] 307.2) Definitions. The following words and terms shall, for the purposes of this chapter, Chapters 28 through 44 and as used elsewhere in this code, have the meanings shown herein.

CONTROL AREA. <u>A space or</u> spaces within a building where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used or handled. <u>A control area may be an entire building or a portion of a building.</u> See also the definition of "Outdoor control area."

Reason: The intent of this proposal is to codify IFC Committee Interpretations #51-07 and #52-07. Interpretation #51-07 states that "When the quantity of hazardous material stored in the building is equal to or less than the maximum allowable quantity per control area in Tables 2703.1.1(1) and 2703.1.1(2), the entire building would be considered the control area. When the entire building is the control area, the maximum allowable quantity of material may be located anywhere in the building subject to the per-floor limitations of Table 2703.8.3.2." Interpretation #52-07 states that "When the quantity of hazardous material being stored in each control area is equal to or less than the maximum allowable quantity per control area in Tables 2703.1.1(1) and 2703.1.1(2), the maximum allowable quantity of material per control area may be located anywhere within a multi-story control area, subject to the per-floor limitations of Table 2703.8.3.2."

This proposal revises Section 2703.8.3.2 to clarify that the provisions of Table 2703.8.3.2 are applicable to a multi-story building that is a single control area. The control area definition is also being revised to clarify that an entire building of any height or area can, in fact, be considered a control area

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-G5-414~RENAMED-F1-2703.8.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal, while consistent with the issued committee interpretations, does not clarify the code because the interpretations themselves are a problem. The code has always allowed multi-story control areas. The committee did feel, however, that the proposed revision to the definition of Control Area had merit and should be pursued in a public comment.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, CBO, The Preview Group, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2703.8.3.2 (IBC [F] 414.2.2) Percentage of maximum allowable quantities. The percentage of maximum allowable quantities of hazardous materials per *control area* allowed at each floor level within a building hall be in accordance with Table 2703.8.3.2. ~~Where the quantity of hazardous material stored in the building is equal to or less than the maximum allowable quantity per control area in Tables 2703.1.1(1) and 2703.1.1(2), the entire building shall be considered a single control area and the maximum allowable quantity of hazardous material shall be permitted to be located anywhere in the building subject to the per-floor limitations of Table 2703.8.3.2.~~

2702.1 (IBC [F] 307.2) Definitions. The following words and terms shall, for the purposes of this chapter, Chapters 28 through 44 and as used elsewhere in this code, have the meanings shown herein.

CONTROL AREA. A space or spaces within a building where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used or handled. A control area may be an entire building or a portion of a building. See also the definition of "Outdoor control area."

Commenters Reason: The code change has been modified to reflect the comments received during the public hearings in Baltimore. The committee confirmed that there is NOT a consensus regarding the distribution of hazardous materials within a single control area, that language has been removed. The code change not only seeks to act on the committees' recommendation to modify the definition of "control area" by making it clear that a single building (regardless of the number of stories in the building) can be considered and regulated as a one (1) control area.

Final Action: AS AM AMPC____ D

F196-09/10

3301.1, 3301.1.3.1 (New), 3302.1, Chapter 47; IBC [F] 307.2, IBC Chapter 35

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing: American Pyrotechnics Association (APA)

1. Revise the IFC as follows:

3301.1 Scope. The provisions of this chapter shall govern the possession, manufacture, storage, handling, sale and use of explosives, explosive materials, fireworks and small arms ammunition.

Exceptions:

1. The Armed Forces of the United States, Coast Guard or National Guard.
2. Explosives in forms prescribed by the official United States Pharmacopoeia.
3. The possession, storage and use of small arms ammunition when packaged in accordance with DOTn packaging requirements.
4. The possession, storage and use of not more than 1 pound (0.454 kg) of commercially manufactured sporting black powder, 20 pounds (9 kg) of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.
5. The use of explosive materials by federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.
6. Special industrial explosive devices which in the aggregate contain less than 50 pounds (23 kg) of explosive materials.
7. The possession, storage and use of blank industrial power load cartridges when packaged in accordance with DOTn packaging regulations.
8. Transportation in accordance with DOTn 49 CFR Part 100-185.
9. Items preempted by federal regulations.
10. Novelties.

3302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, igniters and display fireworks, 1.3G (Class B, Special).

The term “Explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G (Class C, Common) and novelties, 1.4G by hazardous materials regulations of DOTn 49 CFR Parts 100-185.

2. Add new text to the IFC as follows:

3301.1.3.1 Novelties, 1.4G. Novelties, 1.4G shall be regulated as fireworks, 1.4G for the purpose of this code.

3302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

NOVELTIES. Small pyrotechnic devices not requiring DOTn approval and containing small amounts of pyrotechnic or explosive composition designed to produce limited visible or audible effects and not classified as consumer fireworks, 1.4G or novelties, 1.4G. Such novelties which comply with the labeling regulations of the US Consumer Product Safety Commission as set forth in CPSC 16 CFR: Parts 1500 and 1507 are not explosive materials for the purpose of this code.

NOVELTIES, 1.4G. Small pyrotechnic devices approved by DOTn and containing small amounts of pyrotechnic or explosive composition designed to produce limited visible or audible effects and not classified as consumer fireworks, 1.4G. Such 1.4G novelties which comply with the construction, chemical composition, and labeling regulations of American Pyrotechnics Association Standard 87-1 and the US Consumer Products Safety Commission as set forth in CPSC 16 CFR: Parts 1500 and 1507 are not explosive materials for the purpose of this code.

3. Revise the IBC as follows:

IBC [F] 307.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, igniters and display fireworks, 1.3G (Class B, Special).

The term “Explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G (Class C, Common) and novelties, 1.4G by hazardous materials regulations of DOTn 49 CFR Parts 100-185.

4. Add new text to the IBC as follows:

IBC [F] 307.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

NOVELTIES, 1.4G. Small pyrotechnic devices approved by DOTn and containing small amounts of pyrotechnic or explosive composition designed to produce limited visible or audible effects and not classified as consumer fireworks, 1.4G. Such 1.4G novelties which comply with the construction, chemical composition, and labeling regulations of American Pyrotechnics Association Standard 87-1 and the US Consumer Products Safety Commission as set forth in CPSC 16 CFR: Parts 1500 and 1507 are not explosive materials and shall be regulated as fireworks, 1.4G for the purpose of this code.

5. Add new referenced standard to IFC Chapter 47 and IBC Chapter 35 as follows:

APA
American Pyrotechnics Association
Post Office Box 30438
Bethesda, MD 20824

87-1 (2001)	Standard for Construction and Approval for Transportation of Fireworks, Novelties, and Theatrical Pyrotechnics

Reason: Items 1 and 2: The purpose of this proposed code change is to close a loophole in the current requirements in Chapter 33 that regulate consumer fireworks, 1.4G. There is another class of similar fireworks items with a lesser hazard that are classified as novelties, 1.4G. These items, in general, have less pyrotechnic and/or explosive composition than consumer fireworks, 1.4G so they are less of a fire and life safety hazard. However, they are still regulated by the DOTn and are also required to meet the labeling requirements of the CPSC for consumer fireworks, 1.4G. This information can be found in Section C.3.2 Novelty of American Pyrotechnics Association APA Standard 87-1 which is being proposed as a referenced standard. APA Standard 87-1 is titled “Standard for Construction and Approval for Transportation of Fireworks, Novelties, and Theatrical Pyrotechnics.” APA Standard 87-1 comprises Annex C of NFPA 1124-2006, Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnics Articles. It is also referenced by the DOTn in Title 49, CFR, 171-180 and by the CPSC in Title 16, CFR, 1000 to End. It is available from both the federal government and the APA.

This code change proposal also clarifies that novelties which are not classed as novelties, 1.4G because they do not require DOTn approval and they are not regulated as explosives by the DOTn are exempt from the requirements of Chapter 33. However, they are still required to comply with the labeling regulations of the US Consumer Products Safety Commission as set forth in CPSC 16, CFR: Parts 1500 and 1507.

New definitions have also been provided for “Novelties” and “Novelties, 1.4G” in order to help implement this code change proposal.

The proposed new definition for “Novelties” is necessary so the term can be referenced in this code change proposal in order to specifically exempt “novelties” from the requirements of Chapter 33. This will make the International Fire Code consistent with the DOTn regulations which do not require approval of novelties meeting the specific requirements of Section C.3.2 of APA Standard 87-1. In fact, such novelties are not regulated by the DOTn as explosives, although they are still required to comply with CPSC labeling requirements for consumer fireworks. Such “novelties” contain very small amounts of pyrotechnic and/or explosive compositions which for transportation purposes are not considered to be a fire or explosion hazard in their manufactured form.

The proposed new definition for “Novelties, 1.4G” is based on the definition contained in Section C.2.12 Novelty of the American Pyrotechnics Association APA Standard 87-1.

Items 3 and 4: The purpose of this proposed code change is to close a loophole in the current requirements that regulate consumer fireworks, 1.4G. There is another class of similar fireworks items with a lesser hazard that are classified as novelties, 1.4G. These items, in general, have less pyrotechnic and/or explosive composition than consumer fireworks, 1.4G so they are less of a fire and life safety hazard. However, they are still regulated by the DOTn and are also required to meet the labeling requirements of the CPSC for consumer fireworks, 1.4G.

A new definition has also been provided for “Novelties, 1.4G” in order to help implement this code change proposal. This proposed new definition for “Novelties, 1.4G” is based on the definition contained in Section C.2.12 Novelty of the American Pyrotechnics Association APA Standard 87-1, Standard for Construction and Approval for Transportation of Fireworks, Novelties, and Theatrical Pyrotechnics which is being proposed as a referenced standard. APA Standard 87-1 comprises Annex C of NFPA 1124-2006, Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnics Articles. It is also referenced by the DOTn in Title 49, CFR, 171-180 and by the CPSC in Title 16, CFR, 1000 to End. It is available from both the federal government and the APA. Additional information can also be found in Section C.3.2 Novelty of APA Standard 87-1.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, APA 87-1 (2001), for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: THORNBERRY-F1-3301 COMBINED W-G3-307.2

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard APA 87-1 (2001) indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Sections 3.6.2.1, 3.6.2.11 and 3.6.3.2.

Committee Action: Disapproved

Committee Reason: The committee felt that the proposal is inconsistent with the action taken on code change F186-09/10 and that a modification suggested by the proponent to resolve that inconsistency was more confusing than helpful. Also, the proposed referenced standard does not comply with ICC CP-28, Section 3.6 and was also found to be unclear and confusing by some committee members.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE , The Code Consortium Inc, representing American Pyrotechnics Association (APA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3301.1 Scope. The provisions of this chapter shall govern the possession, manufacture, storage, handling, sale and use of explosives, explosive materials, fireworks and small arms ammunition.

Exceptions:

1 through 9 *(No change to text)*
~~10. Novelties.~~

3301.1.3.1 Novelties, 1.4G. Novelties, 1.4G shall be regulated as consumer fireworks, 1.4G for the purpose of this code

3302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, igniters and display fireworks, 1.3G (Class B, Special).

The term "Explosive" includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G (Class C, Common) ~~and novelties, 1.4G~~ by hazardous materials regulations of DOTn 49 CFR Parts 100-185.

~~**NOVELTIES.** Small pyrotechnic devices not requiring DOTn approval and containing small amounts of pyrotechnic or explosive composition designed to produce limited visible or audible effects and not classified as consumer fireworks, 1.4G or novelties, 1.4G. Such novelties which comply with the labeling regulations of the US Consumer Product Safety Commission as set forth in CPSC 16 CFR: Parts 1500 and 1507 are not explosive materials for the purpose of this code.~~

NOVELTIES, 1.4G. Small pyrotechnic devices approved by DOTn and containing small amounts of pyrotechnic or explosive composition designed to produce limited visible or audible effects and not classified as consumer fireworks, 1.4G. Such 1.4G novelties which comply with the construction, chemical composition, and labeling regulations of ~~American Pyrotechnics Association Standard 87-1 and~~ the US Consumer Products Safety Commission as set forth in CPSC 16 CFR: Parts 1500 and 1507 and the standard referenced in DOTn 49 CFR: Part 173.56(j)(1) are not explosive materials for the purpose of this code.

IBC [F] 307.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, igniters and display fireworks, 1.3G (Class B, Special).

The term "Explosive" includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G (Class C, Common) ~~and novelties, 1.4G~~ by hazardous materials regulations of DOTn 49 CFR Parts 100-185.

~~**NOVELTIES, 1.4G.** Small pyrotechnic devices approved by DOTn and containing small amounts of pyrotechnic or explosive composition designed to produce limited visible or audible effects and not classified as consumer fireworks, 1.4G. Such 1.4G novelties which comply with the construction, chemical composition, and labeling regulations of American Pyrotechnics Association Standard 87-1 and the US Consumer Products Safety Commission as set forth in CPSC 16 CFR: Parts 1500 and 1507 are not explosive materials for the purpose of this code.~~

~~American Pyrotechnics Association~~

~~**APA**~~	~~Post Office Box 30438~~ ~~Bethesda, MD 20824~~
~~APA 87-1 (2001)~~	~~Standard for Construction and Approval for Transportation of Fireworks, Novelties, and Theatrical Pyrotechnics~~

Commenter's Reason: This Public Comment contains revisions that respond to the Committee Reason Statement indicating why the International Fire Code Development Committee voted for disapproval of this Code Change Proposal. First, the Committee felt that this Code Change Proposal was inconsistent with the action they took on F186-09/10 for approval as modified. We have addressed that concern by deleting the proposed new definition for "Novelties" in both the International Building Code (IBC) and the International Fire Code (IFC). We have also deleted novelties from the Exceptions to Section 3301.1 Scope of the IFC. And we have deleted the reference to novelties, 1.4G in the second paragraph of the definition for "Explosive." Although the second paragraph was recommended for deletion in Code Change F186-09/10, we have proposed the deletion of the reference to novelties, 1.4G just in case F186-09/10 is disapproved or further revised during the ICC Final Action Hearings.

The Committee also expressed its concern about the reference to the American Pyrotechnics Association Standard 87-1 contained in the proposed new definition for "novelties, 1.4G" since it did not comply with the ICC standards criteria for consensus standards and it was also found to be unclear and confusing by some Committee members. So we deleted the reference to the standard and substituted a reference to DOTn 49 CFR: Part 173.56(J)(1) which provides the necessary reference for the DOTn regulations defining novelties which also include their construction, chemical composition, and labeling regulations.

As a result of the revisions contained in this Public Comment, novelties, 1.4G will be regulated the same as consumer fireworks, 1.4G are currently regulated in both the IBC and the IFC. This will close an unintended loophole in these codes which is currently the result of the DOTn differentiating between novelties, 1.4G and consumer fireworks, 1.4G for the purposes of regulating these devices in transportation. This will make the IBC and the IFC consistent with DOTn regulations for these pyrotechnic devices.

Analysis: The standard referenced by DOTn 49 CFR Part 173.56 (j)(l) in IFC Section 3302.1 in the proposed revision to the definition of Novelties, 1.4G, is American Pyrotechnics Association (APA) Standard 87-1 (2001).

Final Action: AS AM AMPC____ D

F203-09/10
3404.2.7.3.2, 3404.2.9.7.3

Proposed Change as Submitted

Proponent: Steve M. Crothers, Seattle Fire Department, representing Washington State Association of Fire Marshals

Revise as follows:

1. Revise as follows:

3404.2.7.3.2 Vent-line flame arresters and ~~venting devices~~ pressure-vacuum vents. Listed or approved flame arresters or pressure-vacuum (PV) vents that remain closed unless venting under pressure or vacuum conditions shall be installed in normal vents of tanks containing Class IB and IC liquids.

> **Exception:** When determined by the fire code official that the use of such devices can result in damage to the tank.

Vent-line flame arresters and venting devices shall be installed and maintained in accordance with their listings and API 2000. ~~Use of~~ In-line flame arresters in piping systems shall be installed and maintained in accordance with their listing and API 2028. Pressure vacuum vents shall be installed and maintained in accordance with API 2000.

2. Delete without substitution:

~~**3404.2.9.7.3 Flame arresters.** Approved flame arresters or pressure breather valves shall be installed in normal vents.~~

(Renumber subsequent sections)

Reason: The code currently requires that a flame arrester or pressure-vacuum (PV) vent be installed in the normal vent of all protected aboveground tanks containing flammable or combustible liquids but it does not have a similar requirement for other aboveground tanks whose design and construction provides significantly less protection and control than a protected tank. This code change accomplishes several things, it:

1. Correlates the requirement for flame arresters and PV vents so that regardless of the tank type the requirement is the same.
2. Modifies the current provision requiring a flame arrester for all flammable and combustible liquids so that a flame arrester or PV vent is only required for tanks containing Class IB and IC liquids. Because the primary function of a flame arrester is to prevent the unrestricted propagation of flame through flammable gas or vapor mixtures, it is not necessary to install a flame arrester on tanks containing combustible liquids. Additionally, because flame arresters cannot prevent detonation or control flame propagation speeds associated with

a detonation (flame speeds greater than the speed of sound), flame arresters are not effective when installed on tanks containing Class IA liquids. This revision establishes a requirement for a tank vent flame arrester only when there is a sound technical reason to provide one.

3. Provides a much needed correlation between the IFC and NFPA 30, *Code for Flammable and Combustible Liquids*, for establishing when flame arresters are required on tank vents.
4. Adds a new exception that allows omitting the use of a tank vent flame arrester in situations where the properties of the liquid can cause the tank to be damaged by use of the device. Properties of some Class IB and IC liquids such as crystallization, polymerization and corrosion can present obstructions in flame arresters that may justify omitting the device.
5. Clarifies that the existing API reference document (API 2028) addresses in-line flame arresters for piping systems. An end-of-line flame arrester is a flame arrester that is mounted at the end of a pipe (flanged or threaded inlet connection) and vents directly to the atmosphere whereas an in-line flame arrester may be mounted upstream of a pressure/vacuum relief vent, or may be located upstream of a specified maximum length of vent piping to atmosphere. Both are approved devices.
6. Addresses maintenance of flame arresters and pressure vacuum vents. Not only is proper installation of these devices important but their maintenance is critical. A blocked or corroded flame arrester can render the device ineffective and lead to catastrophic results. This code change adds a new requirement to maintain flame arresters and PV devices in accordance with their listings and API 2000.

Cost Impact: Costs will decrease since currently any aboveground tank containing Class I, II or III liquids requires a flame arrestor on the normal vent and this proposal will require flame arrestors only on Class I liquid tanks. There could be some cost increase where maintenance of flame arrestors does not currently occur.

ICCFILENAME: CROTHERS-F2-3404.2.9.7.3.DOC

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

3404.2.7.3.2 Vent-line flame arresters pressure-vacuum vents. Listed or approved flame arresters or pressure-vacuum (PV) vents that remain closed unless venting under pressure or vacuum conditions shall be installed in normal vents of tanks containing Class IB and IC liquids.

Exception: When determined by the fire code official that the use of such devices can result in damage to the tank.

Vent-line flame arresters ~~and venting devices~~ shall be installed ~~and maintained~~ in accordance with their listings ~~and~~ or API 2000 and maintained in accordance with Section 21.8.6 of NFPA 30 or API 2000. ~~Use of~~ In-line flame arresters in piping systems shall be installed and maintained in accordance with their listing ~~and~~ or API 2028. Pressure vacuum vents shall be installed in accordance with Section 21.4.3 of NFPA 30 or API 2000 and maintained in accordance with Section 21.8.6 of NFPA 30 or API 2000.

3404.2.9.7.3 Flame arresters. Approved flame arresters or pressure breather valves shall be installed in normal vents.

Committee Reason: The committee agreed that the proposal provides a needed improvement in the level of protection afforded to aboveground tanks that are not classified as protected aboveground tanks. The modification to Section 3404.2.7.3.2 adds a reference to the appropriate NFPA 30 section as an alternative to API 2000. The modification to reinstate Section 3404.2.9.7.3 maintains the extra measure of protection that has always been afforded to protected aboveground tanks.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lynne M. Kilpatrick, Seattle Fire Department, representing Washington State Association of Fire Marshal's, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

3404.2.7.3.2 Vent-line flame arresters and pressure-vacuum vents. Listed or approved flame arresters or pressure-vacuum (PV) vents that remain closed unless venting under pressure or vacuum conditions shall be installed in normal vents of tanks containing Class IB and IC liquids.

Exception: When ~~determined by the fire code official that the~~ use of such devices can result in damage to the tank due to the liquid properties, including but not limited to, condensation, crystallization, corrosiveness, freezing, polymerization, or plugging.

Vent-line flame arresters shall be installed in accordance with their listings or API 2000 and maintained in accordance with Section 21.8.6 of NFPA 30 or API 2000. Inline flame arresters in piping systems shall be installed and maintained in accordance with their listing or API 2028. Pressure-vacuum vents shall be installed in accordance with Section 21.4.3 of NFPA 30 or API 2000 and maintained in accordance with Section 21.8.6 of NFPA 30 or API 2000.

~~**3404.2.9.7.3 Flame arresters.** Approved flame arresters or pressure breather valves shall be installed in normal vents.~~

Commenter's Reason: The exception is revised in response to a Committee comment to eliminate the fire code official's responsibility to 'determine' when the tank can be damaged. This revision also adds more information to assist the code user in determining when omitting the device is justified.

The intent of the original code change proposal was to require flame arresters and pressure breather valves on aboveground tanks when the liquid in the tank presented the hazard that the device is intended to control. That was accomplished by the Committee action taken in Section 3404.2.7.3.2, which limits the requirement for flame arresters and pressure breather valves to tanks (UL142-steel aboveground tanks or UL2085-protected aboveground tanks) containing Class IB and IC liquids.

Section 3404.2.9.7 sets forth additional requirements for UL2085 protected aboveground tanks, and if Section 3404.2.9.7.3 is retained, it will require flame arresters or pressure breather valves to be installed on all aboveground protected tanks (UL2085), regardless of the fuel contained, including tanks containing Class II and Class III combustible liquids. Retaining 3404.2.9.7.3 simply adds a control that is not necessary and sets up an unwarranted disparity between the requirements for steel aboveground tanks (UL142) and aboveground protected tanks (UL2085).

This proposed change is consistent with 2008 NFPA 30 Section 21.4.3.9 and its Annex note:

> *"21.4.3.6 Tanks and vessels that store Class IA liquids shall be equipped with venting devices that are closed, except when venting under pressure or vacuum conditions.*
>
> *21.4.3.7 Tanks and pressure vessels that store Class IB and Class IC liquids shall be equipped with venting devices or with listed flame arresters. When used, vent devices shall be closed, except when venting under pressure or vacuum conditions.*
>
> *21.4.3.9* Flame arresters or venting devices required in 21.4.3.6 and 21.4.3.7 shall be permitted to be omitted on tanks that store Class IB or Class IC liquids where conditions are such that their use can, in case of obstruction, result in damage to the tank.*
>
> *Annex Note A.21.4.3.9 Liquid properties that justify omitting such devices include, but are not limited to, condensation, corrosiveness, crystallization, polymerization, freezing, or plugging. When any of these conditions exist, consideration should be given to heating, use of devices that employ special materials of construction, use of liquid seals, or inerting. See NFPA 69, Standard on Explosion Prevention Systems."*

Final Action: AS AM AMPC____ D

F204-09/10
3404.2.7.4

Proposed Change as Submitted

Proponent: Lynne M. Kilpatrick, Fire Department, City of Seattle, WA, representing Washington State Association of Fire Marshals

Revise as follows:

3404.2.7.4 Emergency venting. Stationary, aboveground tanks shall be equipped with additional venting that will relieve excessive internal pressure caused by exposure to fires. Emergency vents for Class I, II and IIIA liquids shall not discharge inside buildings. The venting shall be installed and maintained in accordance with Section 22.7 of NFPA 30.

Exceptions:

1. Tanks larger than 12,000 gallons (45 420 L) in capacity storing Class IIIB liquids which are not within the diked area or the drainage path of Class I or II liquids do not require emergency relief venting.
2. Emergency vents on protected aboveground tanks complying with UL 2085 containing Class II or IIIA liquids are allowed to discharge inside the building.

Reason: UL 2085 protected aboveground tanks are designed and constructed to withstand a two-hour fire test of 2000°F during which no single point temperature may exceed 400°F and the average temperature rise throughout the internal tank can be no greater than 260°F. The largest quantity of Class II or IIIA liquid that can be stored indoors in a UL 2085 tank unprotected by an approved automatic sprinkler system is 660 gallons. Given the stringent testing requirement, and the required sprinkler coverage, activation of the emergency vent is likely only under extreme fire conditions over an extended period of time. Further, NFPA 30 requires that emergency vents placed on vent pipes that extend beyond twelve inches from the tank be reengineered to account for the potential back pressure and ensure activation at the appropriate pressure. It is not unusual to see vent lines extending 30 or 40 feet or more through a building in order to achieve the exterior discharge. Allowing the emergency vent to discharge inside eliminates the need to reengineer the venting and ensures proper sizing and activation of the emergency vent.

Cost Impact: There is a cost savings since emergency vent lines would not be required to extend through buildings to the exterior.

ICCFILENAME: KILPATRICK-F4-3404.2.7.4.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement that the proposal will provide increased safety for protected aboveground tanks installed indoors and storing Class I liquids.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE, The Code Consortium Inc, representing ConVault, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3404.2.7.4 Emergency venting. Stationary, aboveground tanks shall be equipped with additional venting that will relieve excessive internal pressure caused by exposure to fires. Emergency vents for Class I, II, and IIIA liquids shall not discharge inside buildings. The venting shall be installed and maintained in accordance with Section 22.7 of NFPA 30.

Exceptions:

1. Tanks larger than 12,000 gallons (45 420 L) in capacity storing Class IIIB liquids which are not within the diked area or the drainage path of Class I or II liquids do not require emergency relief venting.
2. Emergency vents on protected aboveground tanks complying with UL 2085 containing Class ~~II or~~ IIIA liquids are allowed to discharge inside the building.

Commenter's Reason: The purpose of this Public Comment is to limit the application of the proposed new Exception 2 to Section 3404.2.7.4 Emergency Venting so that it only allows the emergency vent on protected aboveground tanks to discharge inside the building where Class IIIA liquids are stored in the tanks. We believe that such an exception will not unduly compromise the very excellent safety record that protected aboveground tanks have displayed in the field and will maintain the level of fire and life safety intended by such tanks when they were originally developed and incorporated into the requirements of the legacy model fire codes.

We expressed our concerns in public testimony to the International Fire Code Committee during the hearings in Baltimore that we were basically opposed to any exception to the emergency venting requirements for protected aboveground tanks that would reduce the level of safety. But we felt reasonably comfortable if Class IIIA liquids were allowed to be vented inside the building. Our main concern is that Class II liquids have a flash point as low as 100°F and it could be possible to have vapors generated during a significant fire exposure released into the fire area via the emergency vent, even though there are very severe limitations on the temperature rise allowed for the contents of a protected aboveground tank when exposed to a 2-hour flammable liquid pool fire. The original concept of the protected aboveground tank was that it was intended to provide comparable safety to an underground storage tank. Thus, a very conservative approach was taken to the requirements in the fire codes to allow protected aboveground tanks in situations where they had been previously prohibited since only underground tanks were allowed. Therefore, we believe there is a need to continue to be cautious when looking at the possibility of relaxing any of the requirements currently contained in the IFC for protected aboveground tanks.

In conclusion, we would request that the Class A voting members either approve this Public Comment amending Code Change F204-09/10 to eliminate Class II liquids from Exception 2 to Section 3404.2.7.4 or disapprove this code change proposal altogether.

Final Action: AS AM AMPC____ D

F211-09/10
3405.3.6.1, Chapter 47

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

1. Revise as follows:

3405.3.6.1 Cleaning operations. Class IA liquids shall not be used for cleaning. Cleaning with Class IB, IC or II liquids shall be conducted as follows:

1. In a room or building in accordance with Section 3405.3.7; or
2. In a parts cleaner ~~machine~~ listed and labeled in accordance with UL 1204 and approved for the purpose in accordance with Section 3405.3.6.2.

Exception: Materials used in commercial and industrial process-related cleaning operations in accordance with other provisions of this code and not involving facilities maintenance cleaning operations.

2. Add new standard to Chapter 47 as follows:

UL
1204-04 Outline of Investigation for Parts Cleaners

Reason: UL's Subject 1204 Outline of Investigation includes a comprehensive set of construction and performance requirements that are used to evaluate and list parts cleaners. This equipment is reviewed to ensure the use and operation of the equipment provides a safe involvement using the flammable and combustible solvents. Five companies currently have parts cleaners listed.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, UL 1204-04, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard UL 1204-04 indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Sections 3.6.2.11 and 3.6.3.2.

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement and felt that the proposal provided clearer guidance on the standard to which the machines must be listed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble (Chairman) representing ICC Reference Standards Committee requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3405.3.6.1 Cleaning operations. Class IA liquids shall not be used for cleaning. Cleaning with Class IB, IC or II liquids shall be conducted as follows:

1. In a room or building in accordance with Section 3405.3.7; or
2. In a parts cleaner listed, ~~and~~ labeled ~~in accordance with UL 1204~~ and approved for the purpose in accordance with Section 3405.3.6.2.

   Exception: Materials used in commercial and industrial process-related cleaning operations in accordance with other provisions of this code and not involving facilities maintenance cleaning operations.

UL
~~1204-04 Outline of Investigation for Parts Cleaners~~

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be promulgated according to a consensus process.

We therefore propose to have deleted the reference standard and subsequent reference to that standard as part of this proposal to modify the original proposal.

Final Action: AS AM AMPC____ D

F216-09/10
3804.3.1 (New)

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman, Joint Fire Service Review Committee

Add new text as follows:

3804.3.1 Installation on roof prohibited. The installation of LP-gas containers on the roofs of buildings is prohibited.

(Renumber subsequent sections)

Reason: Currently, Chapter 38 also refers to NFPA 58. NFPA 58 will allow the installation of LP-gas containers on rooftops. This proposal will include a specific restriction which will supersede the provisions in the referenced standard NFPA 58. As a result, propane tank installation will not be permitted on roof tops.

LP-gas is a flammable gas with a vapor density heavier than air. The heavier vapor density means that any leak from a roof mounted propane storage tank will travel down into the occupied spaces of the building where there is a very high probability of fire or explosion due to all the potential ignition sources.

Additionally, a building fire beneath the LP-gas container will impinge upon or heat the tank causing activation of the pressure relief valve. When the pressure relief valve is activated, it will release propane, which still is heavier than air, and the propane will travel downwards toward the fire and increase fire intensity. This could endanger the building or neighboring buildings and exposures.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: LARIVIERE-F20-3804.3.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal was taking too broad an approach with a total prohibition of LPG containers on roofs and felt that the code should not override the referenced standard, NFPA 58, which allows containers on roofs under certain conditions. The committee suggested that a container size limitation might be useful and also that the proposal should clarify that it would be applicable only to permanent installations and not to DOTn cylinders used in roofing operations.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action and public comments were submitted. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.

Public Comment 1:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3804.3.1 Installation on roof prohibited. ~~The installation of~~ Stationary LP-gas containers shall not be installed on the roofs of buildings ~~is prohibited~~.

(Renumber subsequent sections…)

Commenter's Reason: This code change was Approved as Submitted, but there were some comments at the Code Development Hearing that have resulted in some refinement of the wording. Comments indicated that the wording was too broad, and also that the code could not override the standard.

This Public Comment has been reworded to narrow its application in two ways: 1) it states that is only applies to "stationary" containers, 2) it is clearer now that it applies to "installation". Therefore, it does not apply to the use of LP-gas containers for torch applied roofing, or brazing for example. This restriction only applies to the installation of a stationary container.

The second concern of the Code Development Committee was that this code requirement would be more restrictive than the standard. This concept is commonly done in the I-Codes and in fact Section 102.7 states in part: "Where differences occur between the provisions of this code and the referenced standards, the provisions of this code shall apply." The Assembly body has anticipated differences between the code's provisions and the standard's provisions, and accepts those differences, provided that the code takes precedence over the standard.

In fact the differences between the code and the standard are intentional, as it is with this code change. For example:

Section 903.3.1.1.1 contains a list of areas exempt from fire sprinkler installation; which is not consistent with NFPA 13.
Section 903.3.1.2.1 contains requirements for fire sprinkler installation on balconies and decks; which is not consistent with NFPA 13R.
Section 1208.2 contains requirements for installation of fire sprinklers in Type III-A or Type III-B dry cleaning systems; which is not consistent with NFPA 32.
Section 907.5.2.3 requires manual fire alarm boxes to be red; which is not mentioned in NFPA 72.

This code change intends to disallow the installation of LP-gas containers on rooftops. It is simply a fire safety issue based on physics. Any leak of LP-gas will expose the building because the vapors are heavier than air.

The Public Comment will help ensure that this section is not misinterpreted to include containers used for temporary applications on the roof.

Public Comment 2:

Bruce Swiecicki, representing National Propane Gas Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3804.3.1 Installation on roof prohibited. ~~The installation of~~ LP-gas containers <u>used in stationary installations shall not be located</u> on the roofs of buildings ~~is prohibited~~.

Commenter's Reason: The term "stationary installation" is used in NFPA 58 and defined as follows: "An installation of LP-Gas containers, piping, and equipment for indefinite use at a particular location; an installation not normally expected to change in status, condition, or location." Inserting the word "stationary" will ensure that this section is not misinterpreted to include containers used for temporary applications such as sealing roofing materials or brazing operations.

Final Action: AS AM AMPC____ D

F220-09/10

4603.4.3, 4603.4.4, 4603.4.5 (All New)

<u>Proposed Change as Submitted</u>

Proponents: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

Add new text as follows:

<u>**4603.4.3 Group F-1.** An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy used for the manufacture of upholstered furniture or mattresses.</u>

<u>**4603.4.4 Group M**. An automatic sprinkler system shall be provided throughout all buildings containing a Group M occupancy used for the display and sale of upholstered furniture or mattresses.</u>

<u>**4603.4.5 Group S-1.** An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy used for the storage of upholstered furniture or mattresses.</u>

Reason: This proposal adds retroactive requirements to install an automatic sprinkler system in buildings containing F-1, M and S-1 occupancies involving upholstered furniture and mattresses. The purpose is to build upon the change approved last cycle to require mercantile occupancies with any amount of upholstered furniture to be suppressed as requested by the upholstered furniture industry.

The recognized hazard by a fuel load consisting of upholstered furniture and mattresses has been as identified as requiring sprinkler protection in newly constructed buildings that would also be required to meet all other current requirements of the International Series of Codes. Most, if not all existing buildings do not meet the current requirements of the International Series of Codes. A building that existed prior to the current editions of the International Series Codes most likely has less protective features and the existence of the fuel load presented by upholstered furniture and mattress would then create a greater hazard and an increased need for automatic fire suppression.

Cost Impact: The code change proposal will increase the cost of existing occupancies containing these hazards.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal would create a financial hardship in these difficult economic times for existing businesses, especially small retailers, and would affect all occupancies in mixed-use buildings that house these types of businesses. The proposal should also be correlated with the action taken on code change F69-09/10 which established a threshold for these occupancies when new to prevent a more restrictive requirement for existing buildings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler (GBH International), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

4603.4.3 Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy used for the manufacture of upholstered furniture or mattresses if the Group F-1 fire area exceeds 12,000 square feet (1,115 m^2), and the area that is used for the manufacture of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).

4603.4.4 Group M. An automatic sprinkler system shall be provided throughout all buildings containing a Group M occupancy used for the display and sale of upholstered furniture or mattresses if the Group M fire area exceeds 12,000 square feet (1,115 m^2), and the area that is used for the display and sale of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).

4603.4.5 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy used for the storage of upholstered furniture or mattresses if the Group S-1 fire area exceeds 12,000 square feet (1,115 m^2), and the area that is used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).

Commenter's Reason: The technical committee was concerned that the proposal was not coordinated with the results of code change F69-09/10, which was approved. The revised code change language addresses that. The committee was also concerned that the proposal would have caused an undue burden on very small retailers and the revised language excludes them.

The language approved in code change F69 is as follows:

903.2.4 (IBC [F] 903.2.4) Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:
1. Where a Group F-1 fire area exceeds 12,000 square feet (1115 m^2);
2. Where a Group F-1 fire area is located more than three stories above grade plane; or
3. Where the combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. Where a Group F-1 occupancy that is used for the manufacture of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).
.
903.2.7 (IBC [F] 903.2.7) Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:
1. Where a Group M fire area exceeds 12,000 square feet (1115 m^2);
2. Where a Group M fire area is located more than three stories above grade plane; or
3. Where the combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2). ; or
4. Where a Group M occupancy that is used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m^2).

903.2.9 (IBC [F] 903.2.9) Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:
1. A Group S-1 fire area exceeds 12,000 square feet (1115 m^2);
2. A Group S-1 fire area is located more than three stories above grade plane; or
3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. A Group S-1 fire area used for the storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m^2).
5. A Group S-1 occupancy that is used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).

Final Action: AS AM AMPC____ D

F224-09/10
4603.6.7

Proposed Change as Submitted

Proponent: Gene Boecker, Code Consultants, Inc.

Revise as follows:

4603.6.7 Group R-4. ~~An automatic or~~ A manual fire alarm system that activates an occupant notification system in accordance with Section 907.6 shall be installed in existing Group R-2 residential care/assisted living facilities in accordance with Section ~~907.2.10~~ 907.2.10.1.

Exceptions:

1. Where there are interconnected smoke alarms meeting the requirements of Section 907.2.11 and there is at least one manual fire alarm box per floor arranged to continuously sound the smoke alarms.
2. Other manually activated, continuously sounding alarms *approved* by the *fire code official*.

Reason: During the prior code change cycle the effort was made to clear up the confusion between whether the required system must be a manual or automatic fire alarm system. Consistently, the code changes noted that the required retrofit system must be a manual one. However, in a few instances the clarification was not addressed in a code change.

This proposal is an effort to finish up the clean-up which began with the prior code change cycles in rewriting the requirements for fire alarms in existing buildings.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BOECKER-F11-4603.6.7.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that removing the requirement for automatic systems would be inappropriate. It was also noted that the title of the section indicates that it is applicable to Group R-4 but the text indicates Group R-2.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

4603.6.7 Group R-4. A manual fire alarm system that activates an occupant notification system in accordance with Section 907.6 shall be installed in existing Group ~~R-2~~ R-4 residential care/assisted living facilities in accordance with Section 907.2.10.1.

Exceptions:

1. Where there are interconnected smoke alarms meeting the requirements of Section 907.2.11 and there is at least one manual fire alarm box per floor arranged to continuously sound the smoke alarms.
2. Other manually activated, continuously sounding alarms *approved* by the *fire code official*.

Commenter's Reason: This proposal was Disapproved at the Code Development Hearing because of the confusion as to whether it applied to Group R-4 (as in the section title), or to Group R-2 (as in the text). This Public Comment clarifies that this code section applies to existing Group R-4 residential care/assisted living facilities.

During the prior code change cycle the effort was made to clear up the confusion between whether the required system must be a manual or automatic fire alarm system. Consistently, the code changes noted that the required retrofit system must be a manual one. However, in a few instances the clarification was not addressed in a code change.

This proposal is an effort to finish up the clean-up which began with the prior code change cycles in rewriting the requirements for fire alarms in existing buildings.

Analysis: Current Section 4603.6.7 reads "Group R-4" in both the title and the text.

Final Action: AS AM AMPC____ D

F225-09/10

4603.7.1

Proposed Change as Submitted

Proponent: Jeffrey M. Shapiro, PE, International Code Consultants, representing National Multi Housing Council

Revise as follows:

4603.7.1 Where required. Existing Group R occupancies and *dwellings* not classified as Group R occupancies, which are not already provided with single-station smoke alarms complying with requirements of the code that governed at the time of construction, shall be provided with single-station smoke alarms~~. Installation shall be~~ in accordance with Section 907.2.11, except as provided in Sections 4603.7.2 and 4603.7.3.

Reason: This proposal is intended as a clarification to assist in proper application of the existing text. The key phrase that determines exactly what is required in existing Group R occupancies is "Existing Group R occupancies…not already provided with single station smoke alarms..." Although this statement appears fairly straightforward in its intended application, it is occasionally misinterpreted, perhaps because the IFC Commentary on this issue is even more misleading than the code itself. To some, the text suggests that anytime smoke alarms are not already installed throughout a Group R occupancy, located as required for new construction in accordance with Section 907.2.10, additional alarms must be installed to protect any areas, such as bedrooms, that would require protection in new construction. However, I can state with great certainty that this was never the intended application of the code.

The IFC text originated in the UFC in 1995, and it was carried directly into the IFC during the drafting process. Thereby, the intent of this section was established by the original UFC provision. The provision in question resulted from a code change proposal submitted by the Minnesota State Fire Chiefs Association in 1995 (Proposal #21, 1007-95-1). The proposal was initially disapproved by the UFC Code Development Committee, but was approved at the final action hearing after initial objections were addressed by a public comment.

Part 4 of the public comment was further revised by a floor motion at the hearing, which was when the text "not already provided with single station smoke detectors" was added to the code. This text replaced other proposed text "…in accordance with the building code under which the building was constructed. Buildings that were not constructed under the requirements of a building code shall meet the minimum requirements of Section 1007.2.9.2," which needed to be changed because it didn't require buildings that were constructed under an old building code, prior to when smoke alarms were first required, to be retrofitted. By adding "not already provided with single station smoke detectors," the intent was to retain a "grandfather" clause for existing buildings that were previously provided with smoke alarms, while adding a requirement to retrofit buildings that were not.

When the IFC was developed, it was drafted using a combination of NFPA 1 Fire Prevention Code, NFPA 101 Life Safety Code and the UFC. Documentation from the drafting committee's work on the retroactive smoke alarm section show that the committee was given a choice of accepting either the NFPA 101 provisions (Sections 19-3.4 through 19.3.4.4.2) or the UFC provisions (Sections 1007.2.9.2 through 1007.2.9.2.4) for apartments. With respect to smoke alarms in sleeping rooms, the choice made no difference because neither code required smoke alarms to be retrofitted in these areas. In fact, NFPA 101 quite clearly maintains that approach today in Section 31.3.4.5.1.

In the end, the IFC adopted the UFC text, which included the "Existing Group R occupancies not already provided with single station smoke alarms..." text that remains today. Lacking any code change that would have revised the intended application of Section 4603.7.1, I am confident that the original intent of the code, to grandfather existing buildings that had smoke alarms installed prior to adoption of the IFC, remains the proper application of the code today. Accordingly, this proposal should be approved to remove the existing ambiguity.

Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: SHAPIRO-F1-4603.7.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal would allow for the avoidance altogether of installing smoke alarms for buildings originally built under a code that did not require them. For buildings that were not built under any construction code, this becomes a property maintenance issue that does not belong in the IFC. The proposed language could also be in conflict with state legislations that require retroactive smoke alarm installations.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee and Jeffrey Shapiro, representing the National Multi Housing Council, request Approval as Modified by this Public Comment.

Replace the proposal as follows:

4603.7.1 Where required. Existing Group R occupancies and *dwellings* not classified as Group R occupancies~~, not already provided with single-station smoke alarms,~~ shall be provided with single-station smoke alarms~~. Installation shall be~~ in accordance with Section 907.2.11, except as provided in Sections 4603.7.2 and 4603.7.3.

<u>**Exceptions:**</u>

1. <u>Where the code that was in effect at the time of construction required smoke alarms and smoke alarms complying with those requirements are already provided.</u>
2. <u>Where smoke alarms have been installed in occupancies and dwellings that were not required to have them at the time of construction, additional smoke alarms shall not be required provided that the existing smoke alarms comply with requirements that were in effect at the time of installation.</u>
3. <u>Where smoke detectors connected to a fire alarm system have been installed as a substitute for smoke alarms.</u>

Commenter's Reason: This proposal was Disapproved at the Code Development Hearing because the Committee felt that it did not satisfactorily address structures that were built under a code that did not require smoke alarms. This Public Comment revises the wording and adds exceptions with the simple intent of clarifying how the code is intended to apply.

The text of this public comment restructures the requirement into a base provision with exceptions. The base provision mandates smoke alarm installation in all existing Group R and other dwellings. Then, three exceptions are provided to address possible scenarios where smoke alarms have already been installed into an R occupancy but do not meet the current code requirements, recognizing that the intent of the existing code requirement was to permit existing smoke alarms to continue if they meet the code that was in effect at the time they were made.

Exception 1 indicates that smoke alarms which have been installed and maintained in accordance with the applicable code at the time of construction can continue.

Exception 2 indicates that smoke alarms, which were not required by the code at the time of construction, but were later installed, can continue when they meet the requirements of the applicable code at the time of installation.

Exception 3 indicates that smoke detectors connected to a fire alarm system may be used in lieu of smoke alarms.

In summary, the target of this code section has always been placing smoke alarms into Group R occupancies and dwellings that do not have ANY smoke alarms. This section was not intended to require compliance with the current smoke alarm requirements if the building already has smoke alarms that meet requirements that were applicable when they were installed. The focus is not to have the owner replace or revise their smoke alarms any time the code requirements for new construction change.

Final Action: AS AM AMPC____ D

F226-09/10
4603.8 (New)

Proposed Change as Submitted

Proponent: A. Hal Key, P.E., Fire Department, Mesa, AZ

Add new text as follows:

<u>**4603.8 Existing fire alarm systems.** When an existing fire alarm system becomes unserviceable due to non-availability of components or parts, that system shall be replaced in accordance with Section 907.2.</u>

Reason: When a fire alarm system becomes unserviceable due to the age of the equipment, the entire system must be replaced to maintain the system in operation. In most cases, the type of system (addressable vs. analog) changes and these systems need to be installed to the latest edition of the adopted code. Where an existing system has not yet been upgraded to the latest ADA requirements, the owners of these systems are already required to upgrade the system annunciation.

Cost Impact: The code change proposal will increase the cost of maintaining the system.

ICCFILENAME: KEY-F2-4603.8.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that replacement of an entire unserviceable system may not always be necessary but would be required by this proposal which could create a hardship for building owners.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

~~4603.8~~ 907.9.2 ~~Existing~~ Unserviceable fire alarm systems. When ~~an existing~~ a fire alarm system, or a portion of a fire alarm system, becomes unserviceable due to nonavailability of components or parts, that system, or portion thereof, shall be made serviceable or replaced ~~in accordance with Section 907.2~~.

(Renumber subsequent sections

Commenter's Reason: This proposal was Disapproved at the Code Development Hearing because the Committee felt that it was not clear on what specific items needed to be replaced.

There are times when a Fire Alarm Control Panel needs to be replaced because parts are no longer available, but the existing wiring throughout the building is intact and usable. In this case, the FACP would be replaced and the remainder of the system would remain. This will allow systems to be maintained in a working manner without complete removal and replacement of the entire fire alarm system.

The reference to Section 907.2 is deleted to eliminate the potential confusion that this requirement necessitates replacing the entire system, and needed to comply with current regulations. The intent of this section is to replace the components necessary to maintain the fire alarm system in an operational condition.

Additionally, this section is placed into Section 907.9 which deals with maintenance. Even though this section deals with existing buildings, it is more specific to maintenance of fire alarm systems which are regulated in Section 907. Therefore, Section 907.9.2 is a more appropriate location for this item, rather than Chapter 46.

Final Action: AS AM AMPC____ D

F229-09/10
Chapter 46, 102.1

Proposed Change as Submitted

Proponent: Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International

1. Revise by relocating Chapter 46 in its entirety as follows:

~~CHAPTER 46~~ APPENDIX K
CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

2. Revise as follows:

102.1 Construction and design provisions. The construction and design provisions of this code shall apply to:

1. Structures, facilities and conditions arising after the adoption of this code.
2. Existing structures, facilities and conditions not legally in existence at the time of adoption of this code.
3. ~~Existing structures, facilities and conditions when required in Chapter 46.~~

~~4.~~ 3. Existing structures, facilities and conditions which, in the opinion of the *fire code official*, constitute a distinct hazard to life or property.

Reason: Many jurisdictions that adopt a model fire code lack the authority to retroactively mandate construction upgrades to existing buildings without some specific 'triggering' event. Additionally, as written, the triggering language in Chapter 46 is vague, and would lead to a lack of consistency in enforcement. Section 4601.4 states "Where a building is found to be in noncompliance, the fire code official shall duly notify the owner of the building." What is the mechanism for the fire code official to 'find' the building in noncompliance? Without some specific mechanism in the code, this will lead to arbitrary application of these retroactive requirements.

By relocating Chapter 46 to an appendix Chapter, those jurisdictions that have the authority, the mechanism, and the desire to require assessment and retrofit of existing buildings will have a framework on which they can build a comprehensive package. By removing the Chapter from the body of the code, the majority of jurisdictions, who are either unauthorized or unable to assess every existing building and mandate every possible retrofit outlined in the chapter, will not need to amend these provisions out of the code, or ignore
the potential impact that the breadth of this Chapter would have on some older existing buildings. Note that even with the deletion of this Chapter from the body of the code, the fire code official still has the authority to mandate that 'distinct hazards to life and property' be mitigated.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: PERRY-F1-CHAP46.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that Chapter 46 should remain intact within the body of the code. Moving it to an appendix would require removal of the many "pointer" sections within the code that now direct the user to Chapter 46 because the code style does not allow directing the user to optional appendices since they are not part of the code. The committee also expressed its desire that Chapter 46, which is new to the 2009 edition of the IFC, be allowed to develop some use history before being substantially changed. The committee also observed that jurisdictions that adopt the code always have the authority to make amendments to it in their adopting ordinance and can just as easily amend out Chapter 46 if so desired.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requesting Approval as Modified by this Public Comment.

Modify the proposal as follows:

APPENDIX K
CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

102.1 Construction and design provisions. The construction and design provisions of this code shall apply to:

1. Structures, facilities and conditions arising after the adoption of this code.
2. Existing structures, facilities and conditions not legally in existence at the time of adoption of this code.
3. Existing structures, facilities and conditions which, in the opinion of the *fire code official*, constitute a distinct hazard to life or property.

607.1 Emergency operation. ~~Existing elevators with a travel distance of 25 feet (7620 mm) or more shall comply with the requirements in Chapter 46.~~ New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1.

704.1 Enclosure. ~~Interior vertical shafts, including but not limited to *stairways*, elevator hoistways, service and utility shafts, that connect two or more stories of a building shall be enclosed or protected as required in Chapter 46.~~ New floor openings in existing buildings shall comply with the *International Building Code*.

~~**903.6 Existing buildings.** The provisions of this section are intended to provide a reasonable degree of safety in existing structures not complying with the minimum requirements of the *International Building Code* by requiring installation of an automatic fire-extinguishing system.~~

~~**903.6.1 Pyroxylin plastics.** All structures occupied for the manufacture or storage of articles of cellulose nitrate (pyroxylin) plastic shall be equipped with an *approved* automatic fire-extinguishing system where required in Chapter 46.~~

~~**903.6.2 Group I-2.** An *automatic sprinkler system* shall be provided throughout Group I-2 *fire areas* where required in Chapter 46.~~

~~**905.11 Existing buildings.** Where required in Chapter 46, existing structures shall be equipped with standpipes installed in accordance with Section 905.~~

~~**907.3 Where required in existing buildings and structures.** An *approved* fire alarm system shall be installed in existing buildings and structures where required in Chapter 46.~~

2506.1 Required access. New tire storage yards shall be provided with fire apparatus access roads in accordance with Section 503 and Section 2506.2. ~~Existing tire storage yards shall be provided with fire apparatus access roads where required in Chapter 46.~~

Commenter's Reason: This code change should be Approved as Modified for the following reasons:
1. There is likely not a single jurisdiction that uses the *International Fire Code* that retroactively applies all of the requirements of Chapter 46 to all existing buildings in the jurisdiction.
2. Selective application of portions of Chapter 46, or application only to certain buildings in a jurisdiction, exposes the jurisdiction to accusations of applying the code in an arbitrary and capricious manner.
3. One of the opponents of this change testified in Baltimore, Chapter 46 'sets a baseline for discussion' about existing buildings. Code requirements should not be 'baselines for discussion'.
4. If the intent of the IFC is that every existing building in a jurisdiction be brought up to the 'baseline' of Chapter 46, the provisions of Chapter 46 need to be clearly spelled out as to when they must be satisfied.
5. This comment proposes to delete the handful of 'pointers' to chapter 46 that are scattered in other parts of the IFC, which were pointed out during testimony in Baltimore. Deleting these 'pointers' would have no effect on jurisdictions that choose to adopt Chapter 46.

Final Action: AS AM AMPC____ D

F235-09/10

Appendix K (New)

Proposed Change as Submitted

Proponent: Michael Jacoby, Seven Valleys, PA, representing self

Add new text as follows:

APPENDIX K
EMERGENCY COMMUNICATION SYSTEMS
(HAZARDOUS SUBSTANCE)

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION K101
GENERAL

K101.1 Scope. This appendix contains provisions that are available for adoption by governments, communities or tribes who will have an opportunity to use the National Fire Protection Association's (NFPA) NFPA 72 codes that just added three new chapters at the same time made a name change to the National Fire Alarm and Signaling Codes that also includes the requirements for mass notification systems that can be found in a new chapter called Emergency Communication System (ECS) in NFPA 72-2010.

By adopting the provisions within this appendix it will give governments, communities or tribes etc. who already adopted the International Code Council (ICC) Codes, the ability to enhance their emergency communication by bringing these two major code organizations together to ensure that NFPA 72/National Fire Alarm and Signaling Codes, Emergency Communication Systems (ECS) such as in one-way, two-way and mass notification systems etc. are being designed and later installed per code as desired.

These requirements/codes/specifications could then be used in such applications as for college campuses, schools, and stadiums, community centers to include even local community warning/notification systems etc. when these emergency communication systems are being upgraded or initially installed thus providing early warning messages before, during or after manmade disasters/situations/events, natural disasters such as hurricanes, tornadoes, snowstorms, blizzards, flooding, massive fires while giving instructions to the public in times of crisis etc.

This appendix will also address system upgrades or the initial requirements for fixed sites/facilities with hazardous substances.

K101.2 Emergency communication system requirements. Fire alarm system upgrades to the new National Fire Alarm and Signaling Codes can be applied to such sites that meet the requirements set forth in ICC IFC Section

2701.5.1 and 2701.5.2 or for those sites that already meet the following criteria with the focus being on outside emergency communication that is commonly known as mass notification now known as emergency communications systems while other parts of the National Fire Alarm and Signaling Codes can also be applied.

Guidelines:

1. Sites containing hazardous substances subject to **Pub.L. 109-295** that is commonly referred to by the public as the Department of Homeland Security's Chemical Facility Anti-Terrorism Standards (CFATS).
2. Sites containing hazardous substances with a federal recognized classification of **SARA Title III**, Superfund Amendments and Reauthorization Act (SARA) Title III of SARA ("SARA Title III") that is part of the Emergency Planning and Community Right-To-Know Act (EPCRA) requiring a Risk Management Plan (RMP) as part of a site's emergency response also known by the International Fire Code (IFC) as sites/facilities having a Hazardous Materials Management Plan (HMMP) sometimes referred to by federal or state governments as a Crisis Response Plan, Hazardous Material Emergency Plan or Hazardous Material Off-Site Response Plan.
3. Emergency Communication System Upgrade clarification: A site's risk analysis, being the basis of site's emergency communication design will be done by others unless the fire code official is qualified, and the future site designs of an IFC H classification site/facility/structure has a potential of reaching a DHS/CFATS, SARA Title III classification or will meet ICC IFC Section 2701.5.1 and or 2701.5.2 and the requirements when applicable for the new National Fire Alarm and Signaling Codes with their Emergency Communication System (ECS) or is already specified in the site's fire alarm system plans and a site risk analysis is already incorporated into the emergency communication design as part of their overall design is then complete.

K101.2.1 Retroactive emergency communication system upgrade requirements. The option of upgrading a Fire alarm system to the new National Fire Alarm and Signaling Codes for those sites applicable that in the past required emergency HazMat responses or activated their Hazardous Materials Management Plan (HMMP) the local authority having jurisdiction can review the present status of the site/facility with their fire code official and based on the site's risk analysis a system upgrade can be applied.

SECTION K102
REFERENCED STANDARDS

ICC IFC-06 International Fire Code K101.1, K101.2
NFPA 72-2010 National Fire Alarm Code K101.1, K101.2, K101.2.1

Commenter's Reason: This Appendix with its provisions could be a **key element** that could be used to protect millions throughout our nation by giving those governments, communities or tribes etc. who are presently **ICC compliant** the opportunity to enhance emergency communication within their communities by using these new codes.

For many years our nation waited for codes as such to catch up to the NEW state-of-the-art technology being used in emergency communication systems. Just imagine how much deliberation took place when the NFPA they decided to change the name of their new codes that now might have others confused. Within the codes you might find upgrades to one-way, two-way and mass emergency communication systems etc. that many have been waiting for, for many years. Depending on when you have the opportunity to read this proposed appendix you might discover that due to overlapping code development cycles between organizations the printed form of these new code showing you these upgrades may not yet be available so… I recommend that you use the Internet to find updated NFPA information if you would like to do some research.

Since this new terminology maybe a concern, background information is available through the internet by searching for articles such as Emergency Communications Systems and or the new NFPA 72-2010 codes. If you are interested in some detailed information, you could try to contact somebody at the NFPA that you might know who sat on the NFPA 72 development committee who is familiar with the final ratification of these new NFPA 72/National Fire Alarm and Signaling Codes, Emergency Communication Systems specifications etc. and he or she might be able to fill you in or…at least tell you where you can find these new codes changes on their website, that is if you did not already find what you were looking for.

In the past awareness about emergency communication issues were brought to the ICC IFC attention in the attempt to establish a standard within the IFC so emergency communication/notifications systems being a outside annunciator devices /speakers etc. could be installed by code, but now that the NFPA 72 committee has moved forward… in my opinion I think it does not make any sense to have duplicate codes in the IFC, so that is why this proposed appendix with these new codes I believe should now be used.

What did it take for our Federal Government to get involved? Did you know that it actually took a Presidential Executive Order 13407 followed by Congress's involvement with requirements to start to upgrade our national standards to reflect the new state-of-the-art technology in emergency communications? As an end result our Department of Homeland Security is now involved through an agency that presently falls under their umbrella that is called the Federal Emergency Management Agency (FEMA) and in layman's terms, now has a goal to provide alert and warnings throughout our infrastructure no matter what the crisis by using communication systems that could then provide life-saving information no matter where you are located or what time of the day it might be, such as during a natural or man-made disaster/ event… or in times of crisis. This federal government program is commonly known today as the Integrated Public Alert Warning System (IPAWS).

Do you agree? Washington with all of their wisdom forgot the basics, it appears that they forgot that when it comes to upgrading the alert/warning, emergency communication systems used for early warning mass notification everything starts with codes/specifications and implementation of systems with requirements at the local government level. Now do you realize why these upgraded NFPA 72/National Fire Alarm and Signaling Codes are so important?

Understanding why DHS's CFATS and the SARA Title III classifications are being used as guidelines to start a site's analysis are a very important part of this appendix. In this case you need a benchmark based on a time factor of how long it will take local first responders from the first millisecond of the event to be on scene, to then mitigate the event.

As you will discover our federal government gave an industry a wake-up call. The industry that many knew is now changing and by the time you read this proposal you might already be familiar with the following Federal Law, Pub.L.109-295 publicly known as our Department of Homeland Security's (DHS) and their Chemical Facility Anti-Terrorism Standards (CFATS). Keep in mind that DHS is a Security department and not a Code organization. I think you will quickly understand why CFATS is being used as a guideline if not simply contact the Department of Homeland Security and have them explain to you their Top Screening process that they used and how they determined their multiple tier structure to identify certain sites of concern. Once you understand their methods I feel that you will be able to see why this appendix is so important.

The short version back in 2008 after an official release the national media reported that more than 7,000 sites were chosen by using DHS's Top Screening process based on their tier structure as being sites of potential high-risk for terrorist attack. By the time code officials read this information some of the DHS security inspections at these sites that were on the schedule to start in January 2009 should already be completed. DHS should be the first to see how many of these sites with hazardous substances actually have any outside emergency communication warning devices/systems in place and operational to warn the surrounding public who could be outside exposed to the atmosphere when an event containing hazardous substances takes place at their facility that for many years others "assumed" such early warning devices were being installed. Having emergency communication notification systems in place with the ability to warn the public before exposure is one of the reasons for proposing this appendix. For too many years the mind-set has been that the general public will be sitting in their homes or have their electronic devices turned on just waiting for emergency warnings when in reality they are discovering that depending on the geographical area and the time of day that numbers will vary. Note that each geographical area of a site of interest that could be applicable is different and that is why a site analysis study is required. The most important part of our general public which are those who are less fortunate, our poor, the handicapped and those with special needs have a problem. Emergency Communication Systems used for outside early warning notification have the potential of reaching a large percentage of the affected population almost immediately unlike other means that could be subject to system loads and possible time delays. Another factor that has been increasing is the demand on our electrical grid and at times there are areas within our nation who might already be without electrical service (a major power outage), and or do not have telecom, broadcast, or cable connectivity. As the public starts to do their math and these deficiencies are known is strange how quiet it is now getting. Who was responsible for doing the math?

You probably are questioning why the terms SARA Title III is used as a guideline benchmark, it is simple many elected officials understand the term SARA Title III rather than the H classification being used in present code. Since governments, communities or tribes etc. will be involved in the decision-making on whether or not to adopt this proposed Appendix the term SARA that is an abbreviation for Superfund Amendments and Reauthorization Act, which is more universally understood by elected officials or others who participate in their (LEPC) Local Emergency Planning Committees, this terminology should make it easier for fire code officials to work with local governments to determine which sites located within their communities these upgrades and or new installation requirements will apply. Since fire code officials may not be familiar with the new technology in the world of emergency communication, in order to relieve the fire code official of additional burdens as it pertains to the acoustical designs and decision making a site's risk analysis, being the basis of site emergency communication design will be done by others, unless the fire code official is qualified and he or she would like to get involved.

For the second part of this requirement for installation being that if the site's designer already incorporated the new NFPA 72 codes to be known as National Fire Alarm and Signaling Codes, Emergency Communication System codes in the IFC H classification of a site/facility/structure and the acoustical designs including the decision making as it pertains to a site's risk analysis is already in their site design plans, and everything has been accounted for, thus meeting local government and fire code official approval everything should be Good-To-Go.

Please note that designers have been doing acoustical studies/designs for many years and emergency communication systems are being used throughout the world. Now our fire code officials will have an opportunity to have a closer working relationship with their local governments as being the Authority Having Jurisdiction (AHJ) to ensure that all related code preparedness and public safety communication concerns are met.

As discussions at the local level will always seem to continue on how to activate the emergency communications system, being the trigger, that is why a site analysis of the facility/building/structure is done first because each site maybe unique. These are decisions that are made after the appendix is adopted.

As you consider this proposed appendix for approval please keep in mind that this appendix addresses the ability of a community to adopt the appendix so they can use these new NFPA codes to ensure that early warning emergency communication is available for those who may be outside fully exposed to the atmosphere being that of employees at a site/facility or the public in the surrounding community at site/facilities where these code requirements may apply will then be installed by code. Again in doing so this will address the larger portion of the effectiveness of the notification problem because the majority of the public depending on the geographical area and time of day could be outside of their homes and outside emergency communication early warning notification is essential so that they can protect their families by turning on their electronic devices and waiting for further instructions.

For some areas of our nation emergency communication systems as such are already installed at facilities/sites etc. and even emergency communication systems are being used for public community notification so this appendix may have little or no impact on those who choose to adopt this appendix.

Please consider this proposed Appendix with it's provisions/requirements that will give those governments, communities or tribes who are presently ICC compliant the opportunity to protect their communities, families, loved ones and especially those with special needs by using these new codes that many have been waiting for, for so many years.

Cost Impact: The cost impact of this code proposal will depend on many factors such as when this code is adopted, site inspections are done in order to determine what is required after doing a site analysis, the acoustical design and or other actions are performed in order to determine the cost of construction since the emergency communications system in some applications could also be considered an add-on, even an estimated cost of construction cannot honestly be determined at this time because each site will be different.

ICCFILENAME: JACOBY-F2-APPENDIX K.DOC

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard P.L. 109-295 indicated that, in the opinion of ICC staff, the standard did not comply with ICC standards criteria, Sections 3.6.2.11 and 3.6.3.2.

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal was vague and unenforceable and contains mostly commentary, making it difficult to determine what is required. The committee reiterated its suggestion from its action on a similar proposal in the 2007-2008 cycle that existing technology, such as "Reverse 911", that provide better notification can be used to accomplish many of the proponent's goals without creating the need for outside sirens which already mean something different (weather alert, volunteer fire department alert, etc.) to the public and would generate confusion.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Jacoby, Seven Valleys, PA, representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

APPENDIX K
EMERGENCY COMMUNICATION SYSTEMS
(HAZARDOUS SUBSTANCE)

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION K101
GENERAL

K101.1 Scope. This appendix contains provisions that are being made available for adoption by governments, communities or tribes, being local and regional authorities having jurisdiction, giving them an opportunity to adopt the new National Fire Alarm and Signaling Codes in NFPA72-2010 Edition Chapter 24 Emergency Communication System (ECS) in its entirety, to be used in the protection of their communities.

SECTION K102
REFERENCED STANDARDS

NFPA 72-2010	National Fire Alarm and Signaling Code Chapter 24	K101.1

Commenter Reason: At the time this proposal was made in late October 2009 the printed version of the new NFPA 72 National Fire Alarm and Signaling Codes just became available a few days before the hearings and I feel that many did not have ample time to review these new standards in their entirety.

Also after a January 2010 Commission Report that was reported by the media … preparedness issues I feel will now be at the top of the agenda for many throughout our nation.

I will now try to clarify what my requirement is in this proposal. For those who would like to adopt this appendix it will give those who in the past adopted ICC IFC codes and had or now have emergency communication concerns, an opportunity to use the provision within this appendix so that they can adopt the NFPA 72-2010 new **Chapter 24** in its entirety as requirements, that can then be use to protect their communities.

From this point on, I feel that further detailed justification for this proposed Appendix is no longer necessary, but I will still be making my general reasons-comments available for voting members so that they can decide whether or not this proposal has merit and should be made available to local communities to protect the public and their first responders.

Sadly to say many areas already invested into an old concept dating back many years that assumes that the general public will be sitting by their telephones or in front of their entertainment devices that are subject to power outages, satellite (atmospheric) and hard wiring connectivity issues etc. during natural or man made emergencies or in extreme times of crisis, and that is why others throughout our nation for a long time have been looking at these problems which has resulted in the identification of a series of information and messaging needs in emergency communication so that local and regional Authorities Having Jurisdiction (AHJ) now have codes/specifications available as they try to protect their communities.

This appendix is addressing local preparedness issues and system upgrades.

Whether or not you agree with Emergency Voice Alarm Communications (EVAC) HazMat Alerting (HA) emergency or mass communication/ notification system concepts I am sure that you realize that system upgrades when available are beneficial.

I will continue to reinforce my reason for why this appendix is so important by using the following Real Time example:

Ironically while I am preparing my comments for justification, parts of our nation are without power, and last reported the numbers are now into the hundreds of thousands while others experienced heavy snowfall, ice, downed telephone lines with more snow on the way. It is now being reported that many of the surrounding states, up to five are already in a state of emergency that includes Washington DC, breaking their national records and in one of the surrounding areas it was reported the snowfall was up to 40 inches, in other areas they've been without power for days and believe it or not more snow is being forecast in 72 hours. Last reported in some areas it will still… take days to restore power.

I am hoping that by now you understand why these emergency communication upgrades were made to our emergency and mass notification systems, and why it is so important for those who are ICC IFC compliance to have the opportunity of using the new National Fire Alarm and Signaling Codes to protect their communities if so desired?

Cost Impact: The cost of adoption should be zero.

Final Action: AS AM AMPC____ D

F236-09/10, Part I
Appendix K (New)

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED ONLY FOR INFORMATIONAL PURPOSES FOLLOWING ALL OF PART I.

Proposed Change as Submitted

Proponent: Sean DeCrane, Cleveland Fire Department, representing International Association of Fire Fighters

PART I – IFC

Add new appendix as follows:

APPENDIX K
BUILDING INFORMATION SIGN

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION K 101
GENERAL

K101.1 Scope New buildings shall have a building information sign(s) that shall comply with Sections 505.3.1 through 505.3.7. Existing buildings shall be brought into conformance with Sections K101.1 through K101.9 when one of the following occurs:

1. The fire department conducts an annual inspection intended to verify compliance with this section of the code, or any required inspection.
2. When a Change in Use or Occupancy has occurred.

   Exceptions:

   1. Utility occupancies
   2. One and Two-family dwellings

K101.1.1 Sign location. The building information sign shall be placed on one of the following:

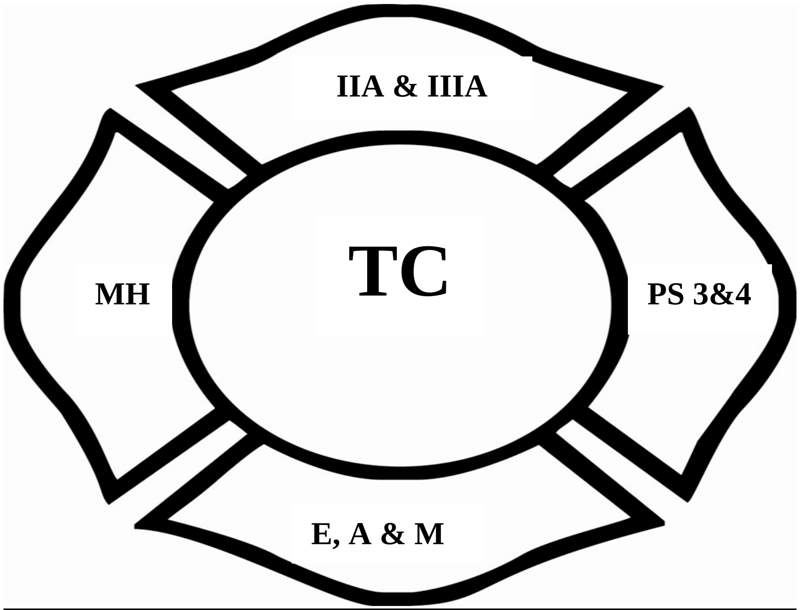
1. The entry door or sidelight at a minimum height of 42" above the walking surface on the address side of the building or structure;
2. The exterior surface of the building or structure no further than 3' from the entrance door, on either side of the entry door, at a minimum height of 42" above the walking surface on the address side of the building or structure;
3. Conspicuously placed, inside an enclosed entrance lobby, on any vertical surface within 10 feet of the entrance door at a minimum height of 42" above the walking surface;
4. Located inside the building's fire command center;
5. Located on the exterior of the fire alarm panel or immediately along side the panel door on the wall if the alarm panel is located in the enclosed main lobby.

K101.1.2 Sign features. The building information sign shall consist of:

1. White reflective background with red letters;
2. Durable material;
3. Numerals shall be Roman or Latin numerals, as required, and/or alphabet letters;
4. Permanently affixed to the building or structure in an approved manner.

K101.1.3 Sign shape. The building information sign shall be a Maltese Cross as shown in Figure K101.1.3

Top Wing



Bottom Wing

FIGURE K101.1.3
BUILDING INFORMATION SIGN

K101.1.4 Sign size and lettering. The minimum size of the building information sign and lettering shall be in accordance with the following:

1. The width and height shall be 6 inches by 6 inches
2, The height or width of each Maltese cross wing area shall be 1 1/8 inches and have a stroke width of ½ inch;
3. The center of the Maltese cross a circle of oval 3 ⅛ inches in diameter and has a stroke width of ½ inch;
4. All roman numerals and alphabetic designations, shall be 1 ¼ inch height and have a stroke width of ¼ inch.

K101.2 Sign designations. Designations shall be made based upon the construction type, content, hazard, fire protection systems, life safety and occupancy. Where multiple designations occur within a classification Category, the designation used shall be based on the greatest potential risk.

K101.3 Construction type (TOP WING). The construction types shall be designated by assigning the appropriate Roman numeral, and letter, placed inside the top wing of the Maltese cross. The hourly rating provided is for the structural framing in accordance with Table 601 of the *International Building Code*,

Construction Type	**Hourly Rating**
IA - Non-Combustible Construction -	3 Hour Rating
IB –Non-Combustible Construction -	2 Hour Rating
IIA – Non-Combustible Construction -	1 Hour Rating
IIB – Non-Combustible Construction -	0 Hour Rating
IIIA – Non-Combustible/Combustible Construction -	1 Hour Rating
IIIB – Non-Combustible/Combustible Construction -	0 Hour Rating
IV – Heavy Timber Construction -	
VA – Combustible Construction -	1 Hour Rating
VB – Combustible Construction –	0 Hour Rating

K101.4 Fire protection systems (Right Wing). The fire protection systems shall be designated by determining its level of protection and assigning the appropriate designation to the right wing of the Maltese cross. Where multiple systems are provided, all shall be listed:

AS – Automated Fire Sprinkler System installed throughout;
DS – Dry Sprinkler System and designated areas

FAS – Fire Alarm System
FP – Fire Pump
FW – Fire Wall and designated areas
PAS – Pre-Action Sprinkler System and designated floor
PS – Partial Automatic Fire Sprinkler System, and designate floor;
CES – Chemical Extinguishing System and designated area,
CS – Combination Sprinkler and Standpipe System;
S – Standpipe System;
NS – No system installed

K101.5 Occupancy type (Bottom Wing). The occupancy of a building or structure shall be designated in accordance with the occupancy classification found in Section 302.1 of the *International Building Code* and the corresponding designation shall be placed in the bottom wing of the Maltese cross. When a building or structure contains a mixture of uses and occupancies; all uses and occupancies shall be identified.

A – Assembly
B – Business
E – Educational
F – Factory or Industrial
H – High Hazard
I – Institutional
M – Mercantile
R – Residential
S – Storage

K101.6 Hazards of content (Left Wing). The hazards of building contents shall be designated by one of the following classifications as defined in NFPA 13 and the appropriate designation shall be placed inside the left wing of the Maltese cross:

LH - Light Hazard
MH - Moderate Hazard
HH - High Hazard

K101.7 Tactical Considerations (Center Circle). The Center Circle shall include the name of the local Fire Service and when required the letters TC for Tactical Considerations. When fire fighters conduct pre-plan operations, a unique situation(s) for tactical considerations shall be identified and the information provided to the fire dispatch communications center to further assist fire fighters in identifying that there is special consideration(s) for this occupancy. Special consideration designations include, but are not limited to:

1. Impact resistant drywall
2. Impact resistant glazing, such as blast or hurricane type glass
3. All types of roof and floor structural members including but not limited to post tension concrete, bar joists, solid wood joists, rafters, trusses, cold-formed galvanized steel, I-joists and I-beams; Green roof with vegetation, soil & plants
4. Hazardous materials, explosives, chemicals, plastics, etc;
5. Solar Panels and DC electrical energy
6. HVAC system; and smoke management system for pressurization and exhaust methods
7. Other unique characteristic(s) within the building that are ranked according to a potential risk to occupants and firefighters

K101.8 Sign classification maintenance, Building information sign maintenance shall comply with each of the following:

1. Fire departments in the jurisdiction shall define the designations to be placed within the sign.
2. Fire departments in the jurisdiction shall conduct annual inspections to verify compliance with this section of the code and shall notify the owner, or the owners agent, of any required updates to the sign in accordance with fire department designations and the owner, or the owner's agent, shall comply within thirty (30) days.
3. The owner of a building shall be responsible for the maintenance and updates to the sign in accordance to fire department designations.
4. The owner of a building shall notify the fire department of any changes that possibly effect the classifications, of the system, within thirty (30) days of the changes and the Fire Department shall conduct an inspection.

5. The owner of a building shall change the effected classification posted on the sign within thirty (30) days of the changes.

K101.9 Training. Jurisdictions shall train all fire department personnel on Sections K101.1 through K101.9

Reason: This Building Information Sign (BIS) is designed to be utilized in the crucial initial response of fire fighters to a structure fire. Similar to the Emergency Response Guidebook, published by the Department of Transportation, the BIS placard is designed to be utilized within the initial response time frame of an incident. Firefighters are trained to size-up a situation as early as possible after notification. The outward appearances of a building can be deceiving and the type of construction may not appear to be what it really is. This is becoming a more frequent occurrence within many communities.. Having the BIS placard will allow responding fire companies to make an informed tactical decision. The responding fire company will be able to identify the type of construction, hazard level of the contents, structural framework, occupancy of the building and the building fire protection system features , as well as he extent of the protection,

In the fire service there are many times we are dispatched to a location or area without an address, I.e. A fire company is dispatched in the vicinity of: Main St. and 5th Ave.. placing this information electronically will not address those incidents. Once the fire company has located the building or structure, the company officer can relay the correct address to the Dispatching Center and exit the apparatus to begin an assessment by making tactical decisions from the BIS building placard. The company officer cannot afford to wait until Dispatch sends an electronic form of the placard to t a mobile computer unit. This sign will give the arriving fire officer information to rapidly begin his/her assessment.

Another instance where a BIS placard is valuable for a Mutual Aid response to your community. Mutual Aid fire companies do not always share the same Dispatching Centers therefore they would not have the ability to receive the electronic communication. Placing this placard in designated locations will allow arriving Mutual Aid companies to begin proper tactical assessments.

Also within the Tactical Considerations (TC) section, the BIS placard will allow fire fighters to identify additional considerations. Just by seeing that there are additional TC considerations would give firefighters pause to consider unique aspects of the situation, such as:

Are there special needs for the occupants?
Is the interior constructed of impact resistant dry wall which will make wall breeching very difficult?
Is there hurricane glazing?
Is there an above ground 1500 gallons fuel oil tank in the basement?

Does the building contain dimension lumber, trusses, I-joists, cold formed steel, etc. in the roof or floors members?

These TC concerns can be identified and placed within the Tactical Considerations section of the BIS placard. The National Institute for Occupational Safety and Health (NIOSH) released an Alert Report, ‘Preventing Injuries and Deaths of Fire Fighters Due to Truss System Failures[1] and made recommendations to identifying structures by suggesting that building owners and managers “Consider placing building construction information outside the building. Include information about roof and floor type (presence of trusses, materials used), roof loads (heating, ventilation, and air conditioning (HVAC) units, sprinkler systems, utilities, hazardous materials stored on site and emergency contact numbers. Use and follow the proper building codes.”

This Building Information Sign has brought many people together from various private industries and public agencies such as:

Structural Building Component,
Steel & Wood industries,
Building officials, and the
Fire Service,

So as to collaborate on a BIS system that is comprehensive and meets the need of the fire service for information that allows for a quicker building assessment on the fire ground. This addresses a key question that has been asked for quite some time -- “How do we provide building information to the fire service?”. With this Building Information Sign we will be providing fire fighters crucial information at the most important time period. Fire Officers will be able to make decisions-based tactics on the knowledge provided within this building BIS placard or be prompted by other Tactical Considerations to request more information from the dispatch center.

Bibliography:
1. NIOSH Alert – “Preventing Injuries and Deaths of Fire Fighters Due to Truss System Failures” April 2005

Cost Impact: The code change proposal will have a minimal increase to the cost of construction.

ICCFILENAME: DECRANE-F3-APPENDIX K.DOC

Public Hearing Results

PART I- IFC

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement and felt that this would be a useful appendix tool for the fire department. The committee also pointed out that sections dealing with symbol size and lettering size need to be correlated because, as written, the lettering side would be larger than the symbol wing space into which it must be placed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeffrey Shapiro, PE, International Code Consultants, representing National Multi Housing Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

K101.8 Sign classification maintenance. Building information sign maintenance shall comply with each of the following:

1. Fire departments in the jurisdiction shall define the designations to be placed within the sign.
2. Fire departments in the jurisdiction shall conduct annual inspections to verify compliance with this section of the code and shall notify the owner, or the owner's agent, of any required updates to the sign in accordance with fire department designations and the owner, or the owner's agent, shall comply within thirty (30) days.
3. The owner of a building shall be responsible for the maintenance and updates to the sign in accordance to fire department designations.
4. ~~The owner of a building shall notify the fire department of any changes that possibly effect the classifications, of the system, within thirty (30) days of the changes and the Fire Department shall conduct an inspection.~~
5. ~~The owner of a building shall change the effected classification posted on the sign within thirty (30) days of the changes.~~

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: It is inappropriate for Appendix K to place a burden (and legal liability) on the owner to identify changes that might "possibly" effect the classifications assigned by Appendix K. Building owners are not typically knowledgeable about building construction, firefighting tactics or other topics contemplated by the warning sign, and they may not even occupy the building. If the fire department wants to use this system, it is incumbent upon them to do the required inspections and advise the owner what to post on the sign. The Annex provides for that without the need to include Items 4 and 5.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

PART II – IBC GENERAL

Add new appendix as follows:

APPENDIX L
BUILDING INFORMATION SIGN
SECTION L101
GENERAL

L101.1 Scope New buildings shall have a building information sign(s) that shall comply with Sections 505.3.1 through 505.3.7. Existing buildings shall be brought into conformance with Sections L101.1 through L101.9 when one of the following occurs:

1. The fire department conducts an annual inspection intended to verify compliance with this section of the code, or any required inspection.
2. When a Change in Use or Occupancy has occurred.

Exceptions:

1. Utility occupancies
2. One and Two-family homes

L101.1.1 Sign location. The building information sign shall be placed on one of the following:

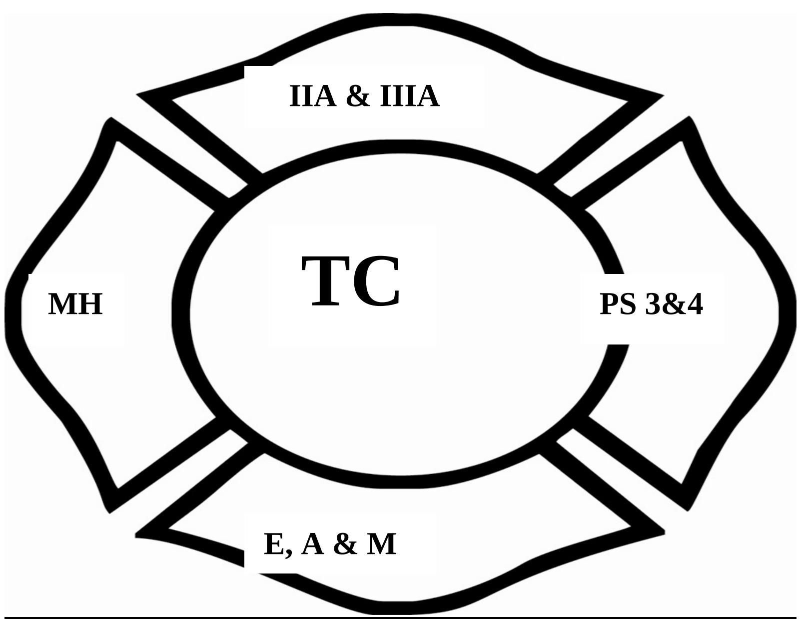
1. The entry door or sidelight at a minimum height of 42" above the walking surface on the address side of the building or structure;
2. The exterior surface of the building or structure no further than 3' from the entrance door, on either side of the entry door, at a minimum height of 42" above the walking surface on the address side of the building or structure;
3. Conspicuously placed, inside an enclosed entrance lobby, on any vertical surface within 10 feet of the entrance door at a minimum height of 42" above the walking surface;
4. Located inside the building's fire command center;
5. Located on the exterior of the fire alarm panel or immediately along side the panel door on the wall if the alarm panel is located in the enclosed main lobby.

L101.1.2 Sign features. The building information sign shall consist of:

1. White reflective background with red letters;
2. Durable material;
3. Numerals shall be Roman or Latin numerals, as required, and/or alphabet letters;
4. Permanently affixed to the building or structure in an approved manner.

L101.1.3 Sign shape. The building information sign shall be a Maltese Cross as shown in Figure L101.1.3

Top Wing



Bottom Wing

FIGURE L101.1.3
BUILDING INFORMATION SIGN

L101.1.4 Sign size and lettering. The minimum size of the building information sign and lettering shall be in accordance with the following:

1. The width and height shall be 6 inches by 6 inches
2, The height or width of each Maltese cross wing area shall be 1 1/8 inches and have a stroke width of ½ inch;
3. The center of the Maltese cross a circle of oval 3 ⅛ inches in diameter and has a stroke width of ½ inch;
4. All roman numerals and/or alphabetic designations, shall be 1 ¼ inch height and have a stroke width of ¼ inch.

L101.2 Sign designations. Designations shall be made based upon the construction type, content, hazard, fire protection systems, life safety and occupancy. Where multiple designations occur within a classification Category, the designation used shall be based on the greatest potential risk.

L101.3 Construction type (TOP WING). The construction types shall be designated by assigning the appropriate Roman numeral, and letter, placed inside the top wing of the Maltese cross. The hourly rating provided is for the structural framing in accordance with Table 601 of the *International Building Code*,

Construction Type	**Hourly Rating**
IA - Non-Combustible Construction -	3 Hour Rating
IB –Non-Combustible Construction -	2 Hour Rating
IIA – Non-Combustible Construction -	1 Hour Rating
IIB – Non-Combustible Construction -	0 Hour Rating
IIIA – Non-Combustible/Combustible Construction -	1 Hour Rating
IIIB – Non-Combustible/Combustible Construction -	0 Hour Rating
IV – Heavy Timber Construction -	
VA – Combustible Construction -	1 Hour Rating
VB – Combustible Construction –	0 Hour Rating

L101.4 Fire protection systems (RIGHT WING). The fire protection systems shall be designated by determining its level of protection and assigning the appropriate designation to the right wing of the Maltese cross. Where multiple systems are provided, all shall be listed:

AS – Automated Fire Sprinkler System installed throughout;
DS – Dry Sprinkler System and designated areas
FAS – Fire Alarm System
FP – Fire Pump
FW – Fire Wall and designated areas
PAS – Pre-Action Sprinkler System and designated floor
PS – Partial Automatic Fire Sprinkler System, and designate floor;
CES – Chemical Extinguishing System and designated area,
CS – Combination Sprinkler and Standpipe System;
S – Standpipe System;
NS – No system installed

L101.5 Occupancy type (Bottom Wing). The occupancy of a building or structure shall be designated in accordance with the occupancy classification found in Section 302.1 of the *International Building Code* and the corresponding designation shall be placed in the bottom wing of the Maltese cross. When a building or structure contains a mixture of uses and occupancies; all uses and occupancies shall be identified.

A – Assembly
B – Business
E – Educational
F – Factory or Industrial
H – High Hazard
I – Institutional
M – Mercantile
R – Residential
S – Storage

L101.6 Hazards of content (Left Wing). The hazards of building contents shall be designated by one of the following classifications as defined in NFPA 13 and the appropriate designation shall be placed inside the left wing of the Maltese cross:

LH - Light Hazard
MH - Moderate Hazard
HH - High Hazard

L101.7 Tactical considerations (Center Circle). The Center Circle shall include the name of the local Fire Service and when required the letters TC for Tactical Considerations. When fire fighters conduct pre-plan operations, a unique situation(s) for tactical considerations shall be identified and the information provided to the fire dispatch communications center to further assist fire fighters in identifying that there is special consideration(s) for this occupancy. Special consideration designations include, but are not limited to:

1. Impact resistant drywall
2. Impact resistant glazing, such as blast or hurricane type glass
3. All types of roof and floor structural members including but not limited to post tension concrete, bar joists, solid wood joists, rafters, trusses, cold-formed galvanized steel, I-joists and I-beams; Green roof with vegetation, soil & plants
4. Hazardous materials, explosives, chemicals, plastics, etc;
5. Solar Panels and DC electrical energy
6. HVAC system; and smoke management system for pressurization and exhaust methods
7. Other unique characteristic(s) within the building that are ranked according to a potential risk to occupants and firefighters

L101.8 Sign classification maintenance, Building information sign maintenance shall comply with each of the following:

1. <u>Fire departments in the jurisdiction shall define the designations to be placed within the sign.</u>
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<u>**L101.9 Training.** Jurisdictions shall train all fire department personnel on Sections L101.1 through L101.9</u>

Reason: This Building Information Sign (BIS) is designed to be utilized in the crucial initial response of fire fighters to a structure fire. Similar to the Emergency Response Guidebook, published by the Department of Transportation, the BIS placard is designed to be utilized within the initial response time frame of an incident. Firefighters are trained to size-up a situation as early as possible after notification. The outward appearances of a building can be deceiving and the type of construction may not appear to be what it really is. This is becoming a more frequent occurrence within many communities.. Having the BIS placard will allow responding fire companies to make an informed tactical decision. The responding fire company will be able to identify the type of construction, hazard level of the contents, structural framework, occupancy of the building and the building fire protection system features , as well as he extent of the protection,

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These TC concerns can be identified and placed within the Tactical Considerations section of the BIS placard. The National Institute for Occupational Safety and Health (NIOSH) released an Alert Report, 'Preventing Injuries and Deaths of Fire Fighters Due to Truss System Failures[1] and made recommendations to identifying structures by suggesting that building owners and managers "Consider placing building construction information outside the building. Include information about roof and floor type (presence of trusses, materials used), roof loads (heating, ventilation, and air conditioning (HVAC) units, sprinkler systems, utilities, hazardous materials stored on site and emergency contact numbers. Use and follow the proper building codes."

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So as to collaborate on a BIS system that is comprehensive and meets the need of the fire service for information that allows for a quicker building assessment on the fire ground. This addresses a key question that has been asked for quite some time -- "How do we provide building information to the fire service?". With this Building Information Sign we will be providing fire fighters crucial information at the most important time period. Fire Officers will be able to make decisions-based tactics on the knowledge provided within this building BIS placard or be prompted by other Tactical Considerations to request more information from the dispatch center.

Bibliography:
1. NIOSH Alert – "Preventing Injuries and Deaths of Fire Fighters Due to Truss System Failures" April 2005

Cost Impact: The code change proposal will have a minimal increase to the cost of construction.

PART II-IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposed appendix should not be placed in the IBC because it is predominantly fire department specific in much of its content (i.e., pertaining to FD training, tactics, procedures, etc.).

Assembly Action: **None**

F237-09/10
Appendix K (New)

Proposed Change as Submitted

Proponents: Patrick Siegman, Principal, Nelson, Nygaard Consulting Associates, representing the Congress for the New Urbanism; Peter Swift, Owner, Swift and Associates, representing the Congress for the New Urbanism; John Norquist, CEO, Congress for the New Urbanism

Add new Appendix as follows:

APPENDIX K
STREET DESIGN FOR LIFE SAFETY

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION K101
GENERAL

K101.1 Intent. The purpose of this appendix is allow jurisdictions to adopt performance-based requirements for fire apparatus access roads, in order to achieve all of the following purposes:

1. Establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises and to provide safety to fire fighters and emergency responders during emergency operations.
2. On the new and existing fire apparatus access roads required by and regulated by this code, establish requirements consistent with nationally and internationally recognized good practice for achieving a reasonable level of overall life safety, by taking into account and balancing the need to prevent road traffic deaths and injuries and the need to safeguard against the hazards of fire, explosions and other dangerous conditions.

K101.2 Scope. If this appendix is adopted by a jurisdiction, then the following changes to the current provisions of the code come into effect within the jurisdiction:

101.2 Scope. This code establishes regulations affecting or relating to structures, processes, premises and safeguards regarding:

1. The hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices;
2. Conditions hazardous to life, property or public welfare in the occupancy of structures or premises;
3. Conditions hazardous to life, property or public welfare on or relating to the design of fire apparatus access roads, including the hazards of traffic, fire, explosion and other dangerous conditions;

~~3.~~ 4. Fire hazards in the structure or on the premises from occupancy or operation;
~~4.~~ 5. Matters related to the construction, extension, repair, alteration or removal of fire suppression or alarm systems.
~~5.~~ 6. Conditions affecting the safety of fire fighters and emergency responders during emergency operations.

101.3 Intent. The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises and to provide safety to fire fighters and emergency responders during emergency operations. Additionally, on the new and existing fire apparatus access roads required by and regulated by this code, the purpose of this code is to establish requirements consistent with nationally and internationally recognized good practice for achieving a reasonable level of overall life safety, by taking into account and balancing the need to prevent road traffic deaths and injuries and the need to safeguard against the hazards of fire, explosions and other dangerous conditions.

503.2.1 Dimensions. Fire apparatus access roads shall have an unobstructed width ~~of not less than 20 feet (6096 mm), exclusive of shoulders, except for approved security gates in accordance with Section 503.6,~~ and an unobstructed vertical clearance ~~of not less than 13 feet 6 inches (4115 mm).~~ that permits passage of the jurisdiction's fire apparatus and, wherever necessary, provides adequate space for deploying the jurisdiction's fire apparatus and for conducting fire and rescue operations.

~~**503.2.2 Authority.** The fire code official shall have the authority to require an increase in the minimum access widths where they are inadequate for fire or rescue operations.~~

503.2.4 Turning radius. The required turning radius of a fire apparatus access road shall ~~be determined by the fire code official.~~ provide for the passage of the jurisdiction's fire apparatus.

503.2.7 Grade. The grade of the fire apparatus access road shall be ~~within the limits established by the fire code official based on the fire department's apparatus.~~ limited to grades that permit passage by, and, wherever necessary, fire and rescue operations by, the jurisdiction's fire apparatus.

503.2.8 Design for road traffic safety. Fire apparatus access roads shall be designed and maintained so as to minimize road traffic deaths and injuries, while maintaining adequate provision for the passage of fire apparatus and for fire and rescue operations. To achieve these goals, fire apparatus access roads shall be designed and maintained to both: (a) permit passage of the jurisdiction's fire apparatus and, wherever necessary, provide adequate space for deploying the jurisdiction's fire apparatus and conducting fire and rescue operations; and (b) minimize excess and inappropriate vehicle speeds.

Reason: This proposed code change provides an appendix that allows, but does not require, a jurisdiction to substitute revised material for current provisions of the code. That is, if the appendix is adopted by a jurisdiction, then the jurisdiction has elected to substitute revised materials for current provisions of the code. This appendix is intended to allow jurisdictions to take an approach to the design of fire apparatus access roads that improves overall life safety, by allowing jurisdictions to adopt roadway designs that strike the best possible balance between reducing the hazards of fire and reducing road traffic deaths and injuries, given the jurisdiction's own particular circumstances and particular choice of fire apparatus.

The text below attempts to provide clear and succinct answers to the questions asked for in the "Supporting Information" Section of the Code Change Proposal Instructions. That is, the following paragraphs state the purpose of the proposed code change, justify changing the current code provisions and seek to explain why the proposed code change is superior to the current provisions of the code.

1. **What is the purpose of this proposed code change (e.g., clarify the code; revise outdated material; substitute new or revised material for current provision of the code; add new requirements to the code; delete current requirements, etc.)?**

Response: This proposed code change provides an appendix that allows, but does not require, a jurisdiction to substitute revised material for current provisions of the code. That is, if the appendix is adopted by a jurisdiction, then the jurisdiction has elected to substitute revised materials for current provisions of the code. This approach will allow jurisdictions to take an approach to the design of fire apparatus access roads that we believe improves overall life safety, by allowing jurisdictions to adopt roadway designs that strike the best possible balance between reducing the hazards of fire and reducing road traffic deaths and injuries, given the jurisdiction's own particular circumstances and particular choice of fire apparatus. By allowing, but not requiring, jurisdictions to adopt this proposed appendix, the ICC will make it possible for jurisdictions to demonstrate the efficacy of this approach, without taking the more far-reaching step of simply altering the basic code.

2. **What is the justification for changing the current code provisions? Why is the proposal superior to the current provisions of the code? Proposals that add or delete requirements shall be supported by a logical explanation which clearly shows why the current code provisions are inadequate or overly restrictive, specifies the shortcomings of the current code provisions and explains how such proposals will improve the code.**

Response: The current International Fire Code specifies dimensions for fire apparatus access roads. Three key points about fire apparatus access roads should be noted:

1. The code requires that at least one fire apparatus access road be provided for every facility, building or a portion of the building hereafter constructed or moved into within a jurisdiction.
2. The code defines a fire apparatus access road as a road that provides fire apparatus access from a fire station to a facility, building or portion thereof.
3. The code defines fire apparatus access road as a general term inclusive of all other terms such as fire lane, public street, private street, parking lot lane and access roadway.

Therefore, since at least one fire apparatus access road must reach from a fire station to every building and facility constructed once the code is adopted, **the current International Fire Code specifies the key dimensions of many, if not most, public and private streets.**
This is significant not only for fire safety, but also for road safety. A substantial body of traffic safety research literature has found conclusively that the dimensions of streets significantly affect road safety. Therefore, **the current International Fire Code sets specifications for the design of many, if not most, public and private streets, and these specifications significantly affect traffic safety.**

Since the essential purpose of the International Fire Code is to provide for a reasonable level of life safety and property protections from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises and to provide safety to fire fighters and emergency responders during emergency operations, the code may not always be thought of as a code that has significant and far-reaching effects on road safety. The reality, however, is that the International Fire Code does significantly affect road design, and therefore, significantly affects road traffic deaths and injuries.

We believe that the International Code Council can substantially advance the cause of improving overall life safety by taking the following actions:

1. ***Embrace the goal of improving overall life safety***, including preventing not only the tragedies caused by fire, structural collapse and other hazards that have long been explicitly focused on by code enforcement and fire officials, but also road traffic deaths and injuries.
2. ***Dedicate itself to reducing the burden of global road traffic deaths and injuries***, by committing itself to work in partnership with a broad range of organizations and governments to develop and implement road safety strategies, plans and codes.
3. ***Work together with road safety organizations to thoroughly review the existing codes promulgated by the International Code Council to ensure that the codes embrace internationally recognized good practices for protecting life safety, including not only reducing the hazards of fire, explosion and other dangerous conditions in buildings, but also reducing road safety hazards.***

While the International Code Council may never wish to expand its mission to include the task of writing full road safety codes, the Council can and we believe should work closely with road safety organizations to ensure that building codes and regulations, such as the fire apparatus access road provisions of the International Fire Code, allow for and encourage best practices in road safety.

The attached code change proposal is submitted in the spirit of cooperation between code enforcement and fire officials and road safety professionals. It was drafted out of our concern that the current provisions of the International Fire Code for fire apparatus access roads do not strike the best possible balance between reducing the hazards of fire and other building-related hazards, and reducing road traffic deaths and injuries. This submission is intended as a first step in bringing road safety professionals and fire service professionals together to work on an area of mutual concern: fire apparatus access roads are not only the areas where firefighters must set up equipment and fight conflagrations, but also the site of innumerable traffic deaths and injuries. The design of fire apparatus access roads (that is, the design of many public and private streets) is necessarily a balancing act, where there are frequently conflicts, tensions and trade-offs between the goals of improving road safety and improving fire safety. The very best design for bringing fire engines quickly to the scene of an incident, or the very best design for providing room to deploy equipment at the scene of a fire, is often not the best design for ensuring low motor vehicle speeds and pedestrian safety at a school crosswalk, or on a quiet residential street.

In drafting this code change proposal, we sought to recognize these tensions and trade-offs regarding fire apparatus access roads, and then to draft a code change proposal that would allow jurisdictions to do a better job of overcoming these conflicts. This code change proposal is intended to allow jurisdictions to design roads for overall life safety, including both fire safety and road safety. It is based on the following principles:

1. The necessary minimum dimensions of fire apparatus access roads are driven in large part by the size, weight, configuration and capabilities of a jurisdiction's fire apparatus.
2. The necessary minimum dimensions of fire apparatus access roads also depend on the staffing, strategies and tactics employed by a jurisdiction.
3. The characteristics of fire apparatus, and the staffing, strategies, and tactics of firefighters and emergency responders, vary widely from jurisdiction to jurisdiction, both internationally and within nations.
4. Roadway dimensions and design significantly affect road safety.
5. Therefore, the roadway designs that can be used by a jurisdiction to improve road safety on fire apparatus access roads vary depending on the fire apparatus employed by that community. Designs for road safety that work well in one jurisdiction may introduce significant difficulties for fire fighting in another jurisdiction where the fire apparatus that is in use is significantly larger, less maneuverable or less capable of deploying in a smaller space.
6. Therefore, rather than employing a one-size-fits-all approach to fire apparatus access roads, which assumes that all jurisdictions around the world and across the nation employ similar fire apparatus, this proposed code change recommends a performance-based approach.
7. Employing a more performance-based approach will make it possible to better balance the goals of improving road safety and improving fire and building safety, while taking into account the major differences between jurisdictions in fire apparatus, staffing, strategies and tactics.

We note that the existing provisions for fire apparatus access roads in Section 503 contain a mix of prescriptive and performance-based requirements. This proposed code change moves further in the direction of a performance-based approach, in the interest of making it more feasible to adopt roadway design solutions that resolve conflicts between road safety and fire safety, are carefully tailored to the fire apparatus in use in a jurisdiction, and improve overall life safety.

As background, the following sections briefly review several considerations that are crucial for designing streets that improve overall life safety. These sections briefly review:

- the magnitude of road traffic deaths and injuries
- road safety risk factors
- the relationship between street design and road safety
- examples of roadway design elements that improve road safety
- the tensions and trade-offs between accommodating needed access for and operations of fire apparatus, and designing streets that improve road safety

First, what is the magnitude of the road traffic safety problem, and why should the ICC be concerned about it?

Why should the International Code Council be concerned about road safety?

The Commission for Global Road Safety succinctly describes the reasons why all citizens, and particularly those of us who dedicate their professional lives to improving public safety, should focus our attention on road safety. According to the Commission's 2006 report, *Make Roads Safe*[1]:

1 Commission for Global Road Safety. *Make Roads Safe*. London, United Kingdom. Commission for Global Road Safety, 2006, p. 2. [Accessed June 1, 2009]. Available at http://www.makeroadssafe.org/publications/Documents/mrs_report_2007.pdf

Deaths and injuries from road traffic crashes are a major and growing public health epidemic. The World Health Organization has estimated that in 2002 almost 1.2 million people died in road crashes worldwide and as many as 50 million were injured. Unless action is taken, global road deaths are forecast to double by 2020 and yet many of these deaths and injuries are known to be preventable…
High income countries have developed effective road safety measures after decades of trial and error and human tragedy. While more effort is still needed in the industrialised nations the major challenge now is to ensure through early intervention that low and middle income countries do not have to experience the same bitter learning curve…
The World Report on road traffic injury prevention, published by WHO and the World Bank in 2004, details the key road injury 'risk factors', the major contributing factors to road crashes and injury severity, including drink driving; lack of helmet use; seat belt non compliance; excessive speed; and poor infrastructure design and management.

As a leading international organization -- if not the leading international organization -- devoted to building a safer world, the International Code Council can play an important role in solving this epidemic. At a minimum, even if it seeks no active role, the ICC will nonetheless be involved, because by specifying the key dimensions of so many public streets (i.e., the dimensions of fire apparatus access roads), the ICC's codes now play a major role in street design and therefore in road safety.

What Are Road Safety Risk Factors?
As the Commission for Global Road Safety's *Make Roads Safe* report notes, road safety specialists frequently refer to risk factors.

Primary Risk
The report notes that, "Primary risk describes the factors that contribute to the risk of occurrence of a road crash." Two of the four primary risk factors are *behavioral factors*, which are influenced by roadway dimensions and design, and the *road environment*, which is directly determined by roadway dimensions and design.[2]
According to the report, regarding behavioral factors:
Excessive or inappropriate speed is a key contributor to crash risk. Speed choice is influenced by the legal speed limit, but also by road layout...
According to the report, regarding road environment:
Road safety engineering and traffic management make a direct contribution to reduction of crash risk. Crash risk is increased by lack of attention to safety in both planning and design of new road networks and new roads. Road design affects road user behavior and crash risk through the speed the drivers will perceive as appropriate, through detailed design factors such as curves...
In modern road systems, vulnerable road users are disadvantaged because such systems are largely designed for the motor vehicle. The absence of footpath and cycle tracks, or traffic calming measures to reduce speed where pedestrians and cyclists mix with motorized traffic, increases the risk of a crash occurring and its severity.

Secondary Risk
"Secondary risk", the report explains, "includes the likelihood of injury occurring and its severity." As with primary risk, two of the major risk factors are behavioral factors, which are influenced by roadway dimensions and design, and the road environment, which is directly determined by roadway dimensions and design. As the report explains:
Impact speed is a crucial determinant of injury severity for vulnerable road users. For example, 90% of pedestrian survive impacts with cars at speeds up to 30 km/hour [18 mph], but more than half will die at speeds of 45 km/hour [27 mph] or more…
[F]or vehicle occupants also, injury severity increases with impact speed. The probability of fatal injury increases from close to zero to almost 100% as the change in impact speed increases from 20 km/hour to 100 km/hour…
Road design can also provide protection for vulnerable road users by reducing impact speed through traffic calming measures.

Other traffic safety research arises similar conclusions. For example, other research studies have found that when people walking are hit by a car:
- At 20 mph, only 5 percent of walkers are killed, most injuries are slight, and 30 percent suffer no injury;
- At 30 mph, 45 percent of walkers are killed, and many are seriously injured;
- At 40 mph, 85 percent of walkers are killed.[3]

Understanding the links between the dimensions of fire apparatus access roads and the likelihood of road traffic deaths and injuries on these roads
The transportation safety research literature makes clear that:
1. The behavior of motor vehicle drivers, bicyclists, pedestrians and other road users is substantially affected by the dimensions of streets.
2. Key roadway dimensions which have been found to significantly affect driver behavior include the following:
    a. roadway widths,
    b. lane widths,
    c. the presence or absence of raised medians, pedestrian refuges and similar measures (note that feasibility of including such measures in a roadway design is often dependent upon the requirements for roadway widths in the vicinity of these measures)
    d. the presence or absence of roundabouts, traffic circles, splitter islands and similar intersection design measures (again, note that feasibility of such intersection designs is highly dependent upon the requirements for roadway widths in the vicinity of these measures)
    e. turning radii (a.k.a. horizontal curvature) at curves in a roadway,
    f. turning radii (i.e., horizontal deflection) at roundabouts, traffic circles, median islands and channelized turns,
    g. curb radii at intersections,

3. The roadway dimensions and features described above affect important aspects of driver and pedestrian behavior. For example, the presence or absence of a raised median on a roadway affects the ability of drivers to make passing maneuvers, midblock turns or to drift into oncoming traffic.

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[2] Ibid. p. 60.
[3] Limpert, Rudolph. *Motor Vehicle Accident Reconstruction and Cause Analysis*. Fourth Edition. Charlottesville, VA. The Michie Company, 1994, p. 663. See also *Killing Speed and Saving Lives*, United Kingdom Dept. of Transportation, London, England.

4. It is particularly important to note that the key roadway dimensions mentioned above affect the speed at which motor vehicle drivers choose to drive. As described above, motor vehicle speed is a key determinant of both the likelihood of a crash occurring and crash severity.
5. Because the dimensions of streets strongly affect the behavior of motorists, bicyclists, pedestrians and other road users, the dimensions of streets significantly affect traffic safety.

Section 503.2 of the current code sets specifications for the dimensions of fire apparatus access roads, including specifying the following key dimensions:

fire apparatus access roads shall have an unobstructed width of not less than 20 feet;
the required turning radii of fire apparatus access roads shall be determined by the fire code official.

While these two specifications are brief, their effect is far-reaching. By setting specifications for the key dimensions of road width and turning radii, Section 503.2 of the code sets specifications for many of the roadway dimensions and street design features (mentioned above) which are known to significantly affect traffic safety.

The following paragraphs provide several examples of the relationship between these two crucial street dimensions (roadway width and turning radii) and the ability to include important design features for traffic safety in a roadway design. In many circumstances, an absolute requirement to provide an unobstructed width of not less than 20 feet at every point along a roadway creates significant conflicts with the need to include roadway design features that improve traffic safety.

Often, these conflicts can be and have been resolved through careful design that consciously balances the need for traffic safety and the needs of firefighters to reach incidents and conduct fire and rescue operations. For example, while particular critical points along a roadway may be intentionally designed with a width of less than 20 foot clear, in order to reduce vehicle speeds and improve traffic safety, other areas along the same block will be provided with at least 20 foot clear, in order to provide, wherever necessary, sufficient space to set up equipment and fight fires.

The proposed appendix, by creating performance-based standards for fire apparatus access roads, will assist in the process of reconciling these conflicts. It provides more flexibility for street design, while still ensuring that streets are designed to allow for the passage of fire apparatus, and space to conduct fire and rescue operations.

Street Design for Traffic Safety: Examples

A few examples of roadway designs that can significantly improve traffic safety, but that frequently require roadway designs with less than 20 foot clear (at some, though not all places along a roadway) include the following:

1. Modern roundabouts
2. Raised medians
3. Low-volume local streets

Each is described in turn below.

1. Modern Roundabouts: The California Department of Transportation recently concluded, "The modern roundabout is now recognized nationally as an intersection type and traffic control treatment capable of providing unique and significant operational and safety benefits over a wide range of traffic volume and conditions. In particular, national research has confirmed that the single-lane version is especially effective in reducing collision frequency and/or severity for all highway users."[4]

Safety of modern roundabouts: Both overseas and in the United States, modern roundabouts have achieved a 50% to 90% reduction in injury accidents compared with intersections using stop control or traffic signals. The most comprehensive survey of roundabout safety in the United States was carried out in 1997 by the Transportation Research Board, and found that at intersections which were converted to roundabouts, overall crashes were reduced by 37% and injury accidents by 51%. The study also broke the results down for large roundabouts with three-lane entries, and smaller roundabouts with one- or two-lane entries. At these smaller roundabouts, crash reductions were even more pronounced: total crashes fell by 51%, with injury crashes reduced by 73%.

Capacity: roundabouts can often offer higher traffic-moving capacity than traffic signals, which in many circumstances leads to significantly reduced delays. The Transportation Research Board survey of intersections converted to roundabouts in the United States, for example, found that in the eight cases where vehicle delays had been measured, rush hour delays had been reduced by an average of 77%.

[4] *California Department of Transportation Design Information Bulletin #80-01: Roundabouts*. October 3, 2003, p. 1. [Accessed June 1, 2009]. Available at http://www.dot.ca.gov/hq/oppd/dib/dib80-01.pdf.

A typical modern roundabout in University Place, WA. At the roundabout entry, the clear width provided is only approximately 13 feet: this is an intentional design element to keep vehicle speeds low. Photo: IMG0032.jpg

Another modern roundabout near a school in Montpelier, VT. Again, note that the entry widths are kept to no more than 13 feet, to ensure low speeds both at the pedestrian crosswalks and within the intersection. Photo: IMG0027.jpg

The conflict between the current code requirement for 20 foot clear width at all points along every fire apparatus access road and the design of roundabouts occurs primarily with the design of roundabouts with one-lane entries. Roundabouts *are* designed to ensure that the largest fire apparatus (as well as tractor-trailer trucks and other large vehicles) that will use the roundabout are accommodated. However, as explained in

Roundabouts: an Informational Guide, the Federal Highway Administration's widely-used guide to roundabout design:

> *Roundabouts operate most safely when the geometry forces traffic to enter and circulate at slow speeds. Horizontal curvature and narrow pavement widths are used to produce this reduced-speed environment.* [5]

Furthermore, the Guide explains:

> *To maximize the roundabout's safety, entry widths should be kept to a minimum..The design should provide the minimum width necessary for capacity and accommodation of the design vehicle in order to maintain the highest level of safety. Typical entry widths for single-lane entrances range from 4.3 to 4.9m (14 to 16 ft); however, values…lower than this range may be required for site-specific design vehicle and speed requirements for critical vehicle paths.*

Thus, to design safe single-lane roundabouts, it is routinely necessary that at the roundabout entries, entry widths must be kept below 20 foot clear. This particular circumstance occurs only for a short distance at the intersection entry. However, it is a critical dimension and one that constantly conflicts with a requirement of 20 foot unobstructed width at all points along fire apparatus access roads.

2. Landscaped medians: There are important advantages to raised and landscaped medians, beyond their aesthetic appeal. In general, published studies conclude that on major roadways, raised central medians provide significant safety benefits when compared to undivided roads and roads with two-way left-turn lanes.

For example, examining overall crash rates – both midblock and intersection – for suburban arterials, Bowman & Vecellio's comprehensive study[6] found a rate of 373 vehicular crashes per million vehicle miles for roadways with a raised median, versus 676 vehicular crashes per million vehicle miles (or some 80% higher) for roadways with a two-way left-turn lane. Overall rates of rear end, right angle, head-on and left-turn crashes were all significantly reduced by the use of a median. Medians also ease crossings for pedestrians, and studies have found medians to be significantly safer for them. On suburban arterials, Bowman & Vecellio found the pedestrian crash rate for suburban arterials with raised medians to be 6.3 per million vehicle miles, versus 12.9 pedestrian crashes per million vehicle miles for those with two-way left-turn lanes.
The conflict that occurs here with the requirement for 20 foot clear is that many roadways only have room within the right-of-way for, and also function most safely (from the point of view of traffic safety) with one traffic lane and one bicycle lane in each direction on each side of the median. This results in a roadway cross section typically provides 17 feet of clear width on each side of the median.

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[5] *Roundabouts: An Informational Guide*. US Department of Transportation Federal Highway Administration Publication No. FHWA-RD-00-067. Washington, D.C., 2000. , p. 130. [Accessed June 1, 2009]. Available at http://www.tfhrc.gov/safety/00-0676.pdf.
[6] B. L. Bowman and R.L. Vecellio. *Effect of Urban and Suburban Median Types on Both Vehicular and Pedestrian Safety*. Transportation Research Record No. 1445. TRB, National Research Council. Washington D.C., 1994.

An example of an undivided roadway. Photo: IMG0064.jpg

An example of a roadway with a raised median and approximately 17 feet of clear width on each side of the median. Photo: median.jpg

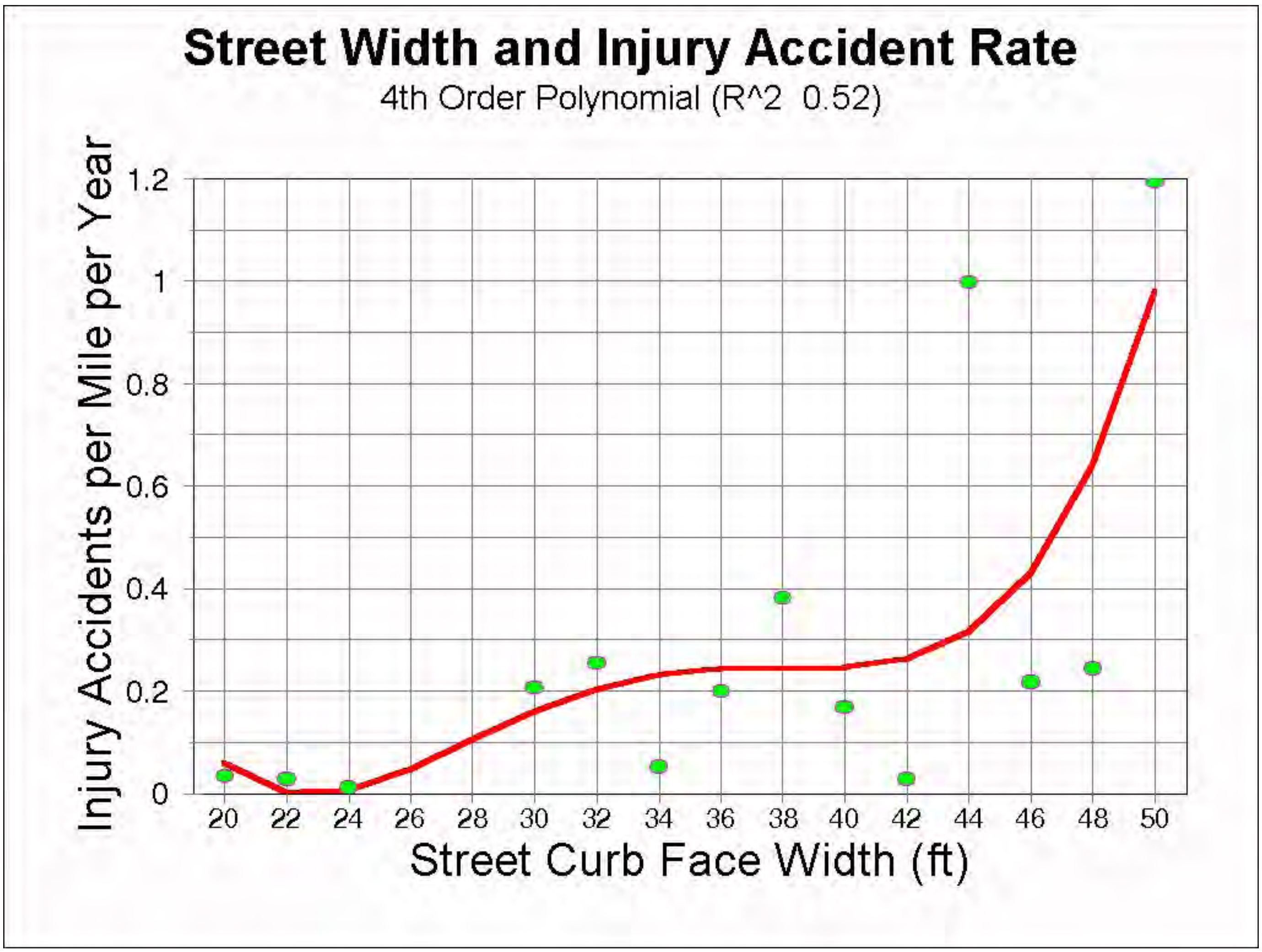
3. Local Street Standards: Low-volume local streets are often purposefully designed to enforce low-driving speeds, obviating the need for future retrofits with speed bumps and other harsh traffic calming measures that can severely impact fire apparatus. For best traffic safety result, these minor residential streets are consciously designed to maintain average speeds of 20 mph or less. To achieve this, low-volume local streets are designed as traditional "yield streets". As the Institute of Transportation Engineers' Residential Streets, Third Edition explains:

> *Yield flow occurs when two-way traffic is impossible where parked vehicles are present. Thus, some motorists must stop and yield the right-of-way to oncoming vehicles. For decades prior to the 1960's, yield flow was the widely accepted norm for local streets. …Most local streets with low ADT [average daily traffic] may have yield-flow operation.*[7]

The AASHTO Greenbook, the standard reference on the geometric design of streets, also explicitly endorses yield streets:

> *The level of user inconvenience occasioned by the lack of two moving lanes is remarkably low in areas where single-family units prevail… In many residential areas a 26-ft.-wide roadway is typical. This curb-face-to-curb-face width provides for a 12-ft. center travel lane and two 7-ft. parking lanes. Opposing conflicting traffic will yield and pause on the parking lane area until there is sufficient width to pass*.[8]

The traffic safety research literature finds that yield streets result in a strong reduction in injury accident rates. Recent research compared injury accidents per mile per year on local streets against thirteen physical characteristics.[9] Street width was found to be significantly related to injury accidents, with the authors concluding that, "as street width widens, accidents per mile per year increases exponentially." The study's regression analysis found that a typical 36-foot wide residential street has 0.16 accidents per mile per year as opposed to 0.03 accidents per mile per year for a 24 foot wide street. This difference is about a 487 percent increase in accident rates (see figure, below). The safest streets were the narrow, 24-foot wide streets, with parking allowed on both sides, resulting in a clear width of approximately 10 feet.



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[7] Kulash, Walter. *Residential Streets, 3rd Edition*. Washington, D.C.: Institute of Transportation Engineers, National Association of Home Builders, American Society of Civil Engineers, and Urban Land Institute, 2001.
[8] American Association of State Highway and Transportation Officials. A Policy on Geometric Design of Highways and Streets (a.k.a. the AASHTO Greenbook). Washington, D.C.: AASHTO, 1990.
[9] Swift, Peter, Dan Painter, AICP and Matthew Goldstein. *Residential Street Typology and Injury Accident Frequency*. Denver, Colorado: Swift & Associates, 2006.

Photo: 4THORDER.JPG

On low-volume local streets, providing widths of less than 20 foot clear can clearly provide numerous traffic safety benefits. The conflict between creating yield streets to meet this traffic safety goal, and the goal of ensuring safe access for fire and rescue operations, has been reconciled in numerous different ways by different jurisdictions. Frequent solutions include requiring that such streets always be through streets (rather than cul-de-sacs); requiring such streets to provide locations with 20 foot clear width at regular intervals (e.g., at all fire hydrants), so that areas exist to allow fire engines to set up and hook up hoses; and limiting building heights on such streets, so that is not necessary to deploy aerial ladders.

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Cost Impact: The code change proposal will not increase the cost of construction

ICCFILENAME: SIEGMAN-SWIFT-NORQUIST-F1-APPENDIX K.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's reason statement and felt that the proposal would provide a good starting point for community planning that takes into account the need for road traffic safety in fire apparatus access road design.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

John Norquist, representing Congress for the New Urbanism (CNU) and self, requests Approval as Submitted.

F237 (Appendix K), is an optional, performance-based guidance to fire code officials on street design. It provides flexibility based on local conditions and desires without jeopardizing public safety. For example, instead of a strict 20-foot-clear requirement, Appendix K recognizes street widths and vertical clearances that permit “passage of the jurisdiction's fire apparatus and, wherever necessary, provides adequate space for deploying the jurisdiction's fire apparatus and for conducting fire and rescue operations.” This is not overreaching, nor does it contain extraneous information; this is a guide that is flexible enough to be applied as local conditions merit or require, across the United States. It also is flexible enough to apply in countries that adopt the IFC, but whose urban development patterns and cultural norms greatly differ from the U.S. It should be adopted as is. As such, more detailed descriptions of street design conditions are merited as background information for guidance in good street design elements.

Public Comment 2:

Carl D. Wren, Austin TX Fire Department, representing self and Page Dougherty representing self, request Approval as Modified by this Public Comment:

Modify the proposal as follows:

APPENDIX K
STREET DESIGN GUIDELINES FOR ALTERNATIVE FIRE APPARTUS ACCESS ~~SAFETY~~

~~The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.~~ This Appendix is for information purposes and is not intended for adoption.

SECTION K101
GENERAL

K101.1 Intent. The purpose of this appendix is to ~~allow~~ provide guidance to jurisdictions ~~to~~ that choose to adopt a performance-based ~~requirements~~ design approach for fire apparatus access roads in cooperation with the design community, ~~in order to achieve all of the following purposes:~~
1~~. Establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises and to provide safety to fire fighters and emergency responders during emergency operations.~~
~~2~~ The design guidance in this appendix can be utilized to evaluate ~~On the~~ new and existing fire apparatus access roads required by ~~and regulated by~~ this code.~~,~~ It can be used to establish design criteria ~~requirements~~ that are consistent with nationally and internationally recognized good practices ~~for~~ in an effort to ~~achieving a reasonable level of~~ improve traffic ~~overall life~~ safety, by taking into account ~~and balancing the need to~~ methods for preventing roadway traffic deaths and injuries ~~and the need to safeguard against the~~ while providing access for emergency responders who work to mitigate the hazards of fire, explosions and other emergencies ~~dangerous conditions~~.

~~**K101.2 Scope.** If this appendix is adopted by a jurisdiction, then the following changes to the current provisions of the code come into effect within the jurisdiction:~~

K101.2 ~~Scope~~ Goals. This ~~code establishes regulations~~ appendix addresses access and traffic safety concerns affecting or relating to structures, processes, premises and safeguards that impact or potentially impact ~~regarding~~:

~~1. The hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices;~~
~~2. Conditions hazardous to life, property or public welfare in the occupancy of structures or premises;~~
~~3. Conditions hazardous to life, property or public welfare on or relating to the design of fire apparatus access roads, including the hazards of traffic, fire, explosion and other dangerous conditions;~~
~~4. Fire hazards in the structure or on the premises from occupancy or operation;~~
~~5. Matters related to the construction, extension, repair, alteration or removal of fire suppression or alarm systems.~~
~~6~~ 1. ~~Conditions affecting t~~The safety of fire fighters and emergency responders in route to, during, and returning from an emergency ~~operations~~.
2. ~~Permit s~~Safe passage of the jurisdiction's fire apparatus
3. The adequacy of space for deploying the jurisdiction's fire apparatus and conducting fire and rescue operations
4. The approach and departure angles for the apparatus, and the inside and outside turning radii.
5. Appropriate vehicle speeds during normal traffic conditions that can enhance the safety of vehicles drivers and passengers as well as pedestrians.

~~**101.3 Intent.** The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises and to provide safety to fire fighters and emergency responders during emergency operations. Additionally, on the new and existing fire apparatus access roads required by and regulated by this code, the purpose of this code is to establish requirements consistent with nationally and internationally recognized good practice for achieving a reasonable level of overall life safety, by taking into account and balancing the need to prevent road traffic deaths and injuries and the need to safeguard against the hazards of fire, explosions and other dangerous conditions.~~

~~503.2.2~~ K101.3 Authority. The fire code official ~~shall~~ needs to have the authority to work ~~require an increase~~ in conjunction with the jurisdiction's traffic engineer to provide the ~~minimum~~ access widths ~~where they are inadequate~~ needed for fire or rescue operations. The jurisdiction also a needs to address other commercial vehicle requirements such as trash, recycling vehicles, and moving vans so that their presence will not delay emergency response vehicles.

~~503.2.1~~ K101.4 Dimensions. Fire apparatus require access roads ~~shall have an~~ of sufficient unobstructed widths ~~of not less than 20 feet (6096 mm)~~, exclusive of shoulders, to allow the passage of and effective deployment of the jurisdiction's emergency apparatus~~, except for approved security gates in accordance with Section 503.6,~~ and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

~~503.2.4~~ K101.5 Turning radius. The required turning radius of a fire apparatus access road shall be ~~determined by the fire code official~~ based on the turning radius of both the in-service and the reserve apparatus used by the fire department, and other commercial vehicles that will operate in the area. ~~provide for the passage of the jurisdiction's fire apparatus.~~

~~503.2.7~~ K101.6 Grade. The grade of the fire apparatus access road shall be ~~within the limits established by the fire code official~~ based on the fire department's apparatus and the limitations of the apparatus related to ascending and transitioning from a flat surface to the grade permitted by the jurisdiction, and descending from a flat surface to the grade permitted by the jurisdiction. In addition, a transitioning distance may be required from the flat surface to the full grade. ~~limited to grades that permit passage by, and, wherever necessary, fire and rescue operations by, the jurisdiction's fire apparatus.~~

~~503.2.8~~ K101.7 Design for road traffic safety. Fire apparatus access road~~s shall be~~ design~~ed and maintained~~ should be influenced by the nature of the area being served, including building dimensions, building occupancies and uses, pedestrian traffic, bicycle traffic, and parking patterns.~~, so as to minimize road~~ The potential design impact on traffic safety should be evaluated to identify possible improvements that help to minimize inappropriate vehicle speeds for the area but do not prevent ~~deaths and injuries, while maintaining~~ adequate access ~~provision~~ for ~~the passage of~~ fire apparatus and for fire and rescue operations. ~~To achieve these goals, fire apparatus access roads shall be designed and maintained to both: (a) permit passage of the jurisdiction's fire apparatus and, wherever necessary, provide~~ Adequate access includes ~~adequate~~ the space necessary for deploying the jurisdiction's fire apparatus and conducting fire and rescue operations~~; and (b) minimize excess and inappropriate vehicle speeds~~.

Commenter's Reason (WREN): This code change was moved by Mr. Crawford of the IFC Code Development Committee with the idea to continue the discussion between the fire service and project developers, engineers and planners. Along with several fire service representatives I have been engaged in a dialogue with the Congress for the New Urbanism (CNU) for over two (2) years, and like Mr. Dougherty and Mr. Crawford, I would also encourage discussion of projects by all the stakeholders with an interest.

The original proposal and this comment are intended to be appendix material. The proposal was intended to be an adoptable appendix but it was not written in mandatory language throughout. This comment proposes to make the appendix a guidance document, to provide a potential process for dealing with this complex subject by both fire code officials and developers in order to further the dialog. I hope the on-going discussions will offer the possibility of a future change with mandatory language that would be mutually acceptable to the urbanist community and to the fire service.

If adopted, this code change would generate a new appendix worded as follows:

K101.1 Intent. The purpose of this appendix is to provide guidance to jurisdictions that choose to adopt a performance-based design approach for fire apparatus access roads in cooperation with the design community.

The design guidance in this appendix can be utilized to evaluate new and existing fire apparatus access roads required by this code. It can be used to establish design criteria that are consistent with nationally and internationally recognized good practices in an effort to improve traffic safety, by taking into account methods for preventing roadway traffic deaths and injuries while providing access for emergency responders who work to mitigate the hazards of fire, explosions and other emergencies.

K101.2 Goals. This appendix addresses access and traffic safety concerns affecting or relating to structures, processes, premises and safeguards that impact or potentially impact:

1. The safety of fire fighters and emergency responders in route to, during, and returning from an emergency.
2. Safe passage of the jurisdiction's fire apparatus
3. The adequacy of space for deploying the jurisdiction's fire apparatus and conducting fire and rescue operations
4. The approach and departure angles for the apparatus, and the inside and outside turning radii.
5. Appropriate vehicle speeds during normal traffic conditions that can enhance the safety of vehicles drivers and passengers as well as pedestrians.

K101.3 Authority. The fire code official needs to have the authority to work in conjunction with the jurisdiction's traffic engineer to provide the access widths needed for fire or rescue operations. The jurisdiction also a needs to address other commercial vehicle requirements such as trash, recycling vehicles, and moving vans so that their presence will not delay emergency response vehicles.

K101.4 Dimensions. Fire apparatus require access roads of sufficient unobstructed widths, exclusive of shoulders, to allow the passage of and effective deployment of the jurisdiction's emergency apparatus and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

K101.5 Turning radius. The required turning radius of a fire apparatus access road shall be based on the turning radius of both the in-service and the reserve apparatus used by the fire department, and other commercial vehicles that will operate in the area.

K101.6 Grade. The grade of the fire apparatus access road shall be based on the fire department's apparatus and the limitations of the apparatus related to ascending and transitioning from a flat surface to the grade permitted by the jurisdiction, and descending from a flat surface to the grade permitted by the jurisdiction. In addition, a transitioning distance may be required from the flat surface to the full grade.

K101.7 Design for road traffic safety. Fire apparatus access road design should be influenced by the nature of the area being served, including building dimensions, building occupancies and uses, pedestrian traffic, bicycle traffic, and parking patterns. The potential design impact on traffic safety should be evaluated to identify possible improvements that help to minimize inappropriate vehicle speeds for the area but do not prevent adequate access for fire apparatus and for fire and rescue operations. Adequate access includes the space necessary for deploying the jurisdiction's fire apparatus and conducting fire and rescue operations.

I hope that the membership will bring forward this Public Comment or Mr. Dougherty's comment and support Approved as Modified by the one of these two Public Comments.

Commenter's Reason (DOUGHERTY): This code change was moved by Mr. Crawford of the IFC Code Development Committee with the idea to establish a discussion between the fire service and project developers, engineers and planners. I would also encourage discussion of projects by all the stakeholders with an interest in the project.

Unfortunately, the code change proposal as approved has a lot of unneeded text in it that is more like commentary language than code. Most of the proposal is not written in mandatory language, as it is intended as a discussion guide. There are also portions of the proposal that do no more than restate the intent of the code as found in Chapter 1 and Chapter 5 of the IFC .

In discussing my concerns with the proponents of F237 and Mr. Crawford regarding the technical deficiencies, I offered to edit the original proposal to make it read more like a code should read and maintain the main concerns of the proponent: When developing a project, the concepts of livable – walkable communities that encourage people to use alternate modes of transportation, reduce traffic and the resulting traffic accidents and fatalities, to get people out walking within the community improving the health of the community, to reduce the carbon foot print in the community - reducing green house gasses and global warming, to produce sustainable housing (green buildings) that are energy efficient. With all of these it is felt that a better designed community can be the result.

The resulting modification was reviewed by the Congress for New Urbanization (CNU) and Mr. Crawford in an effort to provide an appendix that is simple and can achieve the goals of all concerned.

I urge the membership to bring forward the Public Comment; overturn the committee action to Approve as Submitted, and support Approved as Modified by the Public Comment as shown in this proposal.

Note: Mr. Crawford and I attended the CNU Conference in November 2009 to assist them in establishing a dialogue with the fire service. While at the conference we attended a meeting with the fire service and the CNU regarding access issues, which I thought was beneficial to both groups. I have also submitted a Public Comment for Disapproved. If the modified proposal is not acceptable to the membership I would then ask for disapproval. The language in the proposal approved by the committee does not belong in the code or Appendix and needs to be rejected.

Public Comment 3:

Page Dougherty representing self, requests Disapproval.

Commenter's Reason: The code change was "Approved as Submitted" by the committee in the final minutes of the code hearings. It was brought to the committee's attention that the text of the proposal was filed with direct cut of paste of existing code text, including the existing section numbers. The language used was also pointed out to be more commentary type language than that used in code.

Mr. Crawford, who made the motion to Approve F237, indicated that code users need to reach out to the submitter's group to establish a dialogue with firefighters and their group. This has been done as Mr. Crawford and I attended the group's conference in November, 2009 to establish that dialogue and also attended a meeting of that group and the fire service from the Oregon and Washington areas.

The code change as Approved is terrible code language and does little more that provide a laundry list of items that should be included in the discussion between the development community and the fire service. It should not be accepted by the membership as written.

Note: An additional Public Comment has been submitted in an attempt to remove the commentary type language, rearrange the issues to be discussed in a code like manner, and most importantly notes that the Appendix should not be adopted as part of a Code.

If the other Public Comment meets the concerns regarding the issues, vote for it over the Approved version of F237, If you do not like the Public Comment then I ask for your support of a Disapproval vote to prevent the Approved text form being placed in the code.

Remember this is the ONLY CHANCE we have TO REMOVE the F 237-09/10 text as approved for the 2012 IFC

Public Comment 4:

Daniel E. Nichols, New York State Div. of Code Enforcement and Administration, requests Disapproval.

Commenter's Reason:

The committee approved this 'as a starting point', but the proposal has requirements that are located in confusing locations, based on unidentified standards, as well as being detrimental to fire department apparatus.

If a jurisdiction were to adopt this appendix, the following issues would be raised:

<u>K101.2</u>

Modifies 101.2- Scope of the IFC- This would make the fire code official responsible for the hazards of traffic that occur on fire apparatus access roads, including 'other dangerous conditions.'

Modifies 101.3- Intent of the IFC- This would make the design of existing fire apparatus access roads subject to construction requirements. Currently, IFC Section 503.1 only applies the design criteria to newly required fire apparatus access roads.

Modifies 503.2.1- Dimensions- States that the 20 feet would be deleted and adds 'the passage of fire apparatus'. The passage of fire apparatus is not the sole intent of the 20 feet; it is so fire apparatus can pass one another when navigating a fireground as well as to go around a vehicle that has pulled over to allow the fire apparatus to proceed. Another concern is the term 'Wherever necessary, provides adequate space for deploying apparatus. Where will this be? What about other buildings built along the road at a later date? What happens when the fire department's vehicles change? The 20 feet has been long recognized as the required width to effectively operate fire apparatus.

Today's fire apparatus is much larger than a generation ago; mainly because of increased safety features within the apparatus (enclosed cabs, side impact protection, aerial apparatus stability), the need for multiple-use apparatus that decreases the number of vehicles but make each one larger (quint-type and rescue-pumper apparatus), and new environmental concerns. The environmental concerns are based on new Environmental Protection Agency (EPA) requirements on diesel engines that require larger-sized engines to be placed in fire apparatus to more effectively control pollutants. The larger engines have made apparatus wider to facilitate the space for the engine and the associated cooling. As an example, a 1950's city engine was about 80" wide, a mid-1990's city engine was about 92" wide plus 10" for mirrors. Today's fire apparatus utilizes about 100" wide, with an additional 10" for mirror. In short, two late-model fire engines will have only about 20" of space to pass with the current 20 feet requirement. Anything less than 20 feet changes the original purpose of fire apparatus access roads.

On-street parking is a principle of the new urbanism movement. Because of the need for parallel parking, rapid increases of 'double-parkers' due to no dedicated parking within immediate proximity of the residences, and largely unregulated parking of larger vehicles, on-street parking is an additional issue that effects fire apparatus access where the minimum width is generally diminished anyway. Add the issue of snow removal in colder climates and on-street parking becomes a real hindrance to narrow roads.

The appendix material does not give the appropriate guidance to take into account the above issues, as well as others dealing with need for considerations of future fire department apparatus purchases, vehicle height and access to buildings. It also does not give the review and approval process that other performance-based designs have, such as the criteria in the alternate methods and materials process in Chapter 1 of the IFC or as developed in the *ICC Performance Code*.

I ask that the membership consider disapproving this code change. I want to also remind the ICC membership that F16 was disapproved by the committee for reasons (in part) of the fire code official not being in control of the width of roads and F17 was approved to prohibit traffic-calming devices unless approved by the fire code official because of the known reduction of fire apparatus access created by contemporary road designs.

Final Action: AS AM AMPC____ D

F241-09/10

4603.6.1 (New), 4603.6.1.1 (New), 4603.6, Table 4603.1

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman – Joint Fire Service Review Committee

1. Add new text as follows:

4603.6.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.6 shall be installed in Group A occupancies having an occupant load of 300 or more. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

> **Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

4603.6.1.1 System initiation in Group A occupancies with an occupant load of 1,000 or more. Activation of the fire alarm in Group A occupancies with an occupant load of 1,000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.6.2.2.

> **Exception:** Where approved, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an approved, constantly attended location.

(Renumber subsequent sections.)

2. Revise as follows:

4603.6 Fire alarm systems. An *approved* manual, automatic or manual and automatic fire alarm system shall be installed in existing buildings and structures in accordance with Sections 4603.6.1 through ~~4603.6.7~~ 4603.6.8 and provide occupant notification in accordance with Section 907.6 unless other requirements are provided by other sections of this code.

> **Exception:** Occupancies with an existing, previously *approved* fire alarm system.

TABLE 4603.1
OCCUPANCY AND USE REQUIREMENTS

Section	Use			Occupancy Classification																		
	High Rise	Atrium or Covered Mall	Under ground Building	A	B	E	F	H-1	H-2	H-3	H-4	H-5	I-1	I-2	I-3	I-4	M	R-1	R-2	R-3	R-4	S
4603.6.1				R																		
~~4603.6.1~~ 4603.6.2						R																
~~4603.6.2~~ 4603.6.3													R									
~~4603.6.3~~ 4603.6.4														R								
~~4603.6.4~~ 4603.6.5															R							
~~4603.6.5~~ 4603.6.6																		R				
~~4603.6.6~~ 4603.6.7																			R			
~~4603.6.7~~ 4603.6.8																					R	

(Portions of table and notes not shown remain unchanged)

Reason: A study of multiple casualty fires in assembly occupancies has shown that similar conditions existed in all of the fires. These conditions include interior finish, exiting and occupant notification issues. The IFC addresses egress and interior finish issues retroactively in existing buildings. While the IFC contains retroactive fire alarm provisions in Groups E, R and I, there are currently no requirements for fire alarm systems in existing Group A occupancies. In the Beverly Hills Supper Club Fire (1977) and the Coconut Grove Fire (1942) one important factor resulting in 657 fatalities was the lack of occupant notification. In both these fires, multiple assembly rooms created conditions where the occupants of the buildings were not aware of fire conditions elsewhere in the building. Delayed occupant notification resulted in the fire condition blocking exit routes that would have been available earlier in the incidents.

This proposal will require a manual fire alarm system in existing Group A buildings with an occupant load of 300 or more.

Section 4603.6 is revised to include the new sections in the reference.

Table 4603.1 is revised to include the new sections in the reference.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LARIVIERE-F34-4603.6.1.doc

Public Hearing Results

Note: This code change was contained in the errata posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/09-10ProposedChanges.aspx.

Committee Action: Disapproved

Committee Reason: The committee felt that the proposal would be in conflict with the action taken on code change F100-09/10 which clarifies the same requirements for new Group A occupancies and provides for Group A occupancies that are separated from one another.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce (Chairman), Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

4603.6.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.6 shall be installed in Group A occupancies ~~having an~~ where the occupant load ~~of~~ due to the assembly occupancy is 300 or more. Group A occupancies not separated from one another in accordance with Section 707.3.9 of the *International Building Code* shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

> **Exception:** Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This proposal was Disapproved at the Code Development Hearing because it was not consistent with the Committee's action on F100-09/10. This Public Comment revises the text so that it is consistent with the F100-09/10 which revised Section 907.2.1. Therefore, the second sentence is added which refers to considering all Group A occupancies when they are not separated with fire-rated construction.

The need to install fire alarms systems in large existing Group A occupancies exists. We hear of tragic incidents in these facilities all too often. Now that this proposal is correlated with 907.2.1, it should be approved so that occupants in existing Group A occupancies can be protected as well.

Analysis: The text of Section 907.2.1 resulting from the Approval as Submitted of code change F100-09/10 (appears on the Final Action Hearing Consent Agenda), reads as follows:

907.2.1 (IBC [F] 907.2.1) Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.6 shall be installed in Group A occupancies where the occupant load due to the assembly occupancy is 300 or more. Group A occupancies not separated from one another in accordance with Section 707.3.9 of the *International Building Code* shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Final Action: AS AM AMPC____ D

INTERNATIONAL RESIDENTIAL CODE – BUILDING

RB7-09/10
R301.1.1, Chapter 44

Proposed Change as Submitted

Proponent: Julie Ruth, PE, JRuth Code Consulting, representing the American Architectural Manufacturers Association

1. Revise as follows:

R301.1.1 Alternative provisions. As an alternative to the requirements in Section R301.1 the following standards are permitted subject to the limitations of this code and the limitations therein. Where engineered design is used in conjunction with these standards, the design shall comply with the *International Building Code*.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual* (WFCM).
2. American Iron and Steel Institute (AISI) *Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings* (AISI S230).
3. ICC-400 *Standard on the Design and Construction of Log Structures*.
4. American Architectural Manufacturers Association/National Sunroom Association (AAMA) 2100 – *Specification for Sunrooms* for the construction of sunroom additions in areas of Seismic Design Category A and B only.

2. Add new standard to Chapter 44 as follows:

AAMA
2100-10 Specification for Sunrooms

Reason: The 2009 *International Residential Code* defines a sunroom as "A one-story structure attached to a *dwelling* with a *glazing area* in excess of 40 percent of the gross area of the structure's *exterior walls* and roof." These structures are typically constructed in one of two manners: 1) using typical wood framing techniques, or 2) using a stick system that consists of prefabricated framing of aluminum, fiberglass, wood or other materials, with glass or opaque wall or roof panels, and steel or aluminum connections.

The first technique can be done in accordance with the current provisions of the IRC for wood framed construction. There are not now, however, any provisions in the IRC for the second method of constructing a sunroom other than by engineering analysis or demonstrating equivalence to the current provisions of the *International Residential Code* by some other means. This proposal seeks to add testing of sunrooms to the provisions of AAMA/NSA 2100 - 10 *Specification for Sunrooms* to the available options for approval of sunroom construction in the IRC.

In 2002 the American Architectural Manufacturers Association, the National Sunroom Association and the National Patio Association published the first U.S. standard for the construction of sunroom – AAMA/NPEA/NSA 2100 – 02. The standard established five different categories of sunrooms based upon the intended use of the space, and established specific design criteria for them, based upon those same categories and intended end use. The document establishes specific parameters for a test structure, including minimum depth, width, slope of roof, etc., while relying upon documents such as the local building code and ASCE 7 to determine the minimum design loads that the testing is to be based upon.

As the document began to be used and proposed for inclusion in various codes (it is now referenced in the 2007 Florida Building Code) the members of the AAMA Sunroom Council became aware of improvements that were needed. These improvements included revisions that would bring the document more tightly in line with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440 for the design, testing and labeling of windows, glass doors and skylights, and revisions that would bring the foundation requirements more closely in line with the requirements of the *International Residential Code*. AAMA/WDMA/CSA 101/I.S.2/A440 – 08 is referenced in the 2009 edition of the International Residential Code, International Building Code and International Energy Conservation Code for these products.

The standard is currently undergoing revision to incorporate the improvements mentioned above. If the revision is completed by the Code Development Hearings in Baltimore, we will ask the IRC Building and Energy Committee to approve it at that time. If not, we will have the revision complete and the next edition of the standard published and readily available before the 2010 Final Action Hearings for the 2012 International Residential Code for consideration by the active members of the ICC at that time.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, AAMA 2100, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: RUTH-RB-3-R301.1.1-CH 44

Public Hearing Results

Analysis: Review of proposed new standard indicated that, in the opinion of ICC Staff, the standard did not comply with ICC standards criteria, Sections 3.6.3.1. and 3.6.2.11.

Committee Action: **Disapproved**

Committee Reason: The committee feels this is confusing and the standard does not comply with the ICC criteria. The revision to the standard is not complete. Also, there are issues with the electrical provisions that might be a conflict with respect to the standard.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julie Ruth, PE, JRuth Code Consulting, representing the American Architectural Manufacturers Association, request Approval as Submitted.

Commenter's Reason: RB7, as originally submitted, added reference to AAMA/NSA 2100-10 to the IRC for the structural design of sunrooms. AAMA/NSA 2100-10 was intended to be an update to AAMA/NSA/NPEA 2100-02 *Specification for Sunrooms*, which has become widely used within the sunroom industry since its publication 8 years ago. The standard was disapproved by the IRC committee because the revision was not yet complete, the standard was not yet "published and readily available" and sufficient information regarding the consensus process used for the development and revision of the standard had not yet been provided to the ICC staff for them to make a determination regarding it.

AAMA/NSA/NPEA 2100 establishes criteria for five different categories of sunrooms, which range from "A roof or a covering of an outdoor space" with openings "enclosed with insect screening or 0.5 mm (20 mil) maximum thickness plastic film" (Category I) to "a roof or a covering of an outdoor space with enclosed walls that is designed to be heated and/or cooled and is open to the main structure" (Category V). The intent of AAMA 2100 is to define the design load and testing criteria for each category of sunrooms, relevant to the applicable model code, and also the intended use of the space.

The criteria include requirements for the structural design and testing of sunrooms to the wind, live, dead and snow load requirements of the applicable model building code. This Public Comment seeks recognition of AAMA/NSA/NPEA 2100 for the structural design of these special spaces.

During the initial efforts to revise and update AAMA/NSA/NPEA 2100, the members of AAMA staff were not able to locate contact information for the National Patio Enclosures Association. Since that time we have received that information. The NPEA is now participating in the process of updating AAMA/NSA/NPEA 2100 with AAMA and NSA, and the revised document will be designated AAMA/NSA/NPEA 2100-10.

Analysis: The standard proposed for reference in the code, AAMA/NSA/NPEA 2100 was not completed and readily available at the time of the Code Development Hearings in Baltimore. ICC Council Policy CP#/28-05, Code Development, Section 3.6.3.1, requires that the standard must be completed and readily available at the time of these Final Action Hearings in order to be considered for inclusion in the code.

Final Action: AS AM AMPC____ D

RB13-09/10
R301.2.1.1

Proposed Change as Submitted

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

Revise as follows:

R301.2.1.1 Design criteria. In regions where the basic wind speeds from Figure R301.2(4) equal or exceed ~~100 miles per hour (45 m/s) in *hurricane-prone regions*, or~~ 110 miles per hour (49m/s)~~ elsewhere~~, the design of buildings shall be in accordance with one of the following methods. The elements of design not addressed by those documents in Items 1 through 4 shall be in accordance with this code.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM); or
2. International Code Council (ICC) *Standard for Residential Construction in High-Wind Regions* (ICC-600); or

3. *Minimum Design Loads for Buildings and Other Structures* (ASCE-7); or
4. American Iron and Steel Institute (AISI), *Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings (AISI 230).*
5. Concrete construction shall be designed in accordance with the provisions of this code.
6. Structural insulated panel (SIP) walls shall be designed in accordance with the provisions of this code.

Reason: The purpose of this proposal is to restore the IRC scope limit for construction in high-wind areas to the original 110 miles per hour for all areas of the country. Without this revision, houses in areas along the Atlantic and Gulf coasts where the basic wind speed is 100 or 105 miles per hour will need to be engineered or designed to prescriptive requirements intended for areas at risk for Category 4 and 5 hurricanes.

As justification for the original code change made during the 2004-2005 Code Development Cycle (RB31-04/05) the Institute for Building and Home Safety (IBHS) cited four issues: roof sheathing nails, wind bracing requirements, toe-nailed uplift connections, and wall-to-wall connections at the floor line. In lieu of pursuing individual modifications to resolve these issues within the IRC, the proponent simply lowered the ceiling for using prescriptive design provisions along the Atlantic & Gulf coasts. We believe this is excessive and not supported by the observed performance of housing properly constructed to previous editions of the IRC in extreme wind events (hurricanes). At no time did the proponents ever provide documented evidence of failures of structures constructed to the previous IRC provisions. Nor did they provide technical justification in the form of engineering calculations or structural research to support their contentions. However, the 2004-2005 Code Development Cycle coincided with the four 2004 Florida hurricanes (Wilma, Ivan, Charley and Frances) and with Katrina and Rita in 2005. This led to significant political and emotional pressure on the code development community to increase the stringency of building codes, whether or not they were technically justified or appropriately targeted to the risk of severe wind events in those areas subject to the new provisions.

In the subsequent code development cycles, individual changes have been made to address all four issues raised by IBHS. The 2006 IRC increased the minimum roof sheathing nail size from 6d to 8d common nails for all roofs, and the gable and eave end zone nail spacing was tightened for dwellings in the 100mph region. The wall bracing provisions in the 2009 IRC have been reorganized, improved, and clarified and many new construction details provided. Most importantly, a new wind bracing table is provided which ties the required wall bracing for wind resistance to the wind loads determined using ASCE 7-05. Finally, a requirement for a continuous load path at the roof-to-wall, floor-to-floor, and floor-to-foundation connections at braced wall panels was added.

The 2009 IRC also provides requirements for wind resistance of exterior wood sheathing and for the installation of vinyl siding and foam sheathing. These new requirements further increase the resistance of structures built under the IRC to wind damage.

We question the age of the damaged structures used for justifying the code change reducing the IRC scope. The Federal Emergency Management Agency Summary Reports on Building Performance from the 2004 hurricane season and from Hurricane Katrina in 2005 indicated that structures built to the 2000 and 2003 IRC performed extremely well. The 2004 hurricane report stated (p.13), “no structural failures were observed to structures designed and constructed to the wind design requirements of…the 2000 IBC/IRC…” The Hurricane Katrina report stated (p.4-8), “Most structural failures observed…appeared to be the result of inadequate design and construction methods commonly used before IBC 2000 and IRC 2000 were adopted and enforced.” Finally, a study conducted by the Texas Windstorm Insurance Association after Hurricane Rita showed there was substantially less damage and substantially fewer insurance claims in those areas where the 2000 or 2003 IBC and IRC were adopted and enforced.

NAHB estimates show that complying with the ICC-600 Standard for Residential Construction in High Wind Regions or the AF&PA Wood Frame Construction Manual where required by the IRC can add as much as $10,000 to the cost of a home. We believe these additional requirements make it extremely difficult to construct affordable housing along the Atlantic and Gulf coasts and place an onerous burden on builders and homeowners, and particularly on first-time home buyers. This added cost of construction will have the effect of keeping residents of these areas in older homes which do not have the robust construction provided by the IRC prescriptive provisions and which will be substantially more susceptible to structural failures, water infiltration and damage to personal property in high wind events.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EHRLICH-RB-2-R301.2.1.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee feels that the concerns with respect to roof sheathing nails, wind bracing, uplift connectors and wall-to-wall connections have been resolved and it is appropriate to restore the 110 mph basic wind speed as the threshold for high wind design.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

T. Eric Stafford, representing Institute for Business and Home Safety, requests Disapproval.

Commenter's Reason: We are requesting disapproval of RB13-09/10 standing on its own. Our support of this code change is contingent upon approval of code changes RB154-09/10 and/or RB156-09/10. RB154-09/10 and RB156-09/10 propose new requirements to improve the roof-to-wall connections for wind loads for buildings built to the IRC. With the approval of RB154-09/10, we would drop our objection to this proposal.

Final Action: AS AM AMPC____ D

RB16-09/10
301.2.2.6 (New), R1001.3, R1001.4, R1003.3, R1003.4, Table R1001.1

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, City of San Jose, CA, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters)

1. Add new text as follows:

R301.2.2.2.6 Masonry or concrete chimneys. Masonry or concrete chimneys shall be reinforced and anchored to the building in accordance with Sections R1001.3, R1001.4, R1003.3 and R1003.4

2. Revise as follows:

R1001.3 Seismic reinforcing. Masonry or concrete chimneys in Seismic Design ~~Category~~ Categories C, D_0, D_1 or D_2 shall be reinforced. Reinforcing shall conform to the requirements set forth in Table R1001.1 and Section R609, Grouted Masonry.

R1001.4 Seismic anchorage. Masonry or concrete chimneys in Seismic Design Categories C, D_0, D_1 or D_2 shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above *grade*, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements of Section R1001.4.1.

R1003.3 Seismic reinforcing. Masonry or concrete chimneys shall be constructed, anchored, supported and reinforced as required by this chapter. In Seismic Design ~~Category~~ Categories C, D_0, D_1 or D_2 masonry and concrete chimneys shall be reinforced and anchored as detailed in Section R1003.3.1, R1003.3.2 and R1003.4. In Seismic Design ~~Category~~ Categories A and B ~~or C~~, reinforcement and seismic anchorage is not required.

R1003.4 Seismic anchorage. Masonry ~~and~~ or concrete chimneys and foundations in Seismic Design ~~Category~~ Categories C, D_0, D_1 or D_2 shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above *grade*, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements of Section R1003.4.1.

TABLE R1001.1
SUMMARY OF REQUIREMENTS FOR MASONRY FIREPLACES AND CHIMNEYS

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = $0.0929m^2$.

NOTE: This table provides a summary of major requirements for the construction of masonry chimneys and fireplaces. Letter references are to Figure R1001.1 which shows examples of typical construction. This table does not cover all requirements, nor does it cover all aspects of the indicated requirements. For the actual mandatory requirements of the code, see the indicated section of text.

a. The letters refer to Figure R1001.1.
b. Not required in Seismic Design ~~Category~~ Categories A and B ~~or C~~.

Reason: The IBC Chapter 21 requirements for reinforcing and anchorage of masonry and concrete chimneys were extended to Seismic Design Category C by code change S193-07/08. That change appears in 2009 IBC Sections 2111.3 and 2111.4. This proposal intends to make the IRC minimum requirements for reinforcing and anchorage match the IBC because the effects of earthquakes and the risks to life safety from chimney collapse are independent of the code under which the chimney is permitted and constructed. Seismic Design Category C is defined in IRC Table R301.2.2.1.1 as the range of 0.33g S_{DS} 0.50g for soil Site Class D. Assuming soil Site Class D, this S_{DS} range represents a mapped short period (S_S) spectral response acceleration range of 0.32g S_S 0.55g. Earthquakes generating these moderate levels of short period ground motion (e.g., Nisqually Washington Earthquake (2001), Napa California Earthquake (2000), Coalinga California Earthquake (1983) have repeatedly caused collapse or partial collapse of large numbers of unreinforced or unanchored masonry chimneys. In at least two earthquakes, Borah Peak Idaho (1983) and Landers California Earthquake (1992), masonry chimney and fireplace collapses have resulted in fatalities.

To accomplish this change, a new section R301.2.2.2.6 is added to specify that the masonry or concrete chimneys in Seismic Design Category C must comply with sections R1001.3, R1001.4, R1003.3 and R1003.4. In each of those four sections, Category C is added to the list of Seismic Design Categories where chimney reinforcing and anchorage is necessary.

In R1003.3, Category C is deleted from the list of Seismic Design Categories where chimney reinforcement and anchorage are not required.

In Table R1001.1, footnote "b" is revised to delete Seismic Design Category C to be consistent with the changes to sections R1001.3, R1001.4, R1003.3 and R1003.4. Footnote "b" is used at two locations in Table R1001.1, in item H (vertical reinforcing) and in item S (anchorage).

In R1001.3, R1003.3, and R1003.4 and Table R1001.1 footnote "b" an editorial change is made to correct the word "Category" to the plural "Categories" as is currently used in section R1001.4 when more than one category is listed. Another editorial change occurs in R1003.4 where the word "and" between the words "masonry" and "concrete" is changed to "or" to match the wording used in the other three sections.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Maiel-RB-3-R301.2.2.2.6-Ch 10

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that the failures may have been noncompliance rather than inadequate code. No data or substantiation was submitted to show that the code is inadequate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, PE, CBO, City of San Jose, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Chapters), requests Approved as Submitted.

Commenter's Reason: The Tri-Chapter continues to support RB16 as submitted. During the Preliminary Code Hearings in Baltimore, speakers from the Tri-Chapter as well as speakers from the FEMA and experts on earthquake evaluation and response spoke on behalf of the original code change proposal as submitted. Both the proponents and opponents of this code change proposal agreed that there were thousands of masonry chimney failures following prior small earthquakes throughout the United States. The documented ground motions for prior small earthquakes, such as the Nisqually Earthquake in Washington, the Napa Earthquake in California, the Landers Earthquake in California, and the Coalinga Earthquake in California, and the Borah Peak Earthquake in Idaho, are all examples of small earthquakes that created "short period" ground accelerations in the range of 0.32g<Ss< or = 0.55g. Short Period ground accelerations in this range are characteristic of Seismic Design Category "C" (SDC C). This code change specifically calls for minimal longitudinal steel reinforcement and attachment at the roof level of masonry chimneys to prevent documented chimney collapses following small and moderate earthquakes.

The proposed code change should also be approved as submitted in order to provide the same minimum protection of occupants of residential buildings constructed under the IRC as is provided for all buildings constructed under the IBC. The mitigation of the very real dangers posed from falling chimneys during minor earthquakes should not be a function of which code they were built under.

The IRC Committee failed to understand that this code change proposal is not designed to prevent masonry chimney failures during small earthquake events, but rather addresses the more important life-safety issue of chimney collapse. The collapse of masonry chimneys that are not reinforced with longitudinal steel and are not properly anchored at the roof structure of the building have contributed to excessive property damage, injury and even death following small earthquake events. Even when only a portion of a chimney falls, those pieces have the potential to kill and injure people in the vicinity of the chimney.

Finally, the Tri-Chapter does not agree that the thousands of documented chimney failures are due to "poor workmanship" alone and that this is cause to reject the proposed code change. In fact, by requiring minimum longitudinal reinforcement of masonry chimneys and by requiring attachment of masonry chimneys at the roof line we fully expect that the construction of masonry chimneys will receive better inspection and be more likely to be built to withstand small and moderate earthquakes without the potential for collapse.

In summary, we encourage all ICC voting members to support this code proposal as submitted. Minimal longitudinal reinforcement of masonry chimneys and attachment of masonry chimneys at the roof line of buildings in SDC "C" is a proven and cost effective solution to prevent the collapse of masonry chimneys in small and moderate earthquakes and to reduce property damage and save lives.

Final Action: AS AM AMPC____ D

RB19-09/10
Table R302.1

Proposed Change as Submitted

Proponent: Steven Orlowski, National Association of Home Builders (NAHB)

Revise table as follows:

TABLE R302.1
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour-tested in accordance with ASTM E 119 or UL 263 with exposure to both sides	<3 ~~5~~ Feet
	(Not fire-resistance rated)	0-Hours	>3 ~~5~~ Feet
Projections	(Fire-resistance rated)	1-Hour on the underside	<2 ~~4~~ Feet
	(Not fire-resistance rated)	0-Hours	>3 ~~5~~ Feet
Openings	Not Allowed	N/A	< 3 Feet
	25% Maximum of Wall Area	0-Hours	3 Feet
	Unlimited	0-Hours	5 Feet
Penetrations	All	Comply with Section R302.4	< 5 Feet
		None Required	5 Feet

Reason: The purpose of this proposed change is to retain the original fire separation distances to the dimensions used in *2003 International Residential Code*. During the 2004/2005 Code Development Cycle, the Code Committee disapproved this change given that the proponent failed to provide supporting evidence or data to sustain the increase in the fire separation distance. The committee's decision was overturned at the final action hearings without any additional substantiation being brought forth by the proponent. To this day, there are no known reports or studies that demonstrate the previously allowed 3 foot separation distance from the property line and 6 foot separation between structures failed to provide the minimum required safe distance for fire separation.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ORLOWSKI-RB-4-T. R302.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels there is no compelling reason to change the 5 feet separation distance. This is consistent in the Assembly Action on RB184-09/10. The ICC membership voted for the 5 feet separation in past code cycles and the committee supports that.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Steve Orlowski, National Association of Home Builders (NAHB), requests Approved as Submitted.

Commenter's Reason: The committee voted against this proposal during the public hearings, stating that the ICC membership had voted against any decrease in the fire separation distance. Yet, there was a successful floor vote by the ICC membership on a similar proposal (RB184) submitted by the fire service. NAHB urges the attendees at the final action hearings to approve this code change that would reinstate the decreased fire separation distances that were previously permitted in the 2003 IRC, based on the premise that the 2009 IRC requires residential sprinklers in all one- and two- family dwellings and townhouses. The code should be written on the basis of what is required in the model code and not on the possibilities of what may or may not be required at the state and local level when it is adopted.

Final Action: AS AM AMPC____ D

RB20-09/10
R302.1

Proposed Change as Submitted

Proponent: Don Davies, Salt Lake City Corporation, representing the Utah Chapter of ICC

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1. Structures without exterior walls at adjoining lot lines shall not have roof projections within 5'-0" of the lot line.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason: There are currently no provisions in the residential code to limit the roof projection for carports and patio covers where there is no exterior wall adjoining the lot line. Since carports and patio covers have openings exceeding 25% they must be placed at least 5 feet from the lot line as required in I.R.C. Table R302.1. Fire-resistance rating of the projections beyond the exterior walls is addressed in I.R.C. Table R302.1; but in the instance where there is no wall, rating a portion of the roof covering serves no useful purpose and is not addressed by Table R302.1 which deals with exterior walls.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DAVIES-RB-1-R302.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels this change is not needed as Table R302.1 already addresses projections. Also, referring to structures is vague and a list of specific structures would be more appropriate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Don Davies, Salt Lake City Corporation, representing Utah Chapter, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1. ~~Structures~~ Carports and Patio covers without exterior walls at adjoining lot lines shall not have roof projections within 5'-0" of the lot line.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Commenter's Reason: Table R302 addresses projections from an exterior wall, but where no wall exists as in a carport or a patio cover, there is no point of reference from which the projection measurement is taken. Measuring from a post or a beam, assuming that as the exterior wall, is problematic since the post or beam may be in the center of the carport or on the opposite side from the property line side. Allowing a carport to project to within 24" of the lot line with one-hour rated protection for 36" of the carport soffit makes no sense. Without a wall, the extended projection will direct heat and flames to a structure on an adjoining lot, and the protection intended by this portion of the code will not be provided. Simply stating a minimum distance to where the carport can project is a straight forward approach and meets the intent of the code. The term structures were deemed too vague by the committee, so we are using the terms carports and patio covers to address their concerns.

Final Action: AS AM AMPC____ D

RB22-09/10
R302.2, R302.2.4

Proposed Change as Submitted

Proponent: Michael Gardner, representing the Gypsum Association; Jason Thompson, PE, National Concrete Masonry Association (NCMA), representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

R 302.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302.1 for exterior walls.

Exception: A common ~~1-hour~~ 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.

R 302.2.4. Structural independence. Each individual townhouse shall be structurally independent.

Exceptions:

1. Foundations supporting *exterior walls* or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common 1~~-hour~~ 2-hour fire-resistance-rated wall as provided in Section R302.2.

Reason: (Gardner) Lost in the outcome of last fall's debate on residential sprinklers was the impact it made on the common walls that are often used to separate townhouse units. One of the approved proposals that incorporated sprinkler systems into townhouses reduced the rating on the common wall that can be used between townhouse units from two hours to one hour. This proposal is intended to restore the two hour rating to the common wall.

The 2009 IRC permits townhouses a structural independence exemption if they are separated by a common one-hour rated wall that complies with Section 302.2. The 2009 IRC also contains no mandatory sound transmission requirements for common walls. As a consequence, the 2009 IRC will permit two adjacent three story townhouse units to be separated by a common wall that displays no structural independence characteristics and has an STC rating of approximately 33.

Because of the reduced rating, a fire that overwhelms the sprinkler system in a room abutting the common wall will display an increased potential to adversely impact the structural integrity of the common wall and the adjacent townhouse units. In addition, the lack of a robust sound barrier between units creates the potential for a less than acceptable living environment.

The 2006 IRC required the common wall to maintain a two-hour rating. While the 2006 IRC also contained a structural independence exemption, the common two-hour wall required by the code provided an obvious level of increased fire protection not evidenced in the 2009 IRC. The 2006 code, by mandating a two-hour rating, also required the use of a wall that would automatically display a minimum STC rating almost 10 points higher than the minimum wall required by the 2009 code.

The code has never permitted the common wall that may be constructed by the exception to R 302.2 to display a rating that is lower than the rating that would be achieved by the standard charging language in R302.2. That section has historically required townhouses to be evaluated as separate buildings and to be constructed with separate and parallel exterior walls that separate the two adjacent units. The 2009 IRC now permits the common wall to have a lower rating than the basic walls prescribed by the code and also permits the common wall to be constructed without the structural independence characteristics required by R302.2.

Reason: (Thompson) Code change RB66-07/08 required townhouses constructed in accordance with the International Residential Code to be provided with automatic sprinkler protection. While this new requirement added a fire safety feature to townhouses the code change also reduced the level of fire safety that existed in the code by reducing the fire resistance rating required for the common wall separating dwelling units in townhouses. This code change will restore the previous IRC code requirement that the common wall separating dwelling units in townhouses to have a minimum fire resistance rating of 2-hours. There are several reasons why the common wall fire resistance rating needs to be returned to 2-hours.

First, Code Change RB66-07/08 justified the addition of mandatory sprinkler protection for townhouses based on sprinklers being the best tool for providing additional fire safety in residential occupancies. Given that the 2006 IRC already had an established level of fire safety for residential occupancies utilizing townhouse construction with 2-hour fire rated construction for the common wall, the goal for improving fire safety with the addition of sprinkler protection was not fully achieved. The existing level of fire safety was diminished by the reduction in the fire resistance rating of the common wall from 2-hours to 1-hour.

Second, Code Change RB66-07/08 created an inconsistency in the IRC. If two separate one and two family dwellings are constructed on individual lots and each built at the property line, Section R302.1 and Table R302.1 will require the exterior wall of each structure to be built with a 1-hour fire resistance rating using a fire exposure from both sides. The net result is that both dwellings are separated from the other adjacent, closely located dwelling by wall construction with a total cumulative fire resistance of 2-hours. Yet, if these same two individual structures are physically connected at the property line by a common wall the code permits the fire resistance rating between townhouse units to be reduced to 1-hour. The level of fire safety for these two dwelling configurations is not consistent

This code change achieves the full level of fire safety provided for in residential occupancies through the use of sprinkler protection and built-in fire resistant construction. It also will eliminate the fire safety inconsistency in the IRC between dwelling units built at property lines and dwelling units constructed as townhouses and connected at property lines by a common wall.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: GARDNER-RB-3-THOMPSON-RB-1-R302.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee recognizes there are similar occupancies in the IBC that allows 1-hour rated separation with fire sprinkler systems. The 1-hour rating should be retained as an incentive to local jurisdictions to retain the fire-sprinkler system.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Michael Gardner, Gypsum Association, requests Approval as Submitted.

Commenter's Reason: We continue to have concerns about the reduction of the hourly rating on the common wall that can be used to separate adjacent townhouse units constructed to the IRC.

Reducing the wall rating places the occupants of the units at greater risk in the event of a sprinkler system failure. It also creates the opportunity for a builder to install a code-compliant common wall with a low STC rating.

Section R302.2 requires townhouses to be considered as separate buildings and to be separated by fire-resistant exterior walls. Because the units are less than 5 feet apart, two independent one-hour walls have to be erected to separate adjacent units.

Prior to 2009, a historical exception to that language allowed the use of a two-hour common wall to separate adjacent units. In 2009, the exception was changed to permit the use of a one-hour common wall; however, the requirement in the body of R302.2 requiring two one-hour walls was not modified. The reduction in rating for the common wall was justified by the language added to the 2009 IRC that required sprinkler systems to be installed in all townhouse units.

Because sprinklers are required in all townhouse construction, the reduction in hourly rating for the common wall is not justified as the exception permitting the one-hour common wall now creates a life safety threshold that is lower than that required by the basic code language of Section R302.2.

Public Comment 2:

Jason Thompson, PE, National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards, requests Approval as Submitted.

Commenter's Reason: As pointed out in the reasoning statement for RB22, last code cycle code change RB66-07/08 justified the addition of mandatory sprinkler protection for townhouses based on sprinklers being the best tool for providing additional fire safety in residential occupancies. However, the existing level of fire safety was diminished in the IRC when RB66 also allowed a reduction in the fire resistance rating of the common wall from 2-hours to 1-hour. In addition code change RB66-07/08 created an inconsistency in the IRC when two separate one and two family dwellings are constructed on individual lots and each built at the property line. The IRC requires the exterior wall of each structure to be built with a 1-hour fire resistance rating with the net result that both dwellings are separated from the other adjacent, closely located dwelling by exterior wall construction with a total cumulative fire resistance of 2-hours. The level of fire safety for two dwelling separated by a common party wall configuration is not consistent with two dwellings separated by individual exterior walls. This code change eliminates this reduction in fire safety for dwellings built with a common wall and removes the inconsistency in the code for the fire resistance rating of walls between dwellings built with separate exterior walls and with common party walls.

Also, requiring the common wall between townhouses to have a 2-hour fire resistance rating is consistent with the requirements for party walls in the IBC. Section 706.1.1 of the IBC requires walls at property lines of adjacent buildings, and used for joint service between buildings, to be constructed as fire walls. IBC Table 706.4 requires fire walls and party walls between Group R-3 occupancies to have a 2-hour fire resistance rating with no reduction in the fire resistance rating for sprinkler protection. Common walls between townhouses (R-3 occupancies) in the IRC should also have 2-hour fire resistance ratings even though the townhouses are provided with sprinkler protection.

Finally the committee reason for disapproval is also not fully valid. The committee claims "there are similar occupancies in the IBC that allows 1-hour rated separation with fire sprinkler systems". That may be true for interior walls separating dwelling units in Group R-2 occupancies. However, building codes have always placed added emphasis on minimizing fire spread between separately owned properties as evidenced by the fire resistance requirements for exterior walls in Table 602 of the IBC and Table R302.1 of the IRC. Where these tables require the exterior walls to have a fire resistance rating no reduction in the fire resistance rating is permitted for fire sprinkler systems. The common wall between townhouses in the IRC, which serves as the exterior wall between separately owned properties, should have a fire resistance rating consistent with other exterior walls and with no reduction permitted for sprinkler protection.

Public Comment 3:

Rick Davidson, representing self, requests Approval as Submitted.

Commenter's Reason: The reduction in the fire rating for the walls separating townhouses to one-hour when only partial sprinkler systems are used is dangerous and short sited.

When the IRC Committee approved this code change, they stated that the IBC permitted reductions in fire ratings in sprinklered buildings so that reduction should be permitted in the IRC. But what the Committee failed to remember is that systems required in the IBC must be monitored and require periodic inspection. Systems permitted in the IRC do not have these safeguards.

Sprinkler systems required by the IRC are not required to be installed in concealed spaces such as attics and crawl spaces or in *attached garages*. Fires that occur or spread to these areas will not have sprinkler protection and the reduction in the fire rating between dwelling units through these areas is not warranted.

This exception allows only a one-hour wall between garages where previously either two one-hour or one two-hour wall would have been required. And no sprinkler protection is required in a garage.

This exception creates a huge inconsistency in exterior wall requirements between townhouses and single- or two-family dwellings that may be built near a lot line and don't enjoy the same reductions in fire ratings as townhouses do.

Sprinkler systems are not infallible. The National Fire Protection Association published a report in June 2007 entitled *"**U.S. EXPERIENCE WITH SPRINKLERS AND OTHER AUTOMATIC FIRE EXTINGUISHING EQUIPMENT**"* by John R. Hall, Jr. In that report Mr. Hall states: *"Based on 2002-2004 fires reported to U.S. fire departments, when sprinklers cover the area of fire origin, they operate in 93% of all reported structure fires large enough to activate sprinklers. When they operate, they are effective 97% of the time, resulting in a combined effectiveness reliability of 90%."*

Sprinkler systems can be shut off. The recent mortgage crises has resulted in scattered townhouse units being foreclosed and water services in these dwelling units shut off by the water utility both for nonpayment and because the dwelling units are not heated, again possibly for non-payment. This is done without the knowledge of the local building departments and even if the building departments knew of the utility shut offs; they are powerless to require a utility to provide service to a nonpaying customer. This results in occupied townhouses separated from non-occupied townhouses that have no sprinkler protection and only a 1-hour fire wall between them. Unoccupied dwellings are presumed to have a higher fire risk due to the potential for arson or vandalism and allowing the reduction in passive fire protection is inappropriate, dangerous, and short sited.

Passive fire protection will always be there.

Public Comment 4:

Rick Thornberry, P.E., The Code Consortium, representing Cellulose Insulation Manufactures Association (CIMA), requests Approval as Submitted.

Commenter's Reason: The International Residential Code Development Committee gave two basic reasons for recommending disapproval of this code change which would have restored the 2-hour fire-resistance rating for the common wall between townhouses allowed in the Exception to

R302.2 to the requirement that each townhouse have a minimum 1-hour fire-resistance rated exterior wall where they are adjacent to each other based on Table R302.1. They are as follows:

1. The Committee recognized that there are similar occupancies in the IBC that allow 1-hour rated separations with fire sprinkler systems.
2. The 1-hour rating should be retained as an incentive to local jurisdictions to retain the fire sprinkler system.

Regarding Item 1, basically the only time the IBC allows a 1-hour reduction in required separations where automatic sprinkler systems are installed is when the sprinkler system is an NFPA 13 sprinkler system. However, the IRC will allow an NFPA 13D or equivalent sprinkler system. As we all know, an NFPA 13D sprinkler system is primarily a life safety system and not a full property protection system. This is clearly stated in Section 1.2 Purpose of NFPA 13D as follows:

1.2.1 The purpose of this standard shall be to provide a sprinkler system that aids in the detection and control of residential fires and thus provides improved protection against injury and life loss.

1.2.2 A sprinkler system designed and installed in accordance with this standard shall be expected to prevent flashover (total involvement) in the room of fire origin, where sprinklered, and to improve the chance for occupants to escape or be evacuated.

But the wall provided to separate adjacent townhouses is not only intended to provide for life safety protection but also property protection so that a total burnout on one side of the wall will not effect the occupancy of the other side. Reducing the rating from 2-hours to 1-hour will significantly increase the likelihood that a total burnout could burn through the wall and cause fire damage and property loss to the townhouse on the opposite side. This is especially important since NFPA 13D sprinkler systems do not require that sprinklers be provided in the attic. Yet the attic will have a significant common space adjacent to the common wall serving both townhouses on each side of the wall. So if a fire gets into or starts in the attic, there is a significantly greater potential that the 1-hour wall currently allowed by the code will be breached.

It should also be noted that the common wall was originally required to have a 2-hour fire-resistance rating since townhouses are considered separate buildings. So the wall acted like a fire wall. This was allowed in lieu of the two 1-hour exterior walls previously noted above. Fire walls in accordance with the IBC also create separate buildings. Table 706.4 in the IBC specifies the minimum fire-resistance rating for fire walls. In no case is a fire wall allowed to have a fire-resistance rating less than 2-hours, even for Group R-3 occupancy buildings.

Regarding Part 2 of the Committee Reason, there should be no need to provide this trade-off as an incentive to local jurisdictions to retain the fire sprinkler system requirements in the IRC. The IRC needs to be treated as an entire code and it must be assumed that the code requirements act as an overall system to provide the required level of protection. This protection level should be based on the code as an entirety and not on the assumption that a jurisdiction may decide to make a modification or an amendment to the IRC when it adopts it for enforcement in that jurisdiction. Such an incentive, in our opinion, is unwise since it relies on the owners of the buildings on opposite sides of the common wall to maintain their automatic sprinkler systems in an operative condition at all times. Unfortunately, there is no supervision required for these systems and no fire department connection is provided for the fire department to boost the sprinkler system water supply as is typical of an NFPA 13 sprinkler system. Furthermore, the water supply to the system could be shut off for repairs and not turned back on since no supervision of the control valve supplying the water supply to the sprinkler system is required if the valve is locked open. Obviously, the owner of the townhouse would have the key to the lock on the valve so there would be nothing to prevent the owner from unlocking the lock and closing the valve for whatever reason. And it is not uncommon for the valve to remain closed since there is no supervisory reminder that the valve remains closed. It could easily be forgotten after the repairs have been made to the system.

There is also the question of the reliability of the sprinkler system water supply. Will it be available at all times when there is the possibility of a fire occurring? This is especially important in high seismic activity areas where fires often start soon after an earthquake and the water supplies in many cases are out of service due to main breaks and loss of power for extended periods of time.

In conclusion, we believe the reduction from 2-hours to 1-hour for the common wall separating townhouses as an Exception to the otherwise required 1-hour exterior walls for each townhouse is not justified for sprinkler systems installed based on NFPA 13D or an equivalent sprinkler system design. Thus, we strongly urge the Class A voting members to overturn the Committee's recommendation for disapproval and vote to approve this code change.

Final Action: AS AM AMPC____ D

RB23-09/10

R302.2.1, Figures R302.2.1(1)-R302.2.1(2)-R302.2.1(3) (New)

Proposed Change as Submitted

Proponent: Larry Wainright, Qualtim, Inc., representing the Structural Building Components Association (SBCA)

1. Revise as follows:

R302.2.1 Continuity. The fire-resistance-rated wall or assembly separating *townhouses* shall <u>have a fire-resistance rating that is</u> ~~be~~ continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures*. <u>Where the fire-resistance-rated wall or assembly is not continuous, the fire resistance rating shall be deemed continuous provided one of the following conditions is met:</u>

<u>1.</u> <u>A minimum one hour fire-resistance rating is provided on the floor or roof assembly that interrupts the fire-resistance rated wall. Fireblocking shall be provided per Section R302.11 (see Figure R302.2.1(1)). Or</u>

<u>2.</u> <u>Where an unrated floor or roof assembly interrupts the fire-resistance rated wall, the fire-resistance rating shall be deemed continuous provided:</u>

<u>2.1.</u> <u>Where two one-hour walls are provided, a minimum of one 2x full height fireblock shall be installed in each of the one-hour walls as shown in Figure R302.2.1(2).</u>

<u>2.2.</u> <u>Where one two-hour wall is provided, a minimum of two 2x full height fireblocks shall be installed on each side of the two-hour walls as shown in Figure R302.2.1(3).</u>

2. Add new figures as follows:

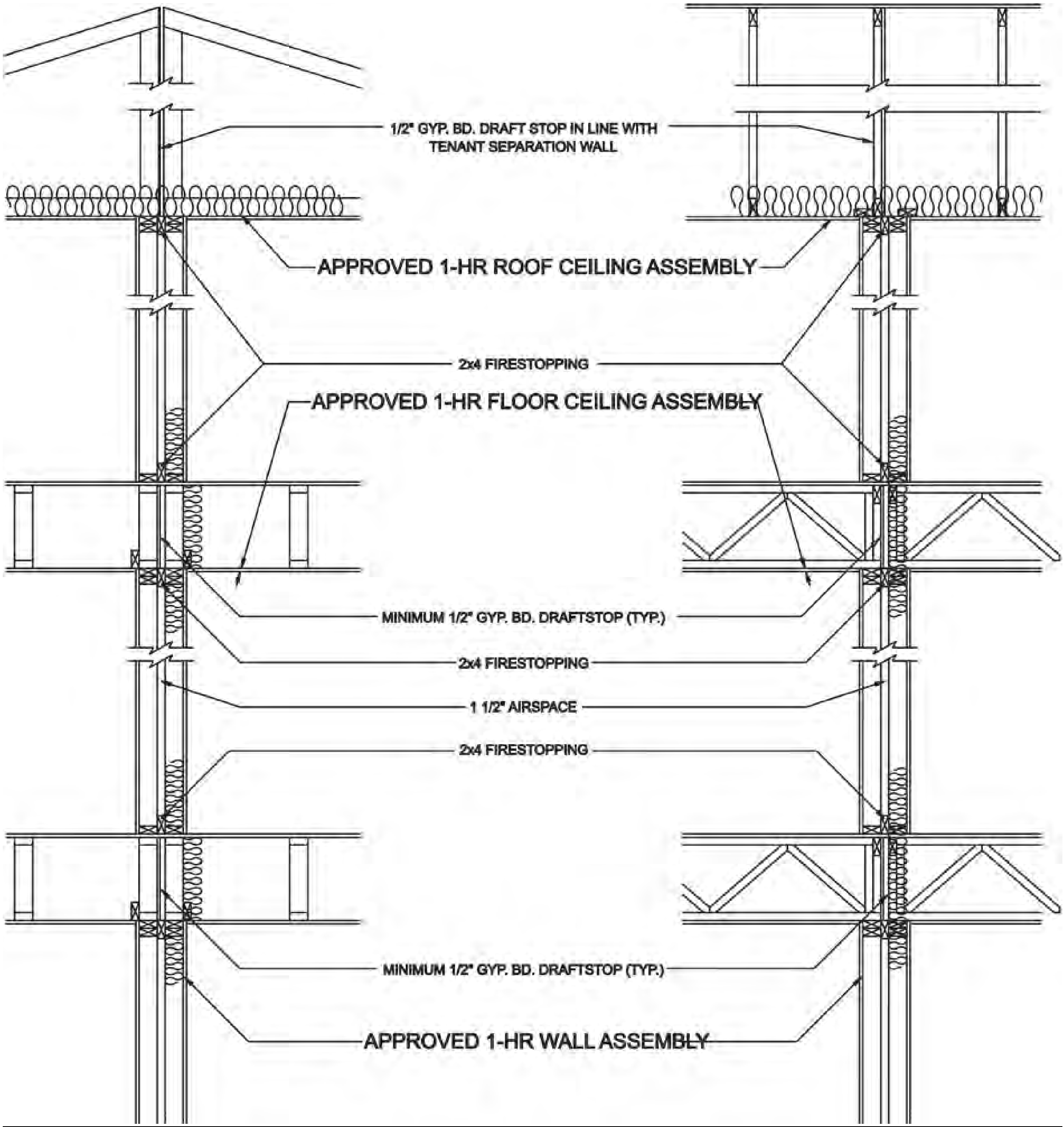
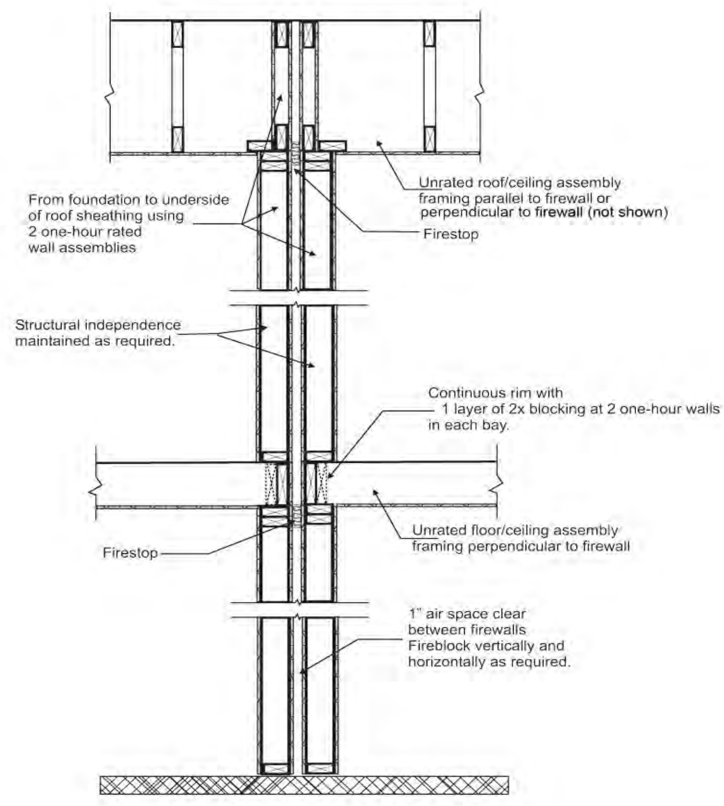


FIGURE R302.2.1(1)
Example assemblies that can be used to make up a one-hour rated system for separation between occupancies



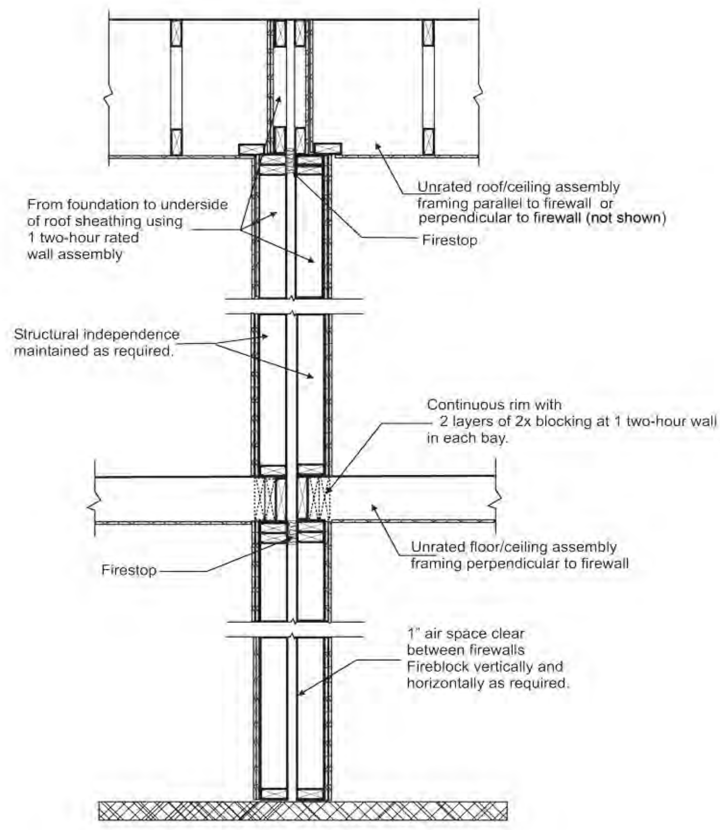


FIGURE R302.2.1(2)

FIGURE R302.2.1(3)

Reason: The purpose of this code change is to clarify an existing provision within the code and to provide a prescriptive solution to that provision. First, it is necessary to clarify that is the fire-resistance rating of the wall assembly that needs to be continuous from the foundation to the underside of the roof sheathing, not necessarily the framing itself. Second, the prescriptive solution gives some guidance on one way the fire-resistance rating can be maintained, while allowing for framing members to bear on the wall. The use of full height blocking to attain the required fire-resistance rating is based on the use of sacrificial material and char rates based on ASTM E119 testing. Under ASTM E119 test conditions, lumber will char at a rate of 1 inch per 30-40 minutes. Therefore, at least 2 inches of sacrificial material is required to achieve the one hour rating. Likewise, 4 inches is required to achieve a 2 hour rating. Further information can be found in an article published and located at the following link: www.sbcmag.info/Archive/2006/sep/0609_code.pdf

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WAINRIGHT-RB-3-R302.2.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The language of this change is unclear and confusing. The details are not clear how they relate to tested assemblies. There are a lot of terms that are not defined. The figures limit the prescriptive solution to one specific way and there may be many others that would be acceptable. This should be reworked and brought back.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Larry Wainright, Qualtim, Inc., representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.2 Townhouses. Each *townhouse* shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302.1 for exterior walls.

> **Exception:** A common 1-hour fire-resistance-rated wall assembly tested in accordance with ASTME 119 or UL 263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls,<u> floor assemblies, ceiling assemblies </u>and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.

R302.2.1 Continuity. The fire-resistance-rated wall<u>s</u> and/or assembl<u>ies</u>~~y~~ separating *townhouses* shall <u>form a continuous fire-resistance rating that is</u> ~~be~~ continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures*.

<u>Where a roof or floor assembly breaks the continuity of the fire-resistance rated wall, fire blocking shall extend from the top of the wall framing to the bottom of the floor or roof sheathing above. The following shall be considered acceptable fire blocking materials when designed and installed in the interstitial space above the fire-resistance rated wall:</u>

1. Two layers of 2 inch nominal lumber fire blocking,
2. Two layers of 1-1/8 inch engineered rimboard,
3. Two layers of 5/8 inch Type X gypsum wallboard,
4. Two layers of 23/32 inch wood structural panels or
5. Other approved materials with equivalent fire resistance.

Commenter's Reason: The purpose of this public comment is to clarify an existing provision within the code. First, it is necessary to clarify that it is the fire resistance rating of the wall assembly that needs to be continuous from the foundation to the underside of the roof sheathing, not necessarily the framing itself. Second, when the framing is not continuous, direction is given to provide some guidance on how the fire resistance rating can be maintained, while allowing for roof and floor assembly framing members to bear on the fire-resistance rated wall. In townhouse construction, shorter floor framing spans are usually achieved by spanning to the common walls thereby increasing design efficiencies and potentially lowering the cost of construction.

While disapproved at the code development hearings, the committee asked that this be reworked and brought back. There were several concerns with the original proposal. First, the details originally provided have been removed because they caused some confusion and only provided one possible solution to this problem; and while wood trusses were shown in the details, the provisions would apply equally to all framing types. Second, it is important to reiterate that fire blocking is necessary to insure that if a fire gets in the floor/ceiling cavity, it cannot continue unimpeded into the separation wall. Third, the fire blocking in the floor/ceiling cavity above the separation wall needs to be sufficient to maintain the fire resistance rating of the wall. The use of full height fire blocking to attain the required fire-resistance rating is based on the use of sacrificial material and char rates based on ASTM E119 testing. Under ASTM E119 test conditions, lumber will char at a rate of 1 inch per 30-40 minutes. Therefore, at least 2 inches of sacrificial material is required to achieve the one hour rating. Further information regarding this testing can be found in an article published and located at the following link: www.sbcmag.info/Archive/2006/sep/0609_code.pdf.

Final Action: AS AM AMPC____ D

RB24-09/10

R302.2.2

Proposed Change as Submitted

Proponent: Jeffrey Anderson, representing the Chesterfield County Department of Building Inspections, Chesterfield, VA

Revise as follows:

R302.2.2 Parapets. Parapets constructed in accordance with Section R302.2.3 shall be constructed for *townhouses* as an extension of exterior walls or common walls in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

   Exception: A parapet is not required in the two cases above when the roof is covered with a minimum class C roof covering, and the roof decking or sheathing is of noncombustible materials or *approved* fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of 5/8-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by a minimum of nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a minimum distance of 4 feet (1219 mm) on each side of the wall or walls and there are no openings or penetrations in the roof within 4 feet (1219 mm) of the exterior or common walls.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher roof deck shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

Reason: This change is proposed to provide consistency between the IRC and the IBC. Specifically, to make IRC Section R302.2.2 consistent with IBC Section 705.11(4). This change would make townhouse construction consistent between both the IRC and the IBC for this type construction.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ANDERSON-RB-1-R302.2.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This change would impose severe restrictions on penetration at the roof. This does not mirror the IBC requirement on this issue.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Steve Orlowski, National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment:

Modify the proposal as follows

R302.2.2 Parapets. Parapets constructed in accordance with Section R302.2.3 shall be constructed for *townhouses* as an extension of exterior walls or common walls in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

   Exception: A parapet is not required in the two cases above when the roof is covered with a minimum class C roof covering, and the roof decking or sheathing is of noncombustible materials or *approved* fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of 5/8-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by a minimum of nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a minimum distance of 4 feet (1219 mm) on each side of the wall or walls and there are no openings or penetrations in the roof within 4 feet (1219 mm) of the ~~exterior or~~ common walls.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher roof deck shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

Commenter's Reason: NAHB urges the attendees of the final action hearing to overturn the committees action and approve this proposal as modified. One of the concerns that the fire service reports is the spread of fires along the roof of adjoined dwellings, like townhouses. To allow penetrations to be within four feet of the firewall, defeats the purpose of requiring fire retardant lumber or 5/8 type x gypsum on the underside of the roof membrane. Any opening within the four feet poses as a potential hazard which will allow the passage of flames to impinge upon the adjoining dwelling unit. This code change will have a minimum impact on the cost of construction and will result in lowering the number of fire that spread along the roof.

Final Action: AS AM AMPC____ D

RB26-09/10
R302.5.1

Proposed Change as Submitted

Proponent: Sean DeCrane, Cleveland, OH Fire Department, representing the Cleveland Fire Department and the International Association of Fire Fighters

Revise as follows:

R302.5.1 Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than 13/8 inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 13/8 inches (35 mm) thick, or 20-minute fire-rated doors <u>equipped with a self-closing device</u>.

Reason: There are times when proposed code submittals require a very lengthy substantiation, and then there are times when code change proposals just make sense. I would believe this is one of those times where a code change proposal makes a lot of sense. We are seeking a requirement to install items for very minimal costs yet great life saving potentials.

As we place greater amounts of thermoplastics in our homes and garages, especially kids' toys, we are increasing the fuel load and toxic by-products. The most obvious by-product of incomplete combustion is carbon monoxide. We know how deadly carbon monoxide is to the occupants of homes. Carbon monoxide is also a by-product of the internal combustion engine. Especially during the winter months the fire service responds to numerous cases of potential carbon monoxide incidents. With an open door between the living quarters and the garage, where the car is warming up for the trip to work, we are allowing the free flow of carbon monoxide from the garage into the home. Some may not believe there is a concern with this situation and may also point out some difficulty in reporting the data of exactly how many individuals were killed by these incidents. Creating and submitting code proposals is about the present but also the future. With the reversal of the code requirement of a self closing door we are allowing millions of homes to be built with a potential safety hazard. Carbon monoxide is a silent and deadly killer and in many incidents the victims do not realize they are slowly being exposed to potentially life threatening levels of carbon monoxide. This is one of the reasons the ICC membership voted to require the installation of carbon monoxide detectors.

We know that requirement of carbon monoxide detectors will save lives. In fact, I have seen numerous responses where a detector alerted an occupant to the presence of dangerous amounts of carbon monoxide, which in turn, allowed them to notify the fire department. With a lack of a requirement of a self closing door we have the potential of creating a Peter Cried wolf situation that will be played out across the country. A self closing door helps to protect the occupants of a home from the dangers in the garage. During the fall and winter months many occupants warm their car before leaving for work or to run an errand. With the increase use of remote starters many of these individuals are engaging their vehicle without visual contact. This creates a potential for the migration of carbon monoxide to the living quarters, even if this amount is not in a lethal range it will be in range to initiate a response from the CO detector, thereby, requiring a response from the local fire department. A response to requires fire fighters and equipment and incurs costs. It also places a responding company in emergency mode while responding increasing the risks to those fire fighters and other drivers at an increased risk. If the fire service downgrades responses to CO alarms then we risk the potential of placing citizens at risk who are truly experiencing a CO emergency. The argument is not to remove the detectors but to place an added protection of a self closing door between the living quarters and the garage.

Even if an individual does not believe that Carbon Monoxide is a true threat there are additional products of combustion that are far deadlier than CO. Hydrogen Cyanide is increasingly being identified as a potential life hazard in fire incidents. In a report published by the Cyanide Poisoning Treatment Coalition, it is reported when the National Institute of Occupational Safety and Health completed their studies of the tragic Station Night Club fire in Warick, RI they found "Within seconds of the ignition of the fire, concentrations of the toxic products carbon monoxide and hydrogen cyanide soared and oxygen levels plummeted to create conditions incompatible with sustaining life"[1]. The report noted "that hydrogen cyanide is approximately 35 times more toxic than carbon monoxide during acute exposure". In tests conducted and referenced by the report, "a series of experiments the Swedish National Testing and Research Institute (SNTRI), assessed the emission of hydrogen cyanide and carbon monoxide under both non-flaming (i.e. pyrolizing) and flaming (i.e. fire) conditions during burning of wool, nylon, synthetic rubber, melamine, and polyurethane foam. The results show that all of these substances liberated high quantities of cyanide when burned-particularly under pyrolizing conditions characterized by low oxygen". If we take a step back and look at most garages, when the garage door is closed, they are box structures that will allow smoke and the by-products of a fire to travel in the least restrictive path, the open door. An open door between the garage and living quarters allows the easy access for the highly toxic by-products of combustion.

To summarize, deadly by-products of combustion, accidental carbon monoxide poisonings from vehicles and needless nuisance alarms are strong, and compelling, arguments to support this code change proposal requiring self closing doors between the garage and living areas in one and two-family homes.

[1] *Smoke Perceptions, Myths and Misunderstandings*, Cyanide Poisoning Treatment Coalition

Cost Impact: The code change proposal will minimally increase costs of construction.

ICCFILENAME: DECRANE-RB-3-R302.5.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There is no data presented to substantiate the need for the door closer. This is a fire-rated door in a non-rated wall assembly and there is no reason for sealing or a closer. Other doors are permitted without a closer. The owner can disable this manually upon the certificate of occupancy.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This item is on the agenda for individual consideration because the proposal received a successful assembly action and public comments were submitted. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.

Public Comment 1:

George Kellogg, City of Rocklin, representing The Sacramento Valley Association of Building Officials, requests Approval as Submitted.

Commenter's Reason: In disapproving this proposed code change the committee mentioned three general areas of concern that included lack of substantiation for the closure, a separation that has no special significance, and a safety device that can be disable. The proposal would have added the requirement for a self closing device to a door between an attached garage and a dwelling unit. From personal experience, in forensic follow up on a fire that involved the house-garage separation, I have seen how the assembly of the old UBC, that included a self closing door, performed. The assembly performed well, slowing the fire that started in the attached garage, allowing the fire department time to arrive and save the residence. The fire had spread though a fixture into the attic but was stopped at the wall between the garage and the kitchen which included a closed fire door. Eventual fire breaching occurred at the ceiling openings rather than the door. Bottom line here is that the rated closed door made a real difference. That someone can disable a safety device should never be a reason for not providing it in the first place. Regarding the committee's comment that other doors are permitted without a closer, I hope no one is mistaking other doors in a residence as being the same situation as the door between the garage and the house. The code itself in the present form makes specific requirements for this door in the separation between the garage and dwelling unit.

Public Comment 2:

Rick Davidson, representing self, requests Disapproval.

Commenter's Reason: This proposal was disapproved by the IRC Committee.

Almost annually, the membership is faced with a proposal to require closers on doors between the house and garage. The membership has consistently voted these proposals down. Primary among the reasons for these proposals being turned down is the lack of any documentation indicating closers on these doors increases the safety of the buildings. In fact, certain legacy codes, including the code on which the IRC was based, did not require closers on these doors and there is no documentation to indicate that homes built under these codes are any less safe than ones that were not.

With this proposal, one argument seems to be the proponents feeling that it "Makes Sense". But what "makes sense" to one person may not "make sense" to someone else. Code changes should be based on need supported with necessary documentation, not just on whimsy.

As is sometimes the case, anecdotal testimony is given to support proposals. But anecdotal testimony is not credible if it is not backed up by studies, statistics and research. There is almost always an equal amount of anecdotal evidence to suggest the contrary.

In this case, it has been argued without substantiation that people will throw open the door to a garage fire and leave it open and allowing the fire to spread into the house. For years the fire service has taught that whenever someone suspects a fire on another side of a door that they should feel the temperature of the door and not open it if they believe there is a fire on the other side. Has this teaching gone by the wayside?

This door will ordinarily be closed for security or to keep out heat or cold. Most people understand the concept of containing a fire in a garage and will close the door if, for some reason, they had opened it.

The code does not require a fire separation between the dwelling and garage. It only requires that gypsum board be placed on the garage side of the wall between the house and garage. Gypsum board joints are not required to be treated. Doors between the house and garage are not required to be rated. The proposal requires that these non-rated doors have ***self-closing*** devices. The term as it is applied here is undefined. Remember, these are not rated doors. A self closing device could mean spring hinges or it could mean a screen door spring or a rope, pulley, and a weight. There is no guidance in the language to encourage uniform enforcement. The language doesn't state that the self-closing device must be "approved". Therefore the building owner is fully within their rights to use whatever type of closer will slam the door shut.

And, the argument is made that the door is necessary to stem the flow of carbon monoxide into the home when cars are started in a garage to warm up and more than half of the space given to the argument focuses on carbon monoxide. Testimony was given at the Baltimore hearings that cold engines give off more carbon monoxide adding more danger. This is all anecdotal testimony.

The amount of carbon monoxide given off by cold engines is overstated. According to the US Environmental Protection Agency and in recognition of the fact that cold engines give off more CO, the 1990 Clean Air Act calls for 1994 and later cars and light trucks to meet federal carbon monoxide standards at 20 degrees Fahrenheit whereas the old rules required those standards be met at 75 degrees Fahrenheit. So the risk of increased CO levels emitting from cold engines is significantly reduced. Additionally, new car engines warm quickly reducing the time when any elevated levels of CO may occur.

Furthermore, following are excerpts from an article entitled:

The Role of Catalytic Converters in Automobile Carbon Monoxide Poisoning[*] A Case Report by Bradley Vossberg, MD and Judah Skolnick, MD, FCCP
[*] From the Frazier Rehab Center, Jewish Hospital Health Network, Louisville, KY.

> *Inhaling motor vehicle exhaust fumes is a common method used by people attempting to commit suicide; however, the decreased carbon monoxide concentrations found in the exhaust of late-model automobiles equipped with catalytic converters are changing the clinical presentation of exhaust inhalation.*
>
> *Closed-environment exposure to MVEGE from automobiles not equipped with catalytic converters can result in death within 30 min. The introduction of catalytic converters beginning with 1975 new-car models dropped CO emission rates to 6.00 g/min. By 1989, the average new-car CO emission at idling was 0.22 g/min. The catalytic conversion process removes CO, hydrocarbons, and nitrogen oxide; the resultant emission is a more desirable mixture of nitrogen, CO_2, and water.* ***Contemporary three-way catalytic converters eliminate > 99% of CO emissions.***
>
> *Given the increased efficiency of modern catalytic converters, patients presenting with closed-environment MVEGE exposure may have much lower HbCO levels than would have been previously expected; in some cases, the HbCO level may be normal. Other important factors to be considered are the role of supplemental O_2 given at the scene and the time taken to obtain the HbCO level.*

More findings related to carbon monoxide poisoning can be found in a technical paper entitled "***Reducing the Risk of Accidental Death Due to Vehicle-Related Carbon Monoxide Poisoning***" by **Linsey C. Marr, Glenn C. Morrison, William W. Nazaroff, and Robert A. Harley,** *Department of Civil and Environmental Engineering, University of California, Berkeley, California.* This technical paper reports on studies and analysis of computer modeling undertaken to determine the risk of death from CO poisoning in homes and garages from automobile exhaust. Among the findings: "The risk of death ranged from 16-21% for a 3-hr exposure ***in*** a garage to 0% for a 1-hr exposure in a house."

With any study with so many variables, one can question the validity of the study. This one is no different. Among the difficulties in modeling the conditions were numerous variables including:

- Age and condition of the motor vehicle
- Air exchange rates for the garage and dwelling
- Size of the garage and dwelling
- Length of time the vehicle is running
- Amount of fuel in the fuel tank
- Age and health of the individual
- Temperature and weather conditions
- Newer vehicles have more effective catalytic converters
- Socioeconomic factors may result in older, less efficient vehicles stored outside or garages with higher air exchange rates

But the study was based on very conservative conditions and it was pointed out that the risks may actually be overestimated.

The study points out that unintentional CO deaths from automobiles do occur. But most all of these deaths occurred ***in*** the garage. The most frequent cause of CO deaths were a driving into a garage (often under the influence of alcohol or drugs) and leaving the engine running (42% of deaths) and starting the car to perform vehicle maintenance (25%) or to provide heat (23%).

Importantly, the study points out that even these deaths are dropping at a rate of about 7% a year as older vehicles are replaced by newer, more efficient ones. In fact, in the technical paper by **M. Shelef** titled "***Unanticipated benefits of automotive emission control: Reduction in fatalities by motor vehicle exhaust gas***" SAE Technical Paper No. 922335, Society of Automotive Engineers: Warrendale, PA, 1992, Shelef argued that reducing CO poisoning deaths may be the biggest benefit from current motor vehicle emission control programs, even though the programs are motivated by concentration standards for outside air.

After reading the various reports and studies on automobile carbon monoxide emissions, it is difficult to come to any conclusion that automobile generated carbon monoxide creates any sort of hazard in the home that would be mitigated by putting closers on garage doors and the proponent has provided no statistical evidence that it does.

But beyond that, it is necessary to look at what you are asked to believe is common practice. That is that a home occupant would start their car parked in a cold garage, go into the home leaving the door open, and allow the carbon monoxide as well as the noise and cold air to enter the house unabated and ignored. Then you are further led to believe that the homeowner would allow this to happen long enough for carbon monoxide levels to build to dangerous levels all the while forgetting why they started the automobile in the first place. This is a fairy tale.

I suggest that people will not leave the door to a frigid garage open, they will not want the cold air and noise to infiltrate their home, and they will not leave the automobile running for extended periods of time but will continue on with whatever caused them to start the automobile in the first place.

Last, the argument is made that the door is necessary to protect the occupants of the dwelling from hydrogen cyanide. The example is then given of the Station Night Club fire and the deaths that resulted from that tragedy. But comparing the circumstances surrounding an old overcrowded night club and a new dwelling are like comparing apples and horse shoes. They are two different types of structures housing two different occupancies.

Homes have multiple smoke alarms. If a fire occurs in a garage and smoke enters the home by whatever means, the smoke alarms would sound allowing the occupants to exit. There is no technical data to support the notion that a garage door would frequently be left open and that fires spread into dwellings through these open doors.

As code officials, we are morally and ethically obligated to explain to a homeowner why a code requirement exists. How can we, with any honesty, tell a homeowner that they must comply with a rule that has no basis in fact? It "makes sense" that we shouldn't require the public to spend money to correct a problem that doesn't exist. Please support the IRC Committee's action for disapproval.

Final Action: AS AM AMPC____ D

RB31-09/10
R302.7 (New), R502.14 (New), Table R502.14 (New)

Proposed Change as Submitted

Proponent: Dennis Pitts, American Forest and Paper Association

Add new text and table as follows:

R302.7 Floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard ceiling membrane.

Exception:

1. Floor assemblies protected by an automatic sprinkler system in accordance with NFPA13, NFPA 13R, NFPA13D, or Section R313.
2. Floor assemblies having a minimum fire resistance of 15 minutes, supporting at least 50% of the full design load, and complying with one of the following:
   2.1. Tested in accordance with ASTM E119 or UL 263, or;
   2.2. Determined in accordance with *International Building Code* Section 721.
3. Floor assemblies located directly over a crawl space.
4. Floor assemblies complying with Section R502.14.
5. A portion of a floor assembly area not greater than 100 square feet per story.

R502.14 Fire resistant assemblies. Wood floor assemblies shall comply with the provisions of Section R302.7 or any one of the following:
1. Wood floor assemblies using dimension lumber equal to or greater than 2 inches in thickness by 8 inches in width, nominal.
2. Wood floor assemblies using structural composite lumber, complying with ASTM D5456, equal to or greater than 1 ½” in thickness by 7 ¼” in width.
3. Wood floor assemblies having a minimum fire resistance time of 15 minutes determined from any of the following options or the sum of the times from any combination thereof:
   3.1. Time assigned to a ceiling membrane or membranes in Table 502.14.
   3.2. Finish rating time for a ceiling membrane not listed in 502.14.
   3.3. Time to structural failure of framing members, supporting at least 50% of the full design load, and complying with one of the following:
      3.3.1. Tested in accordance with ASTM E119 or UL 263, or;
      3.3.2. Determined in accordance with *International Building Code* Section 721.

TABLE R502.14
TIME ASSIGNED TO CEILING MEMBRANES

DESCRIPTION OF FINISH	TIME (MINUTES)[A]
3/8” gypsum *board*	*10*
½” gypsum board	*15*
5/8” gypsum board	20
½” Type X gypsum board	25
5/8” Type X gypsum board	40
Double 3/8” gypsum board	25
3/8” wood structural panel	5
½” wood structural panel	10
5/8” wood structural panel	15

a. Times for individual membranes are additive.

Reason: The fire service has asked for minimum fire resistance of floor/ceiling systems equivalent to 2x lumber floor construction. The basis of the requirements assume that a floor/ceiling assembly constructed using 2x lumber and loaded to 50% of full design load will provide 15 minutes of structural fire resistance as confirmed by recent UL testing reported in *Structural Stability of Engineered Lumber in Fire Conditions*.

The proposed R302.7 provides a simple method of meeting this 15 minute requirement for all floor assemblies by requiring ½” gypsum wallboard as a protective ceiling membrane. Exceptions to this requirement are provided.

The proposed R502.14 provides additional methods of meeting this 15 minute requirement for wood floor framing, including different options for ceiling membrane protection recognized in IBC 721.6, finish ratings from approved ASTM E119 test reports, fire test results from ASTM E119 tests, structural fire resistance calculations per IBC 721.1, or any combination of these provisions.

The proposed Table R502.14 is taken from IBC Table 721.6.2(1).

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: PITTS-RB-3-R302.7-R502.14

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee feels this is a good start and the proponent should work with the proponents of RB85-09/10 through RB88-09/10 to bring back a solution that protects the firefighters and the occupants. The modification that was ruled out of order would be a good basis to begin for rework and bring back. There should be ways other than fire-rating to achieve the solution. Also, this change would force the use of dimensional lumber.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jonathan Humble, AIA, American Iron & Steel Institute, representing American Iron and Steel Institute and Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.7 Floor separation. Floor assemblies within dwelling units shall have a minimum of ½ inch (12.7 mm) gypsum board applied to the underside of the framing members in accordance with R702.3, when not required elsewhere in this code. This provision shall not supersede Sections R302.3, R302.4 or R302.5 where fire resistance ratings or greater thicknesses of gypsum board are required. Penetrations through the gypsum board shall be allowed for stairways, ducting, piping, and electrical and telecommunications outlet boxes, wiring and conduits.

Exceptions:

1. Floor assemblies located over crawl spaces, where the crawl space does not contain mechanical equipment or water heater(s).
2. Dwellings protected with an automatic sprinkler system designed and installed in accordance with NFPA 13D or in accordance with Section P2904.

(Renumber remaining sections)

Commenter's Reason: We propose to modify the original proposal with a product and provision neutral approach to code enforcement. At the 2009 code hearings there were five (5) proposals on the same subject. Each had their own spin on the approach to a design which would accomplish the goal of providing the fire service with some separation of spaces from spaces where framing members that are normally exposed in dwellings today. In this case that separation is gypsum board, not unlike the protection outlined in IRC Section R302.6. Unfortunately, it was the number of variations and subsequent opinions of preference which convinced the code development committee to recommend disapproval for all five of those proposals (e.g. RB31, RB85, RB86, RB87, and RB88).

The modification acts on the following aspects:

Title:
The title chosen is "floor separation" which more appropriately describes the intent.

Neutral Approach:
The modification before you attempts to neutralize those original opinions by focusing on the basic applications necessary for that separation. The modification is product neutral, meaning it applies to all light frame constructions without exception. In addition, the provision is proposed for inclusion into Chapter 3 which further retains that neutrality.

Coordination:
The modification coordinates the other provisions which require gypsum board by referencing the specific sections and the priority, in the second sentence.

Penetrations:
The modification also addresses the impact of stairs, ducting, piping and electrical wiring and conduit penetrating the gypsum board ceiling, in the third sentence.

Exceptions
The modification includes only those exceptions that were found to be a common theme amongst the five original proposals, and practical for this application.

Public Comment 2:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.7 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard membrane, 5/8 inch (15.9 mm) wood structural panel membrane, or equivalent on the underside of light frame construction, steel bar joists and wood chord / metal web joists.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, NFPA 13R or NFPA 13.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.

NFPA 13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height.

Commenter's Reason: RB31-09/10 merely proposes to require a minimum of ½" gypsum wallboard, or equivalent on all unprotected floor assemblies with exceptions for sprinklered buildings, certain crawlspaces and other limited areas that would otherwise be difficult to cover due to obstructions. SBCA's position on this subject is to provide a requirement that applies equally to all building component types and does not provide a competitive advantage to specific types of construction where they would be exempt from the requirements.

The following link shows statistics of firefighter deaths. It is a global report that shows all firefighter deaths and their causes from 1980-2008. This report shows that less than 5% of all firefighter deaths occur from injuries sustained in structural collapses. http://www.sbcindustry.com/images/fire/firefatalstats.pdf

The following spreadsheet is a list of NIOSH reports showing firefighter fatalities that involved a structural collapse. Of those reports, 11 involved firefighter deaths from the collapse of solid sawn lightweight construction and 9 (with potentially 2 more) involved I-joists, MPC wood trusses, and steel trusses combined. This shows that there is no compelling evidence to suggest that engineered products are any more dangerous than solid sawn materials in real fire situations.
Links to the full NIOSH reports are included for more details.

NIOSH Report date	Construction	SBCs	State	Fatality #	NIOSH Report # (link)
4/4/2008	Solid Sawn 2x10- Floor collapse		OH	2	F2008-09
7/5/2008	Brick parapet wall collapse		TX	1	F2008-21
7/22/2008	Solid Sawn - Floor collapse		IL	1	F2008-26
1/26/2007		I-Joist- Floor collapse	TN		F2007-07
2/4/2007	Canapy collapse on garage - traditional wooden construction		PA	2	F2007-08
2/21/2006	Wall collapse-ordinary construction		AL	2	F2006-07
6/25/2006		I-Joist Floor collapse	IN	1	F2006-24
8/13/2006		I-Joist/Floor trusses - Floor collapse	WI	1	F2006-26
12/30/2006	Collapsed awning- 2x4 framing lumber		TX	1	F2007-01
2/19/2005	Solid Sawn roof collapse (wood framed building		TX	1	F2005-09
1/9/2004	Solid sawn - floor collapse		PA	1	F2004-05
4/8/2004	Brick façade collapse		TN	1	F2004-37
1/20/2003	Crushed by concealed chimney - balloon frame		PA	1	F2003-04
6/15/2003		Open web steel truss- roof collapse	TN	2	F2003-18
2/11/2002	Brick veneer collapsed. Wood frame platform construction		TX	1	F2002-07
3/4/2002	Wood frame w/masonry veneer - floor collapse		NC	1	F2002-11

NIOSH Report date	Construction	SBCs	State	Fatality #	NIOSH Report # (link)
3/7/2002		LW Pre-engineered trusses w plywood sheathing & various floor coverings	NY	2	F2002-06
7/4/2002	Duplex -twin frame of a balloon frame - roof collapse		NJ	3	F2002-32
9/14/2002	Balloon frame- roof collapse		IA	1	F2002-40
9/30/2002	Parapet wall collapse		IN	1	F2002-44
11/1/2002	Exterior wall collapse- balloon frame		PA	1	F2002-49
11/25/2002	2x10s heavy timber roof - collapse		OR	3	F2002-50
2/25/2001	Wall collapse-ordinary construction		WI	1	F2001-09
3/8/2001		MPC wood trusses - floor collapse	OH	1	F2001-16
3/18/2001	2nd floor collapse - unspecified construction		MO	2	F2001-15
6/16/2001		MPC roof trusses-roof collapse	SC	1	F2001-27
2/14/2000		MPC roof trusses-roof collapse - McDonalds	TX	2	F2000-13
4/20/2000		MPC floor trusses- floor collapse	AL	1	F2000-26
12/28/2000		MPC roof trusses-roof collapse	AR	4 injured	F2001-03
1/10/1999	Balloon frame- roof collapse (singled our balloon framing in notes of action)		CA	1	99-F03
1/19/1999	Chimney Collapse - fire investigator		NY	1	99-F06
3/8/1998		Wooden truss roof collapse (unsure if SBC)	CA	1	98-F07
6/5/1998	2nd level collapse - wood frame		NY	2 and 4 seriously injured	98-F17
6/11/1998	Roof porch collapse - tin roofing supported by 4 colums		VA	1	98-F18
9/5/1998	Parapet wall collapse - heavy wood truss construction		VT	1	98-F20
8/29/1998	2x10s roof - collapse		MS	2	98-F21
12/31/1998	Balloon frame walls & heavy wood gabled roof - roof collapse		GA	1	99-F04
2/17/1997	Wood framing - floor collapse		KY	1	97-04
3/18/1996		Roof trusses 2x6 collapse - not sure if SBCs	VA	2	96-17
Total:	11	9 (with potential 2 more)			

Public Comment 3:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.7 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard membrane, 5/8 inch (15.9 mm) wood structural panel membrane, or equivalent on the underside of light frame construction, steel bar joists and wood chord/steel web joists.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, NFPA 13R or NFPA 13.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Solid sawn wood joists of at least 2x10 nominal.
5. Metal Plate Connected Wood trusses

NFPA 13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height.

Commenter's Reason: This public comment merely proposes to require a minimum of ½" gypsum wallboard, or equivalent on all unprotected floor assemblies with exceptions for sprinklered buildings, certain crawlspaces and other limited areas that would otherwise be difficult to cover due to obstructions. In addition, solid sawn 2x10 lumber and MPC Wood Trusses are exempted. SBCA's position on this subject is to provide a requirement that applies equally to all building component types and does not provide a competitive advantage to specific types of construction where they would be exempt from the requirements. Recognizing that this may not be possible, this comment offers a compromise where those products that survive the longest in fires are exempted.

Final Action: AS AM AMPC____ D

RB35-09/10

R302.11, M1501.2 (New)

Proposed Change as Submitted

Proponent: Julius Ballanco, PE, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies, Inc.

1. Revise as follows:

R302.11 Fireblocking. In combustible construction, fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top *story* and the roof space.

Fireblocking shall be provided in wood-frame construction in the following locations:

1. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs, as follows:
   1.1. Vertically at the ceiling and floor levels.
   1.2. Horizontally at intervals not exceeding 10 feet(3048 mm).
2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.
3. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section R302.7.
4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an *approved* material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E 136 requirements.
5. For the fireblocking of chimneys and fireplaces, see Section R1003.19.
6. Fireblocking of cornices of a two-family *dwelling* is required at the line of *dwelling unit* separation.
7. At penetrations of walls by dryer exhaust duct at the dryer location in accordance with Section M1501.2.

2. Add new text as follows:

M1501.2 Dryer exhaust duct penetrations. Where a clothes dryer exhaust duct is located within a framed wall, the penetration of the wall membrane at the location of the dryer shall have the annular space sealed with noncombustible material, approved fire caulking, or a noncombustible dryer exhaust duct wall receptacle.

Reason: This change corrects the concerns expressed during the last cycle. I have modified the proposed change to remove penetration of rated walls, since such penetrations are not permitted by the Code. The remaining issues have been addressed as suggested by the Code Committee.

The difference between a dyer exhaust duct penetration and other penetration is that it is in close proximity to a fuel fired appliance or electric heating appliance. Dryers are more prone to fire than other appliances. To protect the structure, it is important to have a higher level of protection.

The language in this change is consistent with the requirements found in the International Mechanical Code.

The CPSC identified 15,600 fires associated with dryers in a single year. Studies have shown that metal ducts protect the structure from the spread of fire. Additionally, noncombustible material or fire caulk around the annular space prevents the fire from spreading into the wall or ceiling cavity. The same can be accomplished with manufactured noncombustible receptacles. The noncombustible receptacles also allow for the proper storage and recoil of the transition flexible duct to a metal duct.

Cost Impact: The code change proposal may increase the cost of construction.

ICCFILENAME: BALLANCO-RB-1-R302.11

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels this is product driven and it would limit the options available to seal around the dryer duct exhaust. This change would require protection around a penetration in a non-rated wall assembly.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julius Ballanco, PE, JB Engineering and Code Consulting P.C., representing In-O-Vate Technologies, Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R302.11 Fireblocking. In combustible construction, fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top *story* and the roof space.

Fireblocking shall be provided in wood-frame construction in the following locations:

1. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs, as follows:
   1.1. Vertically at the ceiling and floor levels.
   1.2. Horizontally at intervals not exceeding 10 feet (3048 mm).
2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.
3. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section R302.7.
4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an *approved* material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E 136 requirements.
5. For the fireblocking of chimneys and fireplaces, see Section R1003.19.
6. Fireblocking of cornices of a two-family *dwelling* is required at the line of *dwelling unit* separation.
7. At penetrations of walls by dryer exhaust duct at the dryer location in accordance with Section M1501.2.

M1501.2 Dryer exhaust duct penetrations. Where a clothes dryer exhaust duct is located within a combustible framed wall, the penetration of the wall membrane at the location of the dryer shall have the annular space sealed with one of the following methods or materials:

1. ~~with~~ N~~n~~oncombustible material,
2. A~~a~~pproved fire caulking, putty, or foam,
3. ~~or a~~ A noncombustible dryer exhaust duct wall receptacle
4. 2 inch nominal lumber isolating the wall cavity space above the penetration.

Commenter's Reason: The Committee thought the original proposal did not include all of the available options. The modification adds the option of firestopping with 2 inch nominal lumber. This is a current method that should be maintained. The fire caulking has also been expanded to include putty or foam.

There was also concern that this would prohibit plastic dryer boxes. This modification would clarify that plastic boxes could be installed. The wall cavity above the plastic box would have to be isolated with 2 inch nominal lumber above the box, or fire caulk, putty, or foam could be added above the plastic box.

Final Action: AS AM AMPC____ D

RB38-09/10
R305.1

Proposed Change as Submitted

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

R305.1 Minimum height. Habitable space, hallways, ~~bathrooms, toilet rooms,~~ laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). <u>Bathrooms and toilet rooms shall have a ceiling height of not less than 6 feet 8 inches (2036 mm) including above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead in showers or tubs equipped with showerheads.</u>

Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
2. ~~Bathrooms shall have a minimum ceiling height of 6 feet 8 inches (2036 mm) at the center of the front clearance area for fixtures as shown in Figure R307.1. The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a minimum ceiling height of 6 feet 8 inches (2036 mm) above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.~~
<u>2.</u> <u>The ceiling height above water closets and lavatories shall be permitted to be of any height.</u>

Reason: First section R305.1 sets a minimum ceiling height for bathrooms and toilet rooms at 7 feet. Then Exception 2 reduces that ceiling height in bathrooms (but not toilet rooms) to 6'8" at the center of the front clearance area for fixtures shown in Figure R307.1 and in tubs and showers with showerheads. It is safe to assume that toilet rooms should have been included in this section. It is probably also safe to assume that ceiling heights in bathrooms and toilet rooms need only be 6'8" at any location in the room, not just in the most used areas of the room. It isn't reasonable to think that the ceiling heights in these rooms should be 7 feet but only 6'8" near the fixtures, but this is what the text implies. Since bathrooms and toilet rooms do not have "required floor areas" but rather "clearance area for fixtures", Exception 1 does not apply to bathrooms and toilet rooms. That exception only applies to required floor area. Therefore, Exception 2 is really not an exception to the charging language but is the charging language and should not be in an exception. This proposal corrects that flaw.

The third exception that states "The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose" is unenforceable and any attempt at enforcement would be arbitrary. It is unenforceable because "capable of being used for its intended purpose" is not defined and is subject to discretionary action. The converse would be what ceiling height is acceptable over a water closet? Is 5 feet acceptable? What about 5 ½ feet? Or, 6 feet? And, if in your opinion an acceptable height is 6 feet and you encounter a situation where the height is 5 ½ feet, how do you enforce your opinion? If it can't be enforced it shouldn't be in the code. There is no basis on which to write a correction order no matter what the height above the fixtures is. The language will result in a lack of uniformity. It will lead to confusion as to what is an acceptable height. It will create conflicts between building departments, contractors, and homeowners. The proposed language specifically calls out water closets and lavatories because those are the only fixtures illustrated in Figure 307.1 besides tubs/showers and there are specific height requirements for tub/showers that are retained. Because of the reasons stated and because the market will likely dictate what an acceptable height is, this proposal deletes the offending language and permits the homeowner to decide what height is most appropriate.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DAVIDSON-RB-6-R305.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that this change will cause confusion and would permit a ceiling height that is unusable.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rick Davidson, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows

R305.1 Minimum height. Habitable space, hallways, laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms and toilet rooms shall have a ceiling height of not less than 6 feet 8 inches (2036 mm) including above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead in showers or tubs equipped with showerheads.

Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet 2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
2. ~~The ceiling height above water closets and lavatories shall be permitted to be of any height~~
2. The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose.

Commenter's Reason: The current language creates an odd set of circumstances for bathrooms and toilet rooms in that it first requires that ceiling height in these rooms are 7 feet. Then by exception #2, the ceiling height is reduced to 6 feet 8 inches "at the center of the front clearance area for fixtures". Read literally, one could reduce the ceiling height in the most used areas of the room to 6 feet 8 inches but the remainder and least used spaces would need to be 7 feet. Clearly the intent is to permit the entire area within bathrooms and toilet rooms to have ceiling heights of 6 feet 8 inches.

There was concern expressed at the Baltimore hearings how the rules for sloped ceilings would be impacted by this change. However, the rules relating to sloped ceilings only apply to rooms that have a required floor area, such as a bedroom. Bathrooms and toilet rooms do not have a required floor area, only clearance area at the fixtures.

There was also concern that deleting the remaining portion of exception #2 that references ceiling heights at fixtures would leave the ceiling height above fixtures unregulated. To eliminate that concern, the current language is retained.

The net result of this code change is that it permits ceiling heights in all bathrooms and toilet rooms to be 6 feet 8 inches throughout the room and not just in front of the fixtures and continues to regulate the height above fixtures by permitting it to be of a height capable of being used.

Public Comment 2:

Rick Davidson, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R305.1 Minimum height. Habitable space, hallways, bathrooms, toilet rooms~~,~~ laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). ~~Bathrooms and toilet rooms shall have a ceiling height of not less than 6 feet 8 inches (2036 mm) including above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead in showers or tubs equipped with showerheads.~~

Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
2. ~~The ceiling height above water closets and lavatories shall be permitted to be of any height.~~
2. Bathrooms shall have a minimum ceiling height of 6 feet 8 inches (2036 mm) at the center of the front clearance area for fixtures as shown in Figure R307.1. The ceiling height above water closets, bathtubs without showerheads and lavatories shall be permitted to be of any height. A shower or tub equipped with a showerhead shall have a minimum ceiling height of 6 feet 8 inches (2036 mm) above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.

Commenter's Reason: This modification addresses only the matter of the ceiling height above fixtures. The **proposal** states that the ceiling height above water closets, bathtubs without showerheads, and lavatories can be of any height. The committee disapproved this proposal because they said it "would cause confusion and would permit a ceiling height that is unusable." Is the proposed language confusing? It simply states that the ceiling height above certain fixtures can be of any height. The language is clear. There is no confusion. Would it permit a ceiling height that is unusable? That question could be answered with a question. Would someone spend the money to design and construct a bathroom with unusable fixtures? Not likely.

Can we enforce what we have? Is the current language confusing? Would it permit a ceiling height that is unusable?

Current language in the code states that the "ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose." This language is unenforceable as it relies on the physical stature of the user, the posture of the user, and how the fixture is used to determine what height is sufficient. But those limitations are moving targets and are limitless in their combination. It is therefore impossible to plan check a plan with a lowered ceiling height above a fixture. If one were to attempt to do so, what height is acceptable? Would the field inspector agree? The building department could adopt a policy but policies can't be enforced in court. The must be based on some type of physiologic evidence. It is unknown if there exists a study on the amount of ceiling height that is needed for a six foot male while sitting on a water closet, presuming the water closet would only be sat on by a male. So is the current language confusing? It certainly is.

The reason why the offending language was put into the code was to permit fixtures to be placed in cramped locations, most often in remodeled homes. The only thing this proposal changes is that it takes the building department off the hook regarding arguments on the appropriate ceiling height above plumbing fixtures and places that responsibility on the person who will be using the fixtures, the homeowner.

For purposes of uniformity, the proposed amendment provides clearer direction regarding this issue using a language format already found in the code.

Final Action: AS AM AMPC____ D

RB39-09/10
R308.4

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc., representing the Glazing Industry Code Committee (GICC)

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in all fixed and operable panels of swinging, sliding and bifold doors.

   Exceptions:

   1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
   2. Decorative glazing.

2. Glazing in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.

   Exceptions:

   1. Decorative glazing.
   2. When there is an intervening wall or other permanent barrier between the door and the glazing.
   3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position.
   4. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.
   5. Glazing that is adjacent to the fixed panel of patio doors <u>which is not required to be safety glazing by another section</u>.

3. Glazing in an individual fixed or operable panel that meets all of the following conditions:
   3.1. The exposed area of an individual pane is larger than 9 square feet (0.836 m2); and
   3.2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor; and
   3.3. The top edge of the glazing is more than 36 inches (914 mm) above the floor; and
   3.4. One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the glazing.

   Exceptions:

   1. Decorative glazing.
   2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965) above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in cross sectional height.
   3. Outboard panes in insulating glass units and other multiple glazed panels when the bottom edge of the glass is 25 feet (7620 mm) or more above *grade*, a roof, walking surfaces or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.

4. All glazing in railings regardless of area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
5. Glazing in enclosures for or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.

   Exception: Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the waters edge of a hot tub, whirlpool or bathtub.

6. Glazing in walls and fences adjacent to indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm), measured horizontally and in a straight line, of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
7. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

   Exceptions:

   1. When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in cross sectional height.
   2. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.7.6 and R312 and the plane of the glazing is more than 18 inches (457 mm) from the railing; or
   3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a *guard*.

8. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glazing is less than 60 inches (1524 mm) above the nose of the tread.

   Exceptions:

   1. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.7.6 and R312 and the plane of the glass is more than 18 inches (457 mm) from the railing; or
   2. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (864 mm) to 36 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a *guard*.

Reason: After several attempts, Exception #5 was added to the 2009 Edition of the IBC. The rationale submitted in RB42-07/08 was that "it is unlikely that the sliding doors will be reversed by the owner and people are familiar with their home environments." There was not corresponding proposal submitted to address eh issue in the same manner within dwelling units covered by the IBC.

The original rationale is flawed for the following reasons:

1. The new language "patio doors" instead of the original language "sliding doors" extends the application to far more doors.
2. The assumption that the people are familiar with their home environment does not take into consideration guests and horseplay activities.
3. The exception is too broad in nature and could be read to override the other provisions. For example, what if the panel is part of a hot tub enclosure? What if the panel is less than 18 inches above the floor?
4. The proponent based the rationale in part on Exception No. 3 but that exception only applies when the wall is perpendicular to the door.

We do not have injury data to support this proposal since historically the panel was required to be safety glazing. However, there was no technical substantiation to the change proposed last cycle to eliminate the requirement for safety glazing.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: KOFFEL-RB-1-R308.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels this change is unnecessary and it contains a circular reference.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee (GICC), requests Approval as Submitted.

Commenter's Reason: R308.4 defines "hazardous locations" and, by doing so, defines where safety glazing must be used. R308.4.2 deals with hazardous locations involving glazing in fixed or operable panels adjacent to doors. Exception #5 to R308.4.2 currently provides that "[g]lazing that is adjacent to the fixed panel of patio doors" are not hazardous and, therefore, exempt from safety glazing requirements. This proposal would limit the applicability of this exemption to those applications where safety glazing is not required by any other provision of R308.4.

This change to exception #5 is needed to ensure that the exception is properly applied. If the proposed language is not added, exception #5 could well be interpreted to eliminate the use of safety glazings in a number of applications where it is otherwise required by R308.4.

For example, what if the glass panel at issue is part of a hot tub enclosure that meets the definition of a hazardous location in R308.4.5? Or, what if the glass panel at issue is less than 18 inches above the floor and otherwise meets the definition of a hazardous location in R308.4.3? In the absence of exception #5, both applications clearly require the use of safety glazing and for very good reasons. However, when exception #5 is applied, it could be interpreted to allow the use of non-safety glazing as part of a hot tub enclosure. Likewise, it could be interpreted to permit non-safety glazing in the panel that is less than 18 above a floor. Adding the proposed language to exception #5 will narrow its application and ensure that, when it is applied, it will not swallow other rules governing where safety glazing must be used.

Historically, exception #5 to R308.4.2 was added to the 2009 Edition of the IRC through RB42-07/08. It was based on the rationale that "it is unlikely that … sliding doors will be reversed by the owner and people are familiar with their home environments." That rationale was, however, flawed for several reasons:

1. The new language "patio doors" instead of the original language "sliding doors" extends the safety glazing exception to far more doors.
2. The assumption that people are familiar with their home environment does not take into consideration guests, rental units, or accidental impacts, for example, resulting from horseplay, that can result in human impact with "[g]lazing that is adjacent to the fixed panel of patio doors."
3. RB42-07/08 was based, in part, on the rationale used to substantiate the existence of exception # 3; however, exception #3 only applies when the wall is perpendicular to the door. Exception #5, as currently written, contains no such limitation.

Given the flawed rationale leading up to the adoption of exception #5 to R308.4.2, its application should be limited to only those situations where it is not in conflict with any other rule governing the use of safety glazing.

Final Action Agenda voters are urged to vote against the standing motion to disapprove in order to vote in favor of a motion to adopt RB39 "As Submitted."

Final Action: AS AM AMPC____ D

RB42-09/10
RB310.1.5

Proposed Change as Submitted

Proponent: Rick Davidson, City of Maple Grove, MN

Add new text as follows:

<u>**R310.1.5 Identification.** Windows installed as an emergency escape and rescue opening and meeting the requirements of Sections R310.1.1 thru R310.1.4 shall be identified as an "Emergency Escape and Rescue Opening". The identification shall be affixed to the frame or glass of the window as to be visible during inspection. The identification shall be of a type which once applied cannot be removed without being destroyed.</u>

Reason: How do confirm that a window has safety glazing? You look for identification. How do you determine the grade of a floor joist? You look for a grade stamp. How do you confirm the R value of an insulation batt? You look for a label. Why, so the component can be identified in the field as meeting a specific standard or requirement. How do you identify whether or not a window meets emergency egress requirements? We might try measure it and then decide if it is compliant or require additional information from the contractor or window supplier. We don't require any identification for windows used as emergency escape and rescue openings like we do with most other building components. This makes it difficult to verify compliance in the field with egress requirements. Manufacturers identify windows that meet egress requirements in their catalogs. That can be verified at plan review. But a disconnect occurs when that window, or one that is close in size, is installed in the field. Field inspectors cannot carry with them the manufactures literature for the dozens or hundreds of window manufacturers. They can only rely on field measurements. Herein lays the problem. There are numerous windows specified by manufacturers as having clear openable areas that meet egress requirements or that are hundredths of a square foot greater or lesser than required. Field inspectors cannot measure these openings to the exactness necessary to determine if windows that are close to meeting requirements are of the appropriate size. We already require windows to be identified for safety glazing and energy compliance reasons. Placing identification on the window that it meets egress requirements will have a minimal increase in cost and will greatly improve timely validation and compliance in the field.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: DAVIDSON-RB-8-R310.1.5

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Based upon the proponent's request for disapproval. The proponent will work with industry on this issue and bring this back later.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Davidson, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows

R310.1.5 Identification. ~~Windows installed as an emergency escape and rescue opening and meeting the requirements of Sections R310.1.1 thru R310.1.4 shall be identified as an "Emergency Escape and Rescue Opening". The identification shall be affixed to the frame or glass of the window as to be visible during inspection. The identification shall be of a type which once applied cannot be removed without being destroyed.~~ <u>Where windows are used to meet the requirements of this section, they shall be provided with a manufacturer's designation or mark that provides one of the following:</u>

<u>1.</u> <u>the net clear opening area, the net clear opening height, and the net clear opening width of the window or</u>
<u>2.</u> <u>shall be identified as meeting emergency escape and rescue requirements with a manufacturer's designation or mark that reads "Emergency Escape and Rescue Opening 5.0 sq. ft" or Emergency Escape and Rescue Opening 5.7 sq. ft." as applicable or similar language to indicate that the window meets the requirements of this section. The manufacturer's designation or mark shall be affixed to the window as to be visible for inspection and shall be of a type which once applied cannot be removed without being destroyed.</u>

Commenter's Reason: It was requested that this proposal be disapproved by the IRC Committee in Baltimore to enable a dialogue to occur with window manufacturers. Concern was expressed by the manufacturer's that identifying windows as "Emergency Escape and Rescue Openings".

It must be pointed out that most window manufacturers' already have statements in their literature that clearly indicate which of their windows meet or exceed national egress requirement.

Some manufacturers already provide a manufacturer's designation or mark. Following are pictures taken of labels found on some window brands that would meet the proposed rule and excerpts from the websites of several manufacturer's that illustrate those points.

Please note that the information from the manufacturers clearly states that their windows meet or exceed national egress requirements. If there truly was a concern about liability, it isn't demonstrated by the information on the manufacturer's own websites and advertising information.

The proposed amendment provides two options for identifying that the window meets egress requirements. The designation or mark may either provide the height, width, and opening dimensions or a statement that it meets either the 5.0 or 5.7 square foot opening requirements. The designation or mark is not required to be a permanent label. The label may be a paper label but must be designed so that it cannot be transferred from one window to another. This will enable the field inspector the ability to approve windows without the need to measure them with the same accuracy as the manufacturer and without the need to perform multiplication of fractional numbers in the field. The terms "manufacturer's designation" and "mark" are defined in the code. The term "once applied cannot be removed without being destroyed" is already used in the code to describe other labels, designations, or marks.

> ***MANUFACTURER'S DESIGNATION.*** *An identification applied on a product by the manufacturer indicating that a product or material complies with a specified standard or set of rules. (See also "Mark" and "Label.")*
>
> ***MARK.*** *An identification applied on a product by the manufacturer indicating the name of the manufacturer and the function of a product or material. (See also "Manufacturer's designation" and "Label.")*

Why can't the field inspector measure the windows in the field? If you review the hundreds of sizes and styles of windows available from dozens of manufacturers, it is apparent that there are thousands of windows that meet or come close to meeting egress requirements. You will find that some windows are exactly 5.7 square feet or 5.0 square feet. And there are others that are just a few hundredths of a square foot more or less. Herein lays the problem. Manufacturers measure window openings to the $1/16^{th}$ or to the hundredths of an inch. This degree of accuracy cannot be achieved in the field. Incorrectly measuring the window size by even a $1/16^{th}$ of an inch can give the impression that a window meets or fails to meet egress requirements when the opposite is true. Validating this takes time and can lead to unnecessary expense and delays. And if one window brand is approved that is just short of meeting minimum standards, the door is open for every other window manufacturer who has a window just slightly below minimum to request the same treatment.

Identifying windows as meeting egress requirements will also provide consumers, contractors, sales people and others concerned about a window used as an emergency escape and rescue opening the information they need to make informed decisions regarding the window without the need to search a catalog or website. It will also help to increase awareness of egress requirements.

The information that would go on the label is already in the manufacture's printed literature. It doesn't require the manufacturer to generate new information. The manufacturer need not indicate that the window complies with egress requirements if they so choose even though their catalogs may already state that certain windows meet national egress requirements.

The code requires labels on windows for energy code compliance and compliance with safety glazing. Almost every building product used today is identified with labels, designations or marks in one way or another. Windows used for egress purposes should be no different.

200 SERIES TILT-WASH DOUBLE-HUNG WINDOWS

Andersen WINDOWS • DOORS

Table of Basic Unit Sizes–Tilt-Wash Double-Hung Windows Scale 1/8" = 1'-0" (1:96)

Grille Patterns: Sunburst, Renaissance*	Circle Top: Unit Dim. Height	Circle Top: Rough Opg. Height
244CT18*	1'-0 5/8" (321)	1'-1 1/8" (333)
244CT20*	1'-2 5/8" (371)	1'-3 1/8" (384)
244CT24	1'-4 5/8" (422)	1'-5 1/8" (435)
244CT28	1'-6 5/8" (473)	1'-7 1/8" (486)
244CT30	1'-8 5/8" (524)	1'-9 1/8" (537)
244CT34	1'-10 5/8" (575)	1'-11 1/8" (587)

*Renaissance pattern not available for 18 or 20 sizes.

- The "Unobstructed Glass" measurement shown for double-hung windows is for single sash only.
- **Rough opening dimensions may need to be increased to allow for use of building wraps, flashing, sill panning, brackets, fasteners or other items.**
- "Unit Dimension" always refers to outside frame to frame dimension.
- Dimensions in parentheses are in millimeters.

† These units meet or exceed the following dimensions: Clear Openable Area of 5.7 sq. ft., Clear Openable Width of 20" and Clear Openable Height of 24".

Tilt-Wash Double-Hung Windows

StormWATCH PROTECTION

Table of Basic Unit Sizes Scale 1/8" = 1'-0" (1:96)

Unit Dimension (height)	Minimum Rough Opening (height)	Unobstructed Glass* (height)	1'-9 5/8" (549)	2'-1 5/8" (651)	2'-5 5/8" (752)	2'-7 5/8" (803)	2'-9 5/8" (854)	2'-11 5/8" (905)	3'-1 5/8" (956)	3'-5 5/8" (1057)	3'-9 5/8" (1159)
Minimum Rough Opening			1'-10 1/8" (562)	2'-2 1/8" (664)	2'-6 1/8" (765)	2'-8 1/8" (816)	2'-10 1/8" (867)	3'-0 1/8" (917)	3'-2 1/8" (968)	3'-6 1/8" (1070)	3'-10 1/8" (1172)
Unobstructed Glass*			15" (381)	19" (483)	23" (584)	25" (635)	27" (686)	29" (737)	31" (787)	35" (889)	39" (991)
3'-0 7/8" (937)	3'-0 7/8" (937)	13 15/16" (354)	TW18210	TW20210	TW24210	TW26210	TW28210	TW210210	TW30210	TW34210	TW38210
3'-4 7/8" (1038)	3'-4 7/8" (1038)	15 15/16" (405)	TW1832	TW2032	TW2432	TW2632	TW2832	TW21032	TW3032	TW3432	TW3832
3'-8 7/8" (1140)	3'-8 7/8" (1140)	17 15/16" (456)	TW1836	TW2036	TW2436	TW2636	TW2836	TW21036	TW3036	TW3436	TW3836
4'-0 7/8" (1241)	4'-0 7/8" (1241)	19 15/16" (506)	TW18310	TW20310	TW24310	TW26310	TW28310	TW210310	TW30310	TW34310	TW38310
4'-4 7/8" (1343)	4'-4 7/8" (1343)	21 15/16" (557)	TW1842	TW2042	TW2442	TW2642	TW2842	TW21042	TW3042	TW3442	TW3842
4'-8 7/8" (1445)	4'-8 7/8" (1445)	23 15/16" (608)	TW1846	TW2046	TW2446	TW2646	TW2846	TW21046	TW3046	TW3446	TW3846
5'-0 7/8" (1546)	5'-0 7/8" (1546)	25 15/16" (659)	TW18410	TW20410	TW24410	TW26410	TW28410	TW210410	TW30410 ♦	TW34410 ♦	TW38410 ♦
5'-4 7/8" (1648)	5'-4 7/8" (1648)	27 15/16" (710)	TW1852	TW2052	TW2452	TW2652	TW2852	TW21052 ♦	TW3052 ♦	TW3452 ♦	TW3852 ♦
5'-8 7/8" (1749)	5'-8 7/8" (1749)	29 15/16" (760)	TW1856	TW2056	TW2456	TW2656	TW2856 ♦	TW21056 ♦	TW3056 ♦	TW3456 ♦	TW3856 ♦
6'-0 7/8" (1851)	6'-0 7/8" (1851)	31 15/16" (811)	TW18510	TW20510	TW24510	TW26510 ♦	TW28510 ♦	TW210510 ♦	TW30510 ♦	TW34510 ♦	TW38510 ♦
6'-4 7/8" (1953)	6'-4 7/8" (1953)	33 15/16" (862)	TW1862	TW2062	TW2462 ♦	TW2662 ♦	TW2862 ♦	TW21062 ♦	TW3062 ♦	TW3462 ♦	TW3862 ♦

To find compatible Circle Top, arch and other shaped windows, see the specialty window section beginning on page 37.

Cottage Style Units

Available for these heights, up to TW3862, in all widths. Contact dealer for lead times.

- * Unobstructed glass height is for single sash only.
- ♦ These units meet or exceed the following dimensions: Clear Openable Area of 5.7 sq. ft., Clear Openable Width of 20" and Clear Openable Height of 24."
- • Rough opening dimensions may need to be increased to allow for use of building wraps, flashing, sill panning, brackets, fasteners or other items. See page 7 for more details.
- • "Unit Dimension" always refers to outside frame to frame dimension.
- • Dimensions in parentheses are in millimeters.
- • When ordering, be sure to specify color desired: White, Sandtone, Terratone® or Forest Green.

NOTE: These sizes with Design Pressure Upgrade are rated at +50/-55.

CASEMENT: TRADITION PLUS WOOD—CLAD WOOD

1-WIDE UNITS

FROM THE JELD-WEN WEB SITE

Bookcode	Sizing		SqFt	LinFt	Divided Lites
	Frame Size	Rough Opening			Lite Pattern
TCC1732	17 X 32	17-3/4 X 32-3/4	3.78	8.17	2W3H
TCC1736	17 X 36	17-3/4 X 36-3/4	4.25	8.83	2W3H
TCC1740	17 X 40	17-3/4 X 40-3/4	4.72	9.50	2W3H
TCC1742	17 X 42	17-3/4 X 42-3/4	4.96	9.83	2W3H
TCC1748	17 X 48	17-3/4 X 48-3/4	5.67	10.83	2W4H
TCC1754	17 X 54	17-3/4 X 54-3/4	6.38	11.83	2W4H
TCC1756	17 X 56	17-3/4 X 56-3/4	6.61	12.17	2W5H
TCC1760	17 X 60	17-3/4 X 60-3/4	7.08	12.83	2W5H
TCC1764	17 X 64	17-3/4 X 64-3/4	7.56	13.50	2W5H
TCC1766	17 X 66	17-3/4 X 66-3/4	7.79	13.83	2W5H
TCC1772	17 X 72	17-3/4 X 72-3/4	8.50	14.83	2W6H
TCC1784 +	17 X 84	17-3/4 X 84-3/4	9.92	16.83	2W7H
TCC2032	20 X 32	20-3/4 X 32-3/4	4.44	8.67	2W3H
TCC2036	20 X 36	20-3/4 X 36-3/4	5.00	9.33	2W3H
TCC2040	[illegible]	[illegible]	[illegible]	[illegible]	2W3H
TCC2042	20 X 42	20-3/4 X 42-3/4	[illegible]	[illegible]	2W3H
TCC2048	20 X 48	20-3/4 X 48-3/4	6.67	11.33	2W4H
TCC2054	20 X 54	[illegible]	[illegible]	12.33	2W4H
TCC2056	20 X 56	[illegible]	7.78	12.67	2W5H
TCC2060	20 X 60	20-3/4 X 60-3/4	8.33	13.33	2W5H
TCC2064	20 X 64	20-3/4 X 64-3/4	8.89	14.00	2W5H
TCC2066	20 X 66	20-3/4 X 66-3/4	9.17	14.33	2W5H
TCC2072	20 X 72	20-3/4 X 72-3/4	10.00	15.33	2W6H
TCC2084	20 X 84	20-3/4 X 84-3/4	11.67	17.33	2W7H
TCC2432	24 X 32	24-3/4 X 32-3/4	5.33	9.33	2W3H
TCC2436	24 X 36	24-3/4 X 36-3/4	6.00	10.00	2W3H
TCC2440	24 X 40	24-3/4 X 40-3/4	6.67	10.67	2W3H
TCC2442	24 X 42	24-3/4 X 42-3/4	7.00	11.00	2W3H
TCC2448	24 X 48	24-3/4 X 48-3/4	8.00	12.00	2W4H
TCC2454	24 X 54	24-3/4 X 54-3/4	9.00	13.00	2W4H
TCC2456	24 X 56	24-3/4 X 56-3/4	9.33	13.33	2W5H
TCC2460	24 X 60	24-3/4 X 60-3/4	10.00	14.00	2W5H
TCC2464	24 X 64	24-3/4 X 64-3/4	10.67	14.67	2W5H
TCC2466	24 X 66	24-3/4 X 66-3/4	11.00	15.00	2W5H
TCC2472	24 X 72	24-3/4 X 72-3/4	12.00	16.00	2W6H
TCC2484	24 X 84	24-3/4 X 84-3/4	14.00	18.00	2W7H
TCC2832	28 X 32	28-3/4 X 32-3/4	6.22	10.00	2W3H
TCC2836	28 X 36	28-3/4 X 36-3/4	7.00	10.67	2W3H
TCC2840	28 X 40	28-3/4 X 40-3/4	7.78	11.33	2W3H
TCC2842	28 X 42	28-3/4 X 42-3/4	8.17	11.67	2W3H
TCC2848	28 X 48	28-3/4 X 48-3/4	9.33	12.67	2W4H
TCC2854	28 X 54	28-3/4 X 54-3/4	10.50	13.67	2W4H
TCC2856	28 X 56	28-3/4 X 56-3/4	10.89	14.00	2W5H
TCC2860	28 X 60	28-3/4 X 60-3/4	11.67	14.67	2W5H
TCC2864	28 X 64	28-3/4 X 64-3/4	12.44	15.33	2W5H
TCC2866	28 X 66	28-3/4 X 66-3/4	12.83	15.67	2W5H
TCC2872	28 X 72	28-3/4 X 72-3/4	14.00	16.67	2W6H
TCC2878	28 X 78	28-3/4 X 78-3/4	15.17	17.67	2W7H
TCC2884 *	28 X 84	28-3/4 X 84-3/4	16.33	18.67	2W7H

+ Tempered Glass Standard
*Stationary Only

Bolded Bookcodes indicate unit meets Egress Requirements for IRC code. State and local egress codes may differ. Always refer to local building codes for complete requirements. Check with local officials to ensure compliance before installing the unit.

CHAPTER 1A

CLAD ULTIMATE CASEMENT (CUCA)
CLAD ULTIMATE PUSH OUT CASEMENT (CUPCA)

Product Information

NOTE:

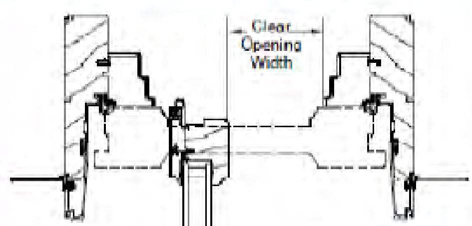
Specifications and technical data are subject to change without notice.
Allow 1/16" (2) tolerance on all measurements.
Metric measurements are shown in parenthesis.
For accessories dimensions and applications see the Accessories section of this manual.
For technical assistance about Marvin products you may call 1-800-346-3363 or visit our website: www.marvin.com.

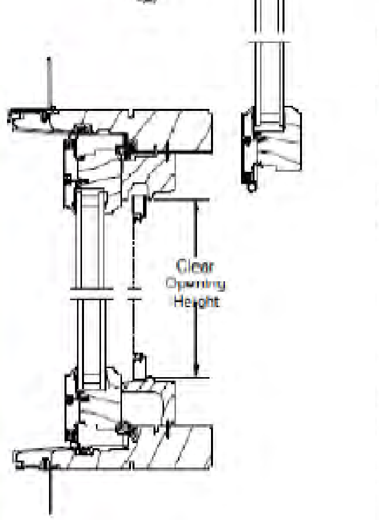
CUCA Hardware:

- Casement operator includes a crank hardware system that allows the window to open to a full 90 degrees with a minimal reduction of egress net clear opening. Single arm operators, steel coated with Egard®. Operation force at handle is 5lbs. or less.
- Casement hinges allow the user the ability to slide the sash across the frame opening so the sash exterior will rotate toward the user for easy washability. Hinges are steel coated with Egard™ and the standard track is stainless steel. Frame OM width of 20" (508) to under 24" (610) use 18" (457) wash/egress hinge. Frame OM width greater than 24" (610) use 22" (559) wash/egress hinge. Frame OM width less than 20" (508) use dyad hinge (dyad hinges do not have special easy washability feature) .

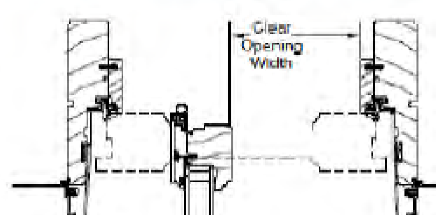
Egress Information

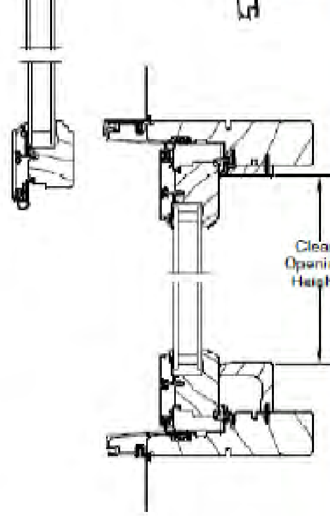
Ultimate Casement - Operator





Ultimate Push Out Casement - Operator





International Building Code - 2003 and 2006
Section 1009 Emergency Escape and Rescue

1009.2 Minimum size: Emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet ($0.53 m^2$). Exception: The minimum net clear opening for emergency escape and rescue openings on the ground level at grade is 5.0 square feet ($0.46 m^2$)

1009.2.1 Minimum dimensions: The minimum net clear opening height dimension shall be 24 inches (610 mm). The net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

1009.3 Maximum height from the floor: Emergency escape and rescue opening shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

1009.4 Operational constraints: Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools. Bars, grilles, grates, or similar devices are permitted to be placed over emergency escape and rescue openings provided the minimum net clear opening size complies with Section 1009.2 and such devices shall be releasable or removable from the inside without the use of a key, tool, or force greater than that which is required for normal operation of the escape and rescue opening.

Code restrictions may vary depending on your local building codes.

2009-07-27

1A.2

11708608
Marvin Architectural Detail Manual

CLAD ULTIMATE CASEMENT

Egress Measurements and Vent Measurements

CUCA Egress and Vent Measurements Operating Casement			Width						
			CN	16	18	20	24	26	28
			OM	16 (406)	18 (457)	20 (508)	24 (610)	26 (660)	28 (711)
Height			Clear Opening	6.40 (163)	8.40 (213)	12.89 (327)	16.89 (429)	18.89 (480)	20.89 (531)
CN	OM	Clear Opening		Square Feet (Square Meters)					
14	13.13 (333)	8 (203)		0.36 (0.03)	0.47 (0.04)	0.72 (0.07)	0.94 (0.09)	1.05 (0.10)	1.16 (0.11)
16	15.13 (384)	10 (254)		0.44 (0.04)	0.58 (0.05)	0.90 (0.08)	1.17 (0.11)	1.31 (0.12)	1.45 (0.14)
18	17.13 (435)	12 (305)		0.53 (0.05)	0.70 (0.07)	1.08 (0.10)	1.41 (0.13)	1.58 (0.15)	1.74 (0.16)
20	19.13 (486)	14 (356)		0.62 (0.06)	0.82 (0.08)	1.25 (0.12)	1.64 (0.15)	1.84 (0.17)	2.03 (0.19)
24	23.13 (587)	18 (457)		0.80 (0.07)	1.05 (0.10)	1.61 (0.15)	2.11 (0.20)	2.36 (0.22)	2.61 (0.24
28	27.13 (689)	22 (559)		0.98 (0.09)	1.28 (0.12)	1.97 (0.18)	2.58 (0.24)	2.89 (0.27)	3.19 (0.30)
32	31.13 (791)	26 (661)		1.16 (0.11)	1.52 (0.14)	2.33 (0.22)	3.05 (0.28)	3.41 (0.32)	3.77 (0.35)
36	35.13 (892)	30 (762)		1.33 (0.12)	1.75 (0.16)	2.68 (0.25)	3.52 (0.33)	3.94 (0.37)	4.35 (0.40)
40	39.13 (994)	34 (864)		1.51 (0.14)	1.98 (0.18)	3.04 (0.28)	3.99 (0.37)	4.46 (0.41)	4.93 (0.46)
44	43.13 (1095)	38 (965)		1.69 (0.16)	2.22 (0.21)	3.40 (0.32)	4.46 (0.41)	4.99 (0.46)	5.51 (0.51)
48	47.13 (1197)	42 (1067)		1.87 (0.17)	2.45 (0.23)	3.76 (0.35)	4.93 (0.46)	5.51 (0.51)	6.09 (0.57)
54	53.13 (1349)	48 (1219)		2.13 (0.20)	2.80 (0.26)	4.30 (0.40)	5.63 (0.52)	6.30 (0.59)	6.96 (0.65)
56	55.13 (1400)	50 (1270)		2.22 (0.21)	2.92 (0.27)	4.48 (0.42)	5.87 (0.54)	6.56 (0.61)	7.25 (0.67)
60	59.13 (1502)	54 (1372)		2.40 (0.22)	3.15 (0.29)	4.83 (0.45)	6.33 (0.59)	7.09 (0.66)	7.84 (0.73)
64	63.13 (1603)	58 (1473)		2.58 (0.24)	3.38 (0.31)	5.19 (0.48)	6.80 (0.63)	7.61 (0.71)	8.42 (0.78)
72	71.13 (1807)	66 (1677)		2.90 (0.27)	3.85 (0.36)	5.91 (0.55)	7.74 (0.72)	8.66 (0.80)	9.58 (0.89)
78	77.13 (1959)	72 (1829)		3.20 (0.30)	4.20 (0.39)	6.45 (0.60)	8.45 (0.78)	9.45 (0.88)	10.45 (0.97)
84	83.13 (2111)	78 (1981)		3.47 (0.32)	4.55 (0.42)	6.98 (0.65)	9.15 (0.85)	10.23 (0.95)	11.32 (1.05)
92	91.13 (2315)	86 (2185)		3.82 (0.36)	5.02 (0.47)	7.70 (0.72)	10.09 (0.94)	11.28 (1.05)	12.48 (1.16)
96	95.13 (2416)	90 (2286)		4.00 (0.37)	5.25 (0.49)	8.06 (0.75)	10.56 (0.98)	11.81 (1.10)	13.06 (1.21)

CUCA Egress and Vent Measurements Operating Casement			Width				
			CN	30	32	36	40
			OM	30 (762)	32 (813)	36 (914)	40 (1016)
Height			Clear Opening	22.80 (581)	24.80 (632)	28.80 (734)	32.80 (835)
CN	OM	Clear Opening		Square Feet (Square Meters)			
14	13.13 (333)	8 (203)		1.27 (0.12)	1.38 (0.13)	1.61 (0.15)	1.83 (0.17)
16	15.13 (384)	10 (254)		1.59 (0.15)	1.73 (0.16)	2.01 (0.19)	2.29 (0.21)
18	17.13 (435)	12 (305)		1.91 (0.18)	2.08 (0.19)	2.41 (0.22)	2.74 (0.25)
20	19.13 (486)	14 (356)		2.23 (0.21)	2.42 (0.21)	2.81 (0.26)	3.20 (0.30)
24	23.13 (587)	18 (457)		2.85 (0.27)	3.11 (0.29)	3.61 (0.34)	4.11 (0.38)
28	27.13 (689)	22 (559)		3.50 (0.33)	3.80 (0.35)	4.42 (0.41)	5.03 (0.47)
32	31.13 (791)	26 (661)		4.13 (0.38)	4.50 (0.42)	5.22 (0.48)	5.94 (0.55)
36	35.13 (892)	30 (762)		4.77 (0.44)	5.19 (0.48)	6.02 (0.56)	.6.85 (0.64)
40	39.13 (994)	34 (864)		5.41 (0.50)	5.88 (0.55)	6.82 (0.63)	7.77 (0.72)
44	43.13 (1095)	38 (965)		6.04 (0.56)	6.57 (0.61)	7.63 (0.71)	8.68 (0.81)
48	47.13 (1197)	42 (1067)		6.68 (0.62)	7.26 (0.67)	8.43 (0.78)	9.60 (0.89)
54	53.13 (1349)	48 (1219)		7.63 (0.71)	8.30 (0.77)	9.63 (0.89)	10.97 (1.02)
56	55.13 (1400)	50 (1270)		7.95 (0.74)	8.64 (0.80)	10.03 (0.93)	11.42 (1.06)
60	59.13 (1502)	54 (1372)		8.59 (0.80)	9.34 (0.87)	10.84 (1.01)	12.34 (1.15)
64	63.13 (1603)	58 (1473)		9.22 (0.86)	10.03 (0.93)	11.64 (1.08)	13.25 (1.23)
72	71.13 (1807)	66 (1677)		10.49 (0.97)	11.41 (1.06)	13.24 (1.23)	15.08 (1.40)
78	77.13 (1959)	72 (1829)		11.45 (1.06)	12.45 (1.16)	14.45 (1.34)	16.45 (1.53)
84	83.13 (2111)	78 (1981)		12.40 (1.15)	13.48 (1.25)	15.65 (1.45)	17.82 (1.66)
92	91.13 (2315)	86 (2185)		13.67 (1.27)	14.87 (1.38)	17.26 (1.60)	19.65 (1.83)
96	95.13 (2416)	90 (2286)		14.31 (1.33)	15.56 (1.45)	18.06 (1.68)	20.56 (1.91)

NOTE: Standard bottom rail

CLAD AND PRIMED WOOD DOUBLE HUNG WINDOWS

1-WIDE UNITS

Clad Unit Dimension	Primed Unit Dimension	Rough Opening	Soft Metric R.O. (mm)	Sash Opening	1-8	2-0	2-4	2-8	3-0	3-4	3-8
Clad Unit Dimension					1' 9-1/2"	2' 1-1/2"	2' 5-1/2"	2' 9-1/2"	3' 1-1/2"	3' 5-1/2"	3' 9-1/2"
	Primed Unit Dimension				1' 11-13/16"	2' 3-13/16"	2' 7-13/16"	2' 11-13/16"	3' 3-13/16"	3' 7-13/16"	3' 11-13/16"
		Rough Opening			1' 10-1/2"	2' 2-1/2"	2' 6-1/2"	2' 10-1/2"	3' 2-1/2"	3' 6-1/2"	3' 10-1/2"
			Soft Metric R.O. (mm)		572	673	775	876	978	1080	1181
3' 0-1/8"	3' 1-7/8"	3' 0-5/8"	930	2-10	18210	20210	24210	28210	30210	34210	38210
3' 4-1/8"	3' 5-7/8"	3' 4-5/8"	1032	3-2	1832	2032	2432	2832	3032	3432	3832
4' 0-1/8"	4' 1-7/8"	4' 0-5/8"	1235	3-10	18310	20310	24310	28310	30310	34310	38310
4' 4-1/8"	4' 5-7/8"	4' 4-5/8"	1337	4-2	1842	2042	2442	2842	3042	3442	3842
4' 8-1/8"	4' 9-7/8"	4' 8-5/8"	1438	4-6	1846	2046	2446	2846	3046**	3446	3846
5' 0-1/8"	5' 1-7/8"	5' 0-5/8"	1540	4-10	18410	20410	24410	28410	30410*	34410*	38410*
5' 4-1/2"	5' 5-7/8"	5' 4-5/8"	1641	5-2	1852	2052	2452	2852	3052*	3452*	3852*
5' 8-1/8"	5' 9-7/8"	5' 8-5/8"	1743	5-6	1856	2056	2456	2856*	3056*	3456*	3856*
6' 0-1/8"	6' 1-7/8"	6' 0-5/8"	1845	5-10	18510	20510	24510	28510*	30510*	34510*	38510*
6' 4-1/8"	6' 5-7/8"	6' 4-5/8"	1946	6-2	1862	2062	2462*	2862*	3062*	3462*	3862*
6' 8-1/8"	6' 9-7/8"	6' 8-5/8"	2048	6-6	1866	2066	2466*	2866*	3066*	3466*	3866*

Units shown with asterisk meet UBC Egress Code requirements of 20" clear opening width, 24" clear opening height and 5.7 sq. ft. or larger opening. Local codes may vary.

***Egress option available*

CLAD AND PRIMED WOOD DOUBLE HUNG WINDOWS

EXTENDED EYEBROW

Chord Height					3"	3-7/8"	4-15/16"
Radius Top of Head Jamb					36"	36"	36"
Clad Unit Dimension					2' 5-1/2"	2' 9-1/2"	3' 1-1/2"
	Primed Unit Dimension				2' 7-15/16"	2' 11-15/16"	3' 3-15/16"
		Rough Opening			2' 6-1/2"	2' 10-1/2"	3' 2-1/2"
			Soft Metric R.O. (mm)		775	876	978
				Sash Opening	2-4	2-8	3-0
4' 0-1/8"	4' 1-7/8"	4' 0-5/8"	1235	3-10	24310	28310	30310
4' 8-1/8"	4' 9-7/8"	4' 8-5/8"	1438	4-6	2446	2846	3046
5' 4-1/8"	5' 5-7/8"	5' 4-5/8"	1642	5-2	2452	2852	3052

COTT-1856
Ratio for Cottage
2/5, 3/5

ORIE-1856
Ratio for Oriel
3/5, 2/5

Also available in Cottage Style and Oriel Style

Casement

Wood and Aluminum EnduraClad® Exterior Size Tables

1/8" = 1' 0"

Transoms

			(451) (432)	(552) (533)	(603) (584)	(654) (635)	(756) (737)	(908) (889)
	Opening		1' 5 3/4"	1' 9 3/4"	1' 11 3/4"	2' 1 3/4"	2' 5 3/4"	2' 11 3/4"
		Frame	1' 5"	1' 9"	1' 11"	2' 1"	2' 5"	2' 11"
(451) (432)	1' 5 3/4"	1' 5"	1717	2117 (F)	2317 (F)	2517 (F)	2917 (F)	3517 (F)
(552) (533)	1' 9 3/4"	1' 9"		2121				
(603) (584)	1' 11 3/4"	1' 11"			2323			
(654) (635)	2' 1 3/4"	2' 1"	1725 (F)	2125 (F)	2325 (F)	2525	2925 (F)	3525 (F)
(756) (737)	2' 5 3/4"	2' 5"					2929	

(F) = Fixed Only

Opening dimensions shown are for clad units only. See wood unit notes below for wood opening dimensions.

Venting transoms are available as casements or awnings.

For windows and patio doors with HurricaneShield® impact-resistant glass, see product instructions or refer to local building code requirements.

Traditional grille patterns shown. See Grille Types page for additional patterns and profiles.

Vent and Fixed Units

(908) (889)	2' 11 3/4"	2' 11"	1735	2135	2335	2535	2935 E3	3535 E1
(1 060) (1 041)	3' 5 3/4"	3' 5"	1741	2141	2341	2541 E3	2941 E2	3541 E
(1 213) (1 194)	3' 11 3/4"	3' 11"	1747	2147	2347	2547 E2	2947 E	3547 E
(1 365) (1 346)	4' 5 3/4"	4' 5"	1753	2153	2353	2553 E2	2953 E	3553 E
(1 518) (1 499)	4' 11 3/4"	4' 11"	1759	2159	2359	2559 E2	2959 E	3559 E
(1 670) (1 651)	5' 5 3/4"	5' 5"	1765	2165	2365	2565 E2	2965 E	3565 E
(1 822) (1 803)	5' 11 3/4"	5' 11"	1771 T	2171 T	2371 T	2571 T	2971 E	3571 E

T Tempered glass is standard.

Egress Notes:

E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft². Check all applicable local codes for emergency egress requirements.

E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft². Check all applicable local codes for emergency egress requirements.

E2 = With optional egress hardware, window meets minimum clear opening of 24" height, 20" width, and 5.7 ft². Check all applicable local codes for emergency egress requirements.

E3 = With optional egress hardware, window meets minimum clear opening of 24" height, 20" width, and 5.0 ft². Check all applicable local codes for emergency egress requirements.

See Design Data pages in this section for clear opening dimensions.

Clear opening (egress) information does not take into consideration the addition of a Rolscreen (or any other accessory) to the product. You should consult your local building code to ensure products with Rolscreens meet egress requirements.

Opening Specifications

CASEMENT

CASEMENT (with Friction Hinges)

FROM THE WEATHER SHIELD WEB SITE

Unit Code	Sq. Ft. [cm²] Clear Opening[g]		Clear Opening[d] inches [mm]			Sq. Ft. [cm²] Daylight Opening	Sq. Ft. [cm²] Vent	Floor to Bottom of Clear Opg. Ht.[e] inches [mm]	Sq. Ft. [cm²] Overall Unit Area[f]
	with Retractable Screen	with Hinged Screen	Width w/ 14" [356] Friction Hinges[g]	Height w/ Retractable Screen	Height w/ Hinged Screen				
28 x 24	2.99 [2778]	3.19 [illegible]	18 [457]	23 15/16 [608]	25 1/2 [648]	3.19 [2964]	4.55 [4227]	55 1/16 [1399]	[illegible]
28 x 28	3.49 [3242]	3.69 [illegible]	[illegible]	[illegible] [710]	[illegible]	3.85 [3577]	5.31 [4933]	51 1/16 [1297]	7.19 [6680]
28 x 32	3.89 [illegible]	4.19 [illegible]	[illegible]	[illegible]	[illegible]	4.52 [4199]	6.07 [illegible]	47 1/16 [1195]	8.08 [illegible]
28 x 36	4.49 [4171]	4.69 [4357]	18 [457]	35 15/16 [913]	37 1/2 [953]	5.18 [4812]	6.83 [6345]	43 1/16 [1094]	8.97 [8333]
28 x 40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	39 1/16 [992]	9.86 [9160]
28 x 44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] [7757]	35 1/16 [891]	10.75 [9987]
28 x 50	6.24 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] [8816]	29 1/16 [738]	12.08 [11223]
28 x 54	6.74 [6262]	6.94 [6447]	18 [457]	53 15/16 [1370]	55 1/2 [1410]	8.17 [7590]	10.25 [9523]	25 1/16 [637]	12.97 [12050]
28 x 58	7.24 [6726]	7.44 [6912]	[illegible]	[illegible]	[illegible]	8.83 [8203]	11.01 [10229]	21 1/16 [535]	13.86 [12876]
28 x 68	8.49 [7887]	8.69 [8073]	[illegible]	[illegible]	[illegible]	10.49 [9746]	12.92 [12003]	11 1/16 [281]	16.08 [14939]
28 x 72	8.99 [8352]	9.19 [8538]	[illegible]	[illegible]	[illegible]	11.15 [10359]	13.68 [12709]	7 1/16 [179]	16.97 [15766]
28 x 76	9.49 [8816]	9.69 [9002]	18 [457]	75 15/16 [1929]	77 1/2 [1969]	11.81 [10972]	14.44 [13415]	3 1/16 [78]	17.86 [16592]
32 x 24	3.66 [3400]	3.90 [3623]	22 [559]	23 15/16 [608]	25 1/2 [648]	3.73 [3465]	5.22 [4850]	55 1/16 [1399]	7.09 [6587]
32 x 28	4.27 [3967]	4.51 [4190]	22 [559]	27 15/16 [710]	29 1/2 [749]	4.50 [4181]	6.09 [5658]	51 1/16 [1297]	8.09 [7516]
32 x 32	4.88 [4534]	5.12 [4757]	22 [559]	31 15/16 [811]	33 1/2 [851]	5.27 [4896]	6.96 [6466]	47 1/16 [1195]	9.09 [8445]
32 x 36[b]	5.49 [5100]	5.73 [5323]	22 [559]	35 15/16 [913]	37 1/2 [953]	6.05 [5621]	7.83 [7274]	43 1/16 [1094]	10.09 [9374]
32 x 40[a]	6.10 [5667]	6.34 [5890]	22 [559]	39 15/16 [1014]	41 1/2 [1054]	6.82 [6336]	8.70 [8083]	39 1/16 [992]	11.09 [10303]
32 x 44[a]	6.71 [6234]	6.95 [6457]	22 [559]	43 15/16 [1116]	45 1/2 [1156]	7.60 [7061]	9.57 [8891]	35 1/16 [891]	12.09 [11232]
32 x 50[a]	7.63 [7088]	7.87 [7311]	22 [559]	49 15/16 [1268]	51 1/2 [1308]	8.76 [8138]	10.88 [10108]	29 1/16 [738]	13.59 [12626]
32 x 54[a]	8.24 [7655]	8.48 [7878]	22 [559]	53 15/16 [1370]	55 1/2 [1410]	9.53 [8854]	11.75 [10916]	25 1/16 [637]	14.59 [13555]
32 x 58[a]	8.85 [8222]	9.09 [8445]	22 [559]	57 15/16 [1472]	59 1/2 [1511]	10.31 [9578]	12.62 [11724]	21 1/16 [535]	15.59 [14484]
32 x 68[a]	10.38 [9643]	10.62 [9866]	22 [559]	67 15/16 [1726]	69 1/2 [1765]	12.24 [11371]	14.80 [13750]	11 1/16 [281]	18.09 [16806]
32 x 72[a]	10.99 [10210]	11.23 [10433]	22 [559]	71 15/16 [1827]	73 1/2 [1867]	13.02 [12096]	15.67 [14558]	7 1/16 [179]	19.09 [17735]
32 x 76[a]	11.60 [10777]	11.84 [11000]	22 [559]	75 15/16 [1929]	77 1/2 [1969]	13.79 [12811]	16.55 [15375]	3 1/16 [78]	20.09 [18664]
36 x 24	4.32 [4013]	4.60 [4274]	26 [660]	23 15/16 [608]	25 1/2 [648]	4.26 [3958]	5.88 [5463]	55 1/16 [1399]	7.88 [7321]
36 x 28	5.04 [4682]	5.33 [4952]	26 [660]	27 15/16 [710]	29 1/2 [749]	5.15 [4785]	6.86 [6373]	51 1/16 [1297]	8.99 [8352]
36 x 32[c]	5.77 [5361]	6.05 [5621]	26 [660]	31 15/16 [811]	33 1/2 [851]	6.03 [5602]	7.85 [7293]	47 1/16 [1195]	10.10 [9383]
36 x 36[a]	6.49 [6029]	6.77 [6290]	26 [660]	35 15/16 [913]	37 1/2 [953]	6.92 [6429]	8.83 [8203]	43 1/16 [1094]	11.22 [10424]
36 x 40[a]	7.21 [6698]	7.49 [6958]	26 [660]	39 15/16 [1014]	41 1/2 [1054]	7.80 [7246]	9.81 [9114]	39 1/16 [992]	12.33 [11455]
36 x 44[a]	7.93 [7367]	8.22 [7637]	26 [660]	43 15/16 [1116]	45 1/2 [1156]	8.69 [8073]	10.79 [10024]	35 1/16 [891]	13.44 [12486]
36 x 50[a]	9.02 [8380]	9.30 [8640]	26 [660]	49 15/16 [1268]	51 1/2 [1308]	10.02 [9309]	12.27 [11399]	29 1/16 [738]	15.10 [14028]
36 x 54[a]	9.74 [9049]	10.02 [9309]	26 [660]	53 15/16 [1370]	55 1/2 [1410]	10.90 [10126]	13.25 [12310]	25 1/16 [637]	16.22 [15069]
36 x 58[a]	10.46 [9718]	10.74 [9978]	26 [660]	57 15/16 [1472]	59 1/2 [1511]	11.79 [10953]	14.23 [13220]	21 1/16 [535]	17.33 [16100]
36 x 68[a]	12.27 [11399]	12.55 [11659]	26 [660]	67 15/16 [1726]	69 1/2 [1765]	14.00 [13006]	16.69 [15506]	11 1/16 [281]	20.10 [18674]
36 x 72[a]	12.99 [12068]	13.27 [12328]	26 [660]	71 15/16 [1827]	73 1/2 [1867]	14.89 [13833]	17.67 [16416]	7 1/16 [179]	21.22 [19714]
36 x 76[a]	13.71 [12737]	13.99 [12997]	26 [660]	75 15/16 [1929]	77 1/2 [1969]	15.77 [14651]	18.65 [17326]	3 1/16 [78]	22.33 [20745]

[a] These sizes meet or exceed emergency escape and rescue opening requirements per 2006 IRC (International Building Code). **Minimum size:** emergency escape and rescue openings shall have a minimum net clear opening of **5.7** sq. ft. [**5295** cm²]. **Exception:** minimum net clear opening for emergency escape and rescue grade-floor openings shall be 5.0 sq. ft. [4645 cm²]. **Minimum dimensions:** the minimum net clear opening width dimension shall be 20" [508mm]. The minimum net clear opening height dimension shall be 24" [610mm]. **Maximum height from floor:** emergency escape and rescue openings shall have the bottom of the clear opening not greater than 44" [1118mm] measured from the floor. Verify local or state emergency escape and rescue opening sizes with your local building inspector.

[b] These windows, with the hinged screen option, meet or exceed emergency escape and rescue opening requirements.

[c] These windows meet or exceed emergency escape and rescue opening requirements if installed lower in the wall so the "Floor to Bottom of Clear Opening Height" does not exceed 44" [1118mm].

[d] Clear opening width and height dimensions are rounded down to the nearest 1/16" [2mm].

[e] Floor to bottom of clear opening dimensions are based on 82" [2083mm] jamb height of Collections Center Hinged French Doors and Inswing French Doors. Dimensions are rounded to the nearest 1/16" [2mm].

[f] Sq. Ft. [cm²] Overall Unit Area is calculated on the jamb dimension.

[g] Clear opening width is calculated with sash open 90°.

Final Action: AS AM AMPC____ D

RB45-09/10
R311.3.2

<u>Proposed Change as Submitted</u>

Proponent: Homer Maiel, PE, CBO, City of San Jose, CA, representing the ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters)

Revise as follows:

R311.3.2 Floor elevations for other exterior doors. Doors other than the required egress door shall be provided with landings or floors not more than 7 ¾ inches (196 mm) below the top of the threshold <u>provided the door does not swing over the landing or floor</u>.

> **Exceptions:** A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.

Reason: This revision is needed to make sure that Section R311.3.2 is consistent with Section R311.3.1. Tripping hazards will be equal regardless of whether a door is or is not a required egress door. The Exception to this section indicates that the door should not be swung over one-riser or two-riser stairway. However, the main body of the section fails to address that a door should not swing over a lower landing, as Section R311.3.1 clearly states.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MAIEL-RB-4-R311.3.2

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: Based on proponent's request for disapproval. The proposal would require the door to not swing or not have a floor or landing. The proponent should rework and bring back later.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, P.E., CBO., City of San Jose, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R311.3.2 Floor elevations for other exterior doors. Doors other than the required egress door shall be provided with landings or floors not more than 7 3/4 inches (196 mm) below the top of the threshold provided the door does not swing over the landing or floor. <u>For doors that swing over the landing or floor, the threshold shall comply with Section R311.3.1.</u>

> **Exceptions:** A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.

Commenter's Reason: The Tri-Chapter recommends the following modification to RB45 in order to address the condition when a door, other than the main egress door, swings over a landing or floor. We believe that this presents the same hazard as would exist with the primary egress door and that the landing or floor should be limited to no more than 1 1/2 inches below the top of the threshold. The proposed Amendment to the original code change proposal addresses this condition by adding a sentence to the original code change proposal that states "<u>For doors that swing over the landing or floor, the threshold shall comply with Section R311.3.1</u>." The Reason Statement for the original code change proposal does not change, with the exception that the additional threshold condition associated with the condition of the door swinging over a landing or floor is addressed.

Final Action: AS AM AMPC____ D

RB46-09/10
R311.7.4.1, R311.7.4.2, R311.7.4.2.1 (New), R311.7.43

Proposed Change as Submitted

Proponent: Rick Davidson, City of Maple Grove, MN

1. Revise as follows:

R311.7.4.1 Riser height. The maximum riser height shall be 73/4 inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the leading edge of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.

> **Exception:** The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

R311.7.4.2 Tread depth. The minimum tread depth shall be 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth. ~~Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm).~~

2. Add new text as follows:

R311.7.4.2.1 Winder treads. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm).

3. Revise as follows:

R311.7.4.3 ~~Profile~~ Nosings . The radius of curvature at the nosing shall be no greater than 9/16 inch (14 mm). A nosing not less than 3/4 inch (19 mm) but not more than 11/4 inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosings shall not exceed 1/2 inch (12.7 mm). ~~Risers shall be vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.~~

> **Exception~~s~~:**
>
> ~~1.~~ A nosing is not required where the tread depth is a minimum of 11 inches (279 mm).
> ~~2. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.~~

Reason: Language related to risers is relocated from the section on "Profile" to the section on "Risers", which is more appropriate. This change is strictly cut and paste. The language on winder treads is made into its own subsection of Treads to enable the user of the code to more easily find that text. The purpose of this code change is to ease use of the code.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DAVIDSON-RB-5-R311.7.4

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R311.7.4.1 Riser<u>s</u> ~~height~~. The maximum riser height shall be 73/4 inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the ~~leading edge~~ <u>nosing</u> of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.

Exception: The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

R311.7.4.2 Tread<u>s</u> ~~depth~~. The minimum tread depth shall be 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). ~~Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth.~~

R311.7.4.2.1 Winder treads. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm). <u>Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth.</u>

R311.7.4.3 Nosings. The radius of curvature at the nosing shall be no greater than 9/16 inch (14 mm). A nosing not less than 3/4 inch (19 mm) but not more than 11/4 inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosings shall not exceed 1/2 inch (12.7 mm).

Exception:

A nosing is not required where the tread depth is a minimum of 11 inches (279 mm).

Committee Reason: The committee feels this change makes the code easier to use by breaking out the winder text into its own section. The modification corrects the term "leading edge" to "nosing" and moves the winder walking criteria into the new winder section.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jake Pauls, representing self, requests Disapproval.

Commenter's Reason: The approval of this code change leaves the RB46 badly broken and it should be disapproved. There are other code change proposals that deal with the issues better, specifically RB47-09/10 dealing with treads, with separate sections for separate topics:
R311.7.4.2 Tread Depth
R311.7.4.2.1 Uniformity of Rectangular Tread Depths
R311.7.4.2.2 Uniformity of Winder Treads

Complementing the foregoing proposal is E75-09/10 Part 2 which also deals with separate requirements for the separate topics:
R311.7.4.3 Nosing and Riser Profile
R311.7.4.3.1 Nosing Projection Size
R311.7.4.3.2 Nosing Projection Uniformity
R311.7.4.3.3 Open Risers

Proposal RB46 leaves different topics within the same section, thus making use of the code more difficult and compliance less likely both at the design and construction process and at inspection.

Notably, the IRC BE Code Change Committee took a different approach than did the IBC Means of Egress Code Change Committee on this matter. The latter's action on E75-09/10 Part I was approved as submitted with the differentiation of sections recommended also for E75-09/10 Part II. The IRC BE Committee disapproved E75-09/10 Part II. As such, the IRC will remain broken—or at least not fixed to the extent warranted and to the extent fixed for the IBC.

Thus, with the IRC BE Committee's action, there is an inadequate response to a major safety problem with many home stairs. Moreover, this problem is still badly dealt with in the guides ICC publishes for builders and inspectors (Residential Inspector's Guide Based on the 2006 IRC, Chapters 1-11, and Home Builders' Jobsite Codes: a Pocket Guide to the 2009 International Residential Code). If the ICC-sanctioned writers of guides cannot even get the intent and content of the code requirements right, then what can we expect from ordinary users?

Note that the two Committees saw the problem differently in their reason statements for E75-09/10. The IBC Means of Egress Committee said, "By breaking the current text into smaller sections the proposal clarifies the requirements for stair nosings and risers." The IRC BE Committee said, "The committee feels the code already addresses this and it is an enforcement and education issue. There is a concern about correlation of this with the previous action on RB46-09/10. The committee suggests both parties work together and bring this back later."

The problem here is not having the proponents working together, it is a problem of the IRC and IBC committees not working together on exactly the same issues. Clearly in the view of this commenter, the IRC BE Committee does not understand the problem. A bad code is a bad code and we should not rely on enforcement and education to overcome the code's defects.

As this is simply a reformatting issue and not a technical change, why is there such backwardness on the part of the IRC BE Committee? This is now a matter for membership. Do you want the inadequate change proposed in this proposal, RB46-09/10, or do you want the IRC clarified as proposed in RB47-09/10 and its complementary change E75-09/10? The choice is very simple, do you want ICC and ICC Code users saddled with an inadequate code for another three years or do you want to have it fixed properly? If you want it fixed properly, you should vote in favor of this comment and disapprove RB46-09/10.

More important, as spelled out in detail in the comment on RB47, confusion over what the Code requires is costing dearly in terms of flawed stair design, construction and inspection. There are many needless injuries caused by the bad formatting of the IRC's requirements. Again, there is no technical change here—and thus no cost involved in getting better benefit out of the IRC. Vote to disapprove RB46-09/10, a proposed change that does not provide the needed improvement in code clarity and public safety.

Final Action: AS AM AMPC____ D

RB47-09/10

R311.7.4.2, R311.7.4.2.1 (New), R311.7.4.2.2 (New)

Proposed Change as Submitted

Proponent: Jake Pauls, representing self

1. Revise as follows:

R311.7.4.2 Tread depth. The minimum tread depth shall be 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's nosing ~~leading edge~~. ~~The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm).~~

2. Add new text as follows:

R311.7.4.2.1 Uniformity of rectangular tread depths. The greatest tread depth, measured horizontally between nosings of treads as specified in R311.7.4.2 and including the top tread, within each flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

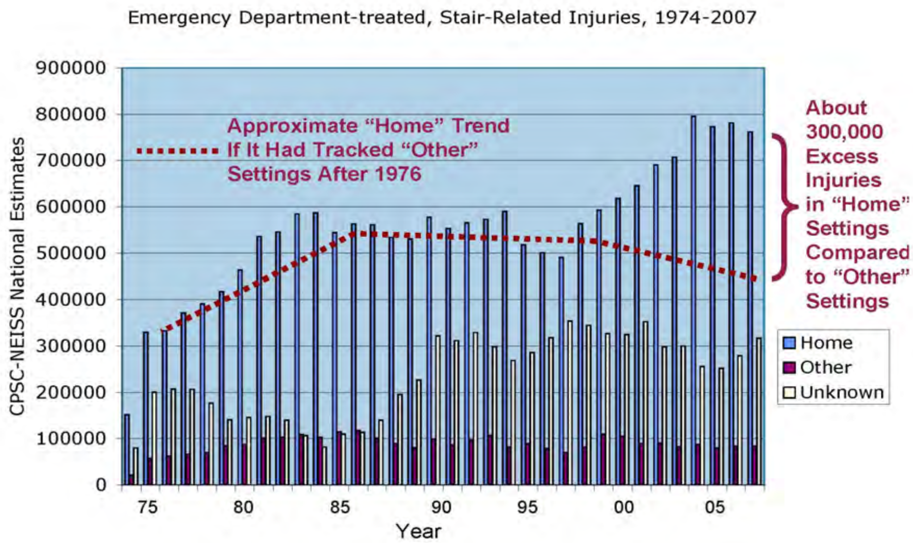
R311.7.4.2.2 Uniformity of winder treads. Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm).

Reason: There is no technical change to the requirement in this proposal. It is a clarification of intent by separating out and labeling the separate issues of tread depth and the uniformity of tread depths for rectangular and winder treads, the only two forms of tread addressed in the current code. This proposed change, along with another for R311.7.4.3, is intended to clear up what appears to be widespread confusion resulting in flawed design, inspection, and ICC training plus published guidance regarding the need for every step of a flight to have uniform tread depth (or run) dimensions, measured horizontally, nosing to nosing. (Note that the change also incorporates the change of term "leading edge of tread" to "nosing" as that term was defined in the last cycle and is the term used in R311.7.4.3.) For consistency and to utilize defined terms, "nosing" should be the standard term used here.

A far too common error in design and construction of stairways is the lack of attention to keeping all tread depths, especially the top one in a flight, uniform in size, particularly where projecting nosings are provided on a flight of stairs installed as a manufactured unit which does not include the top or landing nosing projection. ICC IRC guides for inspection and for the homebuilding industry (published by ICC in conjunction with NAHB) fail to even mention these important rules. These two ICC publications are listed in the Bibliography.

The resulting non-uniformities in tread depths, with a larger top tread followed by smaller treads in the flight make the stair flight orders of magnitude more dangerous for descent-direction users. This pervasive systemic defect has also become so concerning to leading stairway safety professionals such as myself that a special website page has been created simply to deal with this issue. See http://web.me.com/bldguse/Site/Stairways.html for information on this including the graph provided below as Figure 1 showing a large increase in the number of home stair-related injuries identified in the CPSC NEISS national estimates for the USA in the last several years. Excerpts of text from the Stairways website page are also quoted below as are excerpts from an American Society of Safety Engineers 2008 Professional Development Conference paper by Pauls and Harbuck. The full ASSE conference paper is freely accessible as a PDF download from the Downloads area of my website, http://web.me.com/bldguse/Site/Downloads.html. Generally, it is suspected that with recent greater use of manufactured stair flights, the incidence of systemic, top-of-flight non-uniformities has grown with resulting significant increases in home stair-related injuries.

Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years.



On the Stairways website page, referenced above, is the following text and photograph (here identified as Figure 2) of a typical dwelling unit stairway with the systemic top-of-flight defect in tread depth non-uniformity. Below Figure 2 is an additional photograph, Figure 3, showing what a stair flight looks like it very likely conforms to the uniformity requirements but which should be properly measured, at least at the top three steps, to confirm that there is not a rare coincidence of both larger tread depth and larger rise dimensions at the top step. Here follows the text from the website which has been publicly available since May 2009.

"While more investigation is required, it appears that a major reason for the recent 'excess' injuries related to home stairs might be a systemic defect on many home stairways (as well as some in other settings) in the USA and Canada. This defect is a non-uniformity of the nosing projection at the top of stair flights; due to the omission of a $10 nosing piece, at the landing level, at the time of stairway construction. This makes the top tread below the landing effectively larger than all the steps below it.

This common defect greatly increases the risk of an 'overstepping misstep' on the second or third step down the flight. Such missteps can lead to a very serious fall down the stair flight, with resulting injuries.

This is why we should now give our stairways 'a second look.' Specifically we should perform the simple 'crouch and sight' test. Do this from the landing above the stair flight you wish to check. Crouch down so you are able to see all the stair nosings (the leading edges) line up. If the top, landing nosing does not line up with all the other step nosings, your stair likely has the systemic defect. Here is a home stairway with the systemic defect."

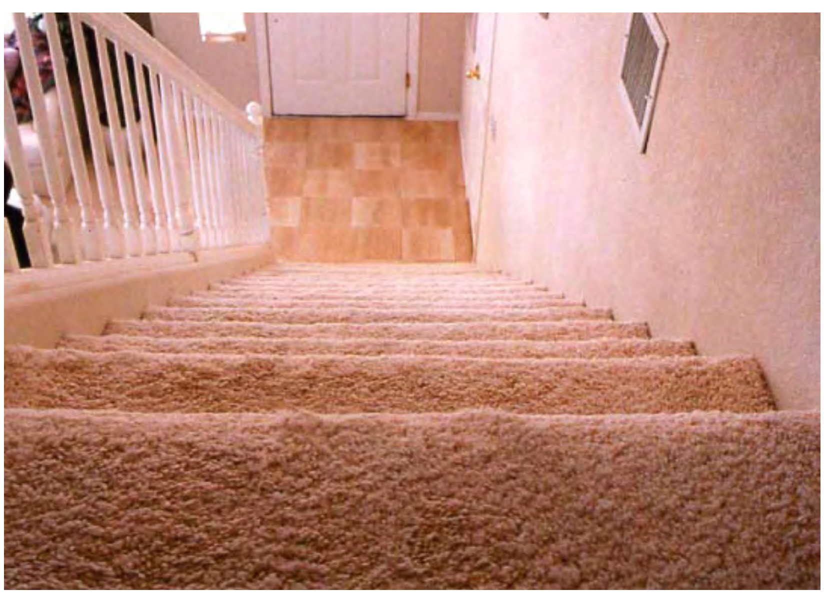


Figure 2. Typical Dwelling Unit Stairway with the Systemic, Top-of-Flight Defect.

The "Stairways" page of the website goes on to provide advice specifically for homeowners who perform the "crouch and sight" test and discover that their stairway has the systemic, top-of-flight defect.

"If your home stairway has this defect—which results from the non-uniformities of nosing projections and of what are called 'tread depth' or 'run' dimensions—and your home was recently constructed, call your local building inspection authorities and request that the stairway be re-inspected for building code compliance. Both the non-uniform nosing projection and the non-uniform tread depth or run are building code violations, for example under widely used codes in the USA.

If there has been a fall and significant injury on the non-uniform stair flight, you might also want to confer with an attorney (experienced in dealing with stair-related injury cases), especially if the home was recently constructed.

Much more information on this (and other) safety problems with stairways is found in the downloadable files associated with this website. See especially the latest papers and presentations by Jake Pauls on home stairways in the two most recently posted folders.

•Home Stairway Safety and Codes (Posted February 2009)

•Presentations at MUTN Conference in BC, Canada, April 2009

Also, in early summer 2009, watch this website for an announcement of the availability of an educational DVD package, based on the one-day workshop at the MUTN Conference in BC, Canada, in April 2009. (Contact Jake Pauls for purchase information.)"

Figure 3. Dwelling Unit Stair Very Likely Not Having the Systemic, Top-of-Flight Defect.

Any ICC chapter wishing to have their members participate in a one-day workshop (also slated for presentation in Eastern Canada on September 14, 2009) should contact Jake Pauls. It is available in a not-for-profit mode. Code authorities should be prepared to deal knowledgeably with consumers who, upon discovering the systemic defect in their homes (after performing their own "crouch-and-sight" test), contact their local building department and ask for a re-inspection of their home stairways. If there has been an injurious fall on such a stairway they should also be prepared to deal with resulting legal actions that might name the local building department as a third party defendant. They should know how to perform the measurements of the stair step geometry that are of a quality expected in such litigation actions. These measurement techniques, usually requiring use of a spirit level or electronic level, are all described in the workshop materials posted on the above-mentioned website Downloads area and on the DVD of the Spring 2009 workshop noted above. These measurement techniques are consistent with the ICC requirements both as currently stated and as further clarified if this proposal is accepted.

In order to begin stopping all future misinterpretations of the IRC requirements for tread depth uniformity, it is hoped that all code enforcement authorities heed very carefully the current and clarified requirements of R311.7.4.2 as well as of R311.7.4.3.

Bibliography

ICC (2007). Residential Inspector's Guide Based on the 2006 IRC, Chapters 1-11. International Code Council, Washington, DC., ISBN 978-1-58001-568-4.

ICC and NAHB. Home Builders' Jobsite Codes: a Pocket Guide to the 2006 International Residential Code. International Code Council, Washington, DC and National Association of Home Builders, Washington, DC.

Pauls, J. and Harbuck, S. (2008). Ergonomics-based Methods of Inspecting, Assessing and Documenting Environmental Sites of Injurious Falls Resulting from Missteps on Small Elevation Differences, Slopes and Steps. *Proceedings of the American Society of Safety Engineers Professional Development Conference & Exposition*, Las Vegas, NV, 2008. (Downloadable as file, "Pauls-Harbuck-ASSE-paper.pdf," from folder, "Home Stairway Safety and Codes," accessible from the Downloads area of http://web.me.com/bldguse/Site/Downloads.html.)

Cost Impact: The code change proposal will not increase the cost of construction. (The nosing piece required to comply with both the current code and the code as amended by this proposal costs about $10 per flight in terms of material, in oak, at retail level.)

ICCFILENAME: PAULS-RB1-311.7.4.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Based on the committee's previous action on RB46-09/10. The committee prefers the rewrite of RB46-09/10.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

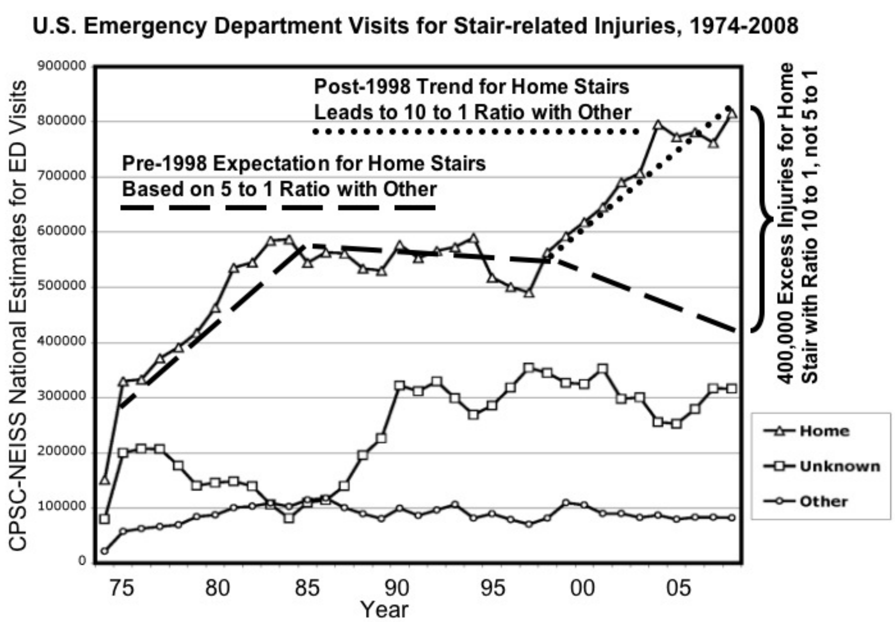
Public Comment:

Jake Pauls, representing self, requests Approval as Submitted.

Commenter's Reason: First, this change is an improvement over RB46-09/10 and reference should be made to my comment on RB46-09/10 which should be disapproved so RB47-09/10 can be approved instead along with E75-09/10 Part II. Both RB47-09/10 and E75-09/10 Part II should be approved as submitted.

RB47-09/10 solves a problem created by the current inadequate organization of tread geometry requirements in the IRC by simply breaking the text into more manageable sections, with each section dealing with a particular issue. E75-09/10 Part II does the same for riser geometry. Neither changes the requirements in the particular sections so there is no cost impact. However, clarity thus achieved will reduce design, construction and enforcement costs while contributing to safety levels that were intended by the rules but which are not being achieved. See the evidence of the home stairway safety problem below, in Figure 1 and the discussion of the five apparent reasons for the poor safety record of home stairways. One of the five reasons is addressed by this comment (and by the approval of RB47-09/10 and E75-09/10 Part II); other of my comments address some of the other reasons.

Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years
This is an update, including data for 2008, of Figure 1 in proposal RB47-09/10



Rather than repeat the extensive justification provided for RB47-09/10, this comment focuses on newer data and improved presentation of the data (as in Figure 1) coming from the US Consumer Product Safety Commission (CPSC) National Electronic Injury Surveillance System (NEISS).

Five reasons have been identified recently for the diverging injury records for home stairways and for stairways in all other settings. The former are rising rapidly (approaching a growth rate of over 4 percent, about five times US population growth) in a trend begun at about the time the ICC started affecting residential codes in the USA through its production and promotion of the International Residential Code. The latter are now dropping at a notable rate (about 2 percent reduction per year at a time of about 1 percent a year of population growth in the USA). These factors, in no particular order, are:

(A) Significantly lower ICC standard for maximum rise and minimum tread depth for home stairs (the result of the code-development compromise and the code-adoption compromise).
(B) The systemic top-of-flight defect in many homes' (and some other buildings') stairs partly due to ICC's failure to provide clearly stated code requirements and to include the rules preventing this in their inspection guides.
(C) ICC's adoption of seriously compromised requirements for handrails for home stairways.
(D) An apparent deterioration in enforcement/inspection quality generally in relation to homes, partly influenced by the widespread perception—possibly nurtured by ICC leaders—that the builders' work should receive minimal scrutiny in view of their "Strategic Partnership."
(E) The concurrent deterioration of movement performance of population capability generally with the effects of reduced physical activity, overweight and obesity. (In a public health model, this should lead to increased—*not decreased*—compensation with the design and construction of critical built environment features such as stairways, particularly in the home settings where the most vulnerable populations and use conditions are common and easily predicted.)
(F)

This comment, and Proposal RB47-09/10, address the second of these reasons, i.e., (B). This defect with many home stairs is caused by the failure to have a uniform tread depth on all the steps of a stair when the floor or landing nosing projection is less than that of all the other treads in the flight. Figure 2 shows such a badly constructed stair in a new US home. The defect is easily identified without any tools; the inspector (or builder) need only do the simple "crouch and sight test" from the upper landing to check to see if all the nosings line up as they will do with a code-complying stair. (See also the website, http://web.mac.com/bldguse/Site/Stairways.html for additional information on this problem and its elimination.)

Figure 2. Typical Home Stair with Top-of-Flight, Tread Uniformity Defect

The re-organization of R311.7.4.2 by separates different topics into new sections, R311.7.4.2.1 Uniformity of rectangular tread depths and R311.7.4.2.2 Uniformity of winder treads. My proposal E75-09/10 Part II complements proposal RB47-09/10 by dealing with the important matter of nosing projection uniformity, the main mechanism for making the tread depths consistent for all steps of a flight. (The IBC Means of Egress Committee got proposal E75-09/10 Part I right with their approval while the IRC BE Committee got the corresponding IRC proposal, E75-09/10 Part II wrong with their disapproval.)

These proposals do not introduce technical changes. Rather these are badly needed clarifications of the Codes' intent and requirements which are clumped together in the current codes so that important features are missed by designers, builders and enforcers. The separate issues should be given separate sections so they are not lost in a mass of text.

Note that the Code is so broken that even the experts who write two of ICC guides get this matter wrong. They completely miss the important rules that are separated into distinctive sections with the approval of RB47-09/10. (Those two guides, purchased from ICC as recently as January 2010 to confirm they are still defective, are the Residential Inspector's Guide Based on the 2006 IRC, Chapters 1-11, and Home Builders' Jobsite Codes: a Pocket Guide to the 2009 International Residential Code.)

Of all the five reasons for increased home stair-related injuries, the systemic top-of-flight defect is the most potent. It increases the risk of a misstep and fall near the top of the stair flight by orders of magnitude (one or more factors of ten). This is the simplest of all five defects to prevent. The cost is very small, about 10 dollars of material for the landing or floor level nosing piece. The benefit of this small fix—which the codes demand but which builders and inspectors too often miss—is many, many times greater.

Again, proposal RB75-09/10 should be adopted as submitted along with E75-09/10 Part II. (Note, as addressed in a separate comment on RB74-09/10, that code change proposal should be disapproved; it does a very inadequate job in fixing the organization of the code requirements for reasonable clarity.)

For additional detail, refer to the substantiation provided with proposal RB75-09/10.

Final Action: AS AM AMPC____ D

RB48-09/10
R311.7.3 (New), R311.7.5

Proposed Change as Submitted

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers'

1. Add new text as follows:

<u>**R311.7.3 Vertical rise.** A flight of stairs shall not have a vertical rise larger than 12 feet (3658 mm) between floor levels or landings.</u>

2. Revise as follows:

R311.7.5 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. <u>The minimum width perpendicular to the direction of travel shall be no less than the width of the flight served. The edges of landings may be curved or segmented. Landings used to turn the direction of travel less than 90 degrees but no less than 60 degrees shall not be considered winder treads provided the depth at the walk line is no less than 18 inches and the minimum depth is no less than 6 inches (152 mm). Where the stairway has a straight run the minimum depth in the direction of travel need not exceed 36 inches (914 mm).</u>

> **Exception:** A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing over the stairs. ~~A flight of stairs shall not have a vertical rise larger than 12 feet (3658 mm) between floor levels or landings. The width of each landing shall not be less than the width of the stairway served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel.~~

Reason: There are certain attributes of landings that are intended to be or need to be regulated by the code but this section currently needs improvements to consistently determine the allowed dimensions or shape of landings. The common interpretations currently referenced in the commentary have been used to develop this proposal. Further the fractured arrangement of text following the exception is eliminated and prevents confusion of requirement and exception.

1. The **Vertical rise** section being added is actually relocated without change from below the exception in **R311.7.5**. The name and text is technically consistent with the IBC. The information in this section is needed to calculate the number of risers between levels, the riser height, and the tread depth of each flight or stair in a stairway. For this reason, if such a requirement is needed, it should be included with the essential elementary sections that precede the tread and riser sections to assure understanding and compliance.
2. The revision adds text to **R311.7.5** that clarifies what dimension is actually the width or widths of the landing. By stating that width is perpendicular to the direction of travel the shape of landings and the intent to allow curved and segmented corners as stated in the commentary is covered. The required sizes are not changed and remain the same.
3. Differentiation between angular shaped landings and winder treads is also needed and provided by the additional text. The text defines the minimum size that is comparable and slightly exceeds the minimum distance of travel the user experiences on the most common 90-degree landing. Please see figures 1, 2, and 3 attached. It is easy to see that the shape of the landing can be inconsequential to its width and its use in the stairway provided the minimum criteria suggested here are achieved. The clear differentiation between landings and winders stated here is important because landings separate flights and winders do not. Stair components regulated “within a flight” such as handrails, riser height, tread depth, dimensional uniformity, etc. are all dependent upon a determination that currently requires better description for consistent understanding.

R311.5.7 Stairway Landings

Figures 1,2, & 3 below illustrate the minimum dimensions proposed of a stairway landing that turns less than 90 degrees.
Note: The outside of each landing is shown with both segmented and curved options that would clarified if the minimum width of the landing described as "measured perpendicular to the line of travel" by this proposal is clarified.

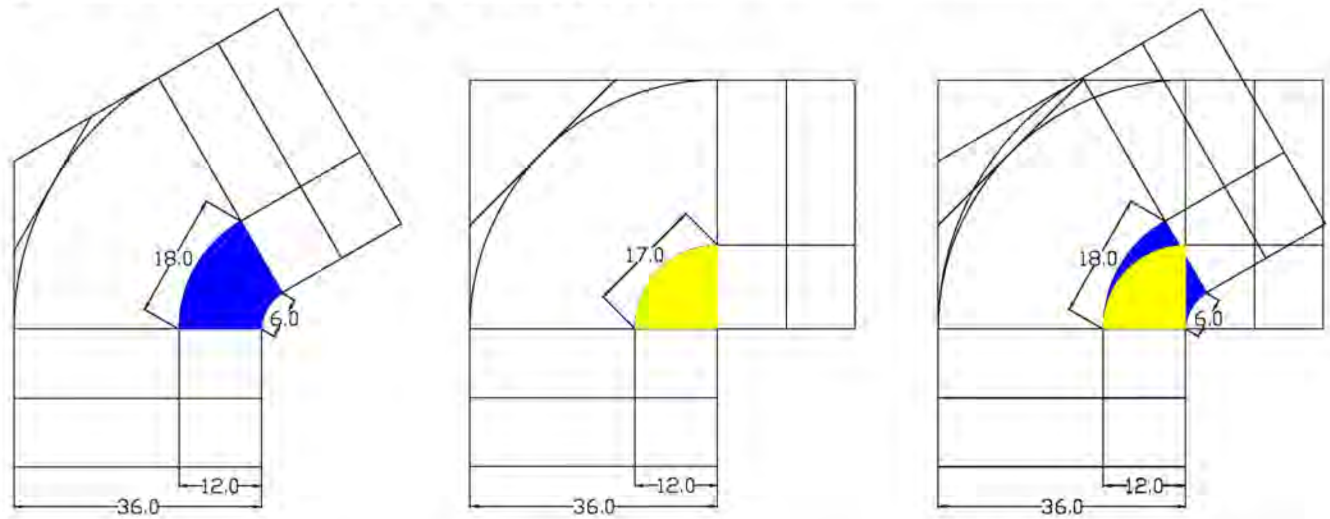


Figure 1:
Proposed 60 degree minimum Landing. The critical area inside of the walk line is shaded.

Figure 2:
Convetional 90 degree Landing. The total area inside of the walk line is shaded

Figure 3:
The 60 and 90 degree landings are shown superimposed . The total area inside of the walk line of the 60 degree winder is clearly comparable to that of conventional landings when the suggested minimum dimensions are applied.

4. The needed exception remains in tact without change.
5. Please note all the text deleted following the exception has been incorporated within **R311.7.5** or relocated under **Vertical rise** as stated above.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: COOPER-RB-3-R311.7.3-R311.7.5

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that the definition of winders historically works for the geometry that is here. If the proposed geometry is specific to a specific type of stairway then a new code section specifically addressing the problem is needed. The last sentence is such that it would allow a landing less than 36 inches. This should be reworked and brought back.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R311.7.3 Vertical rise. A flight of stairs shall not have a vertical rise larger than 12 feet (3658 mm) between floor levels or landings.

R311.7.5 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. The minimum width perpendicular to the direction of travel shall be not less than the width of the flight served. Landings of shapes other than square or rectangular shall be permitted provided ~~The edges of landings may be curved or segmented. Landings used to turn the direction of travel less than 90 degrees but no less than 60 degrees shall not be considered winder treads provided~~ the depth at the walk line and the total area is not less than that of a quarter circle with a radius equal to the required landing width. ~~is no less than 18 inches and the minimum depth is no less than 6 inches (152 mm).~~ Where the stairway has a straight run the minimum depth in the direction of travel shall be not less than ~~need not exceed~~ 36 inches (914 mm).

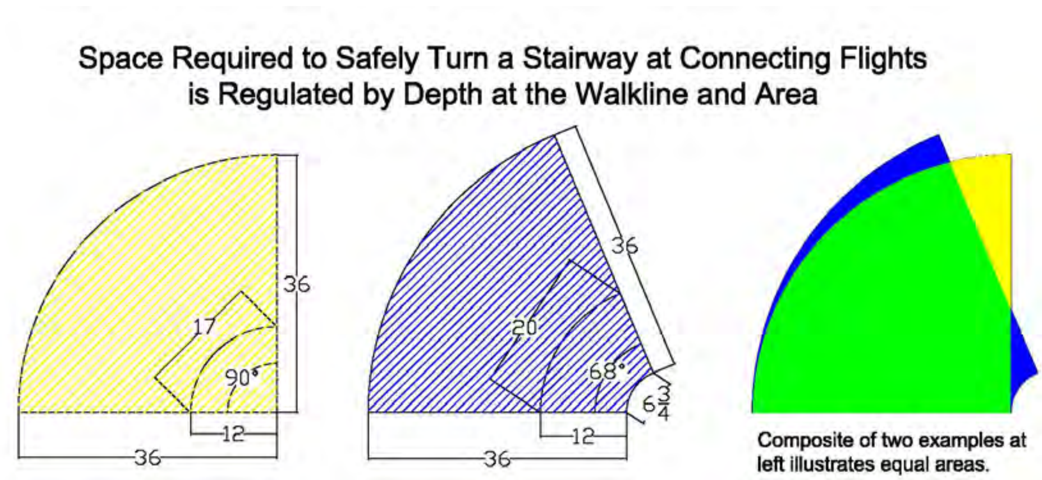
Exception: A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing over the stairs.

Commenter's Reason: In Baltimore the committee commented in agreement with the addition of the new vertical rise section and the proponent's reason. They also liked the clarification that landing width is perpendicular to the direction of travel. Part of the confusion in the current text is the reference to width and no correlation with depth. Tread depth is measured in the direction of travel and depth is so associated. The depth of landings is clarified by using the term "depth in the direction of travel" in the last sentence. These solutions remain in tact in this modification and are supported in the proponent's original statement. It is important to understand that although the minimum stairway width is 36 inches the minimum landing size is related to the width of the flight served.

The intent of the original proposal was to clarify that landings of different shapes are not to be excluded if they provide sufficient space to serve as landings. The original drawings submitted clearly identify that other shapes can provide the same space or more than that of square or rectangular landings at the turn. The commentaries clearly state it is not the intent to require that a stairway landing be shaped as a square or rectangle. Although the original language of the proposal provides specific requirements the same intent has been accomplished and simplified in this modification to allow ease of enforcement without measuring angles.

The requirement now essentially relates that the landing be designed with concern for the gait of the user at the walkline by providing a depth at the walkline of not less than that which would be experienced on a rectangular landing. Further more the provision for an area equivalent to the relevant portion of a square landing has been added slightly increasing the size from the original proposal. Please see that the two landings illustrated below have the same width and area but are of different shapes allowing the safe turning of the stair at an angle of less than 90 degrees with out resorting to winder treads. In this example both landings would be considered acceptable minimum size landings for a stairway that is 36 inches wide.

Finally the committees concern to modify the language of the last sentence has also been addressed. (Please see the drawings submitted below) This modification provides clarification of the most common enforcement practices and substantially improves the interpretation and enforcement of the code.



Final Action: AS AM AMPC____ D

RB49-09/10
R311.7.7.1

Proposed Change as Submitted

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers'

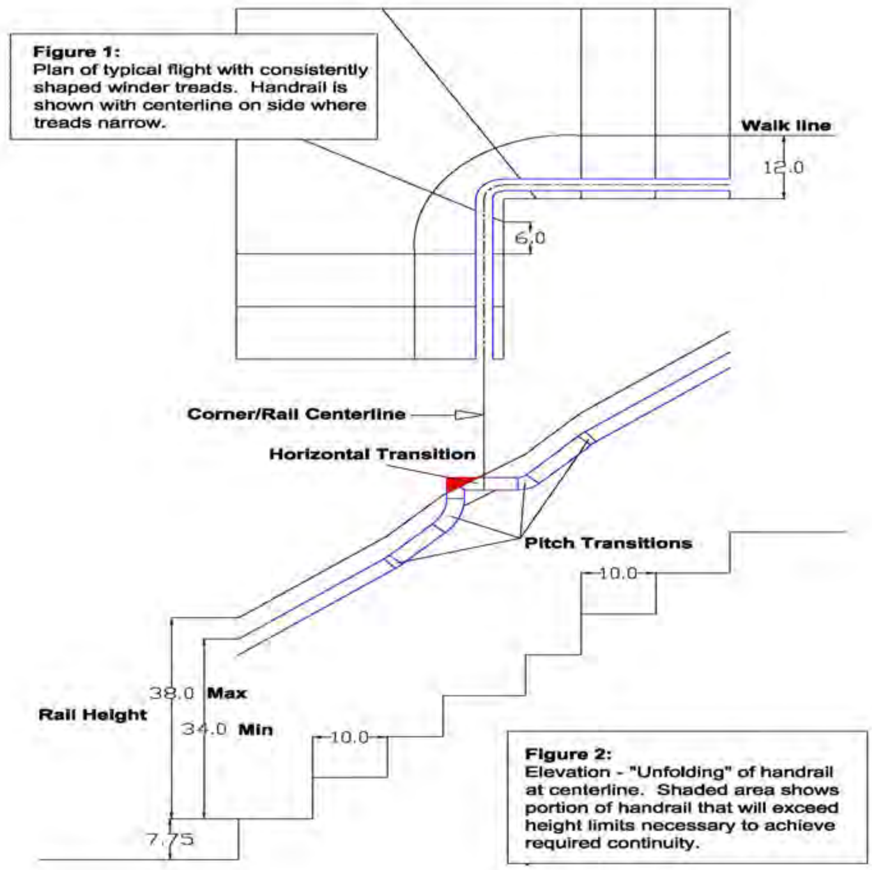
Revise as follows:

R311.7.7.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

Exceptions:

1. The use of a volute, turnout, or starting easing shall be allowed over the lowest tread.
2. When handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to guardrail, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.

Reason: Winder treads do not separate flights and the handrail transitions that must occur above them are not considered included by the text of this exception. As the original proponent of this exception adopted in 2007 this was an oversight. When using readily available fittings and bendings to provide continuity of the handrail above winder treads, especially at the side of the stair where the treads are narrower the height of the handrail may exceed the limits of 34 to 38 inches. The radical changes of angle in the short distances are best understood by studying this condition in elevation. Figure 1 shows a typical stairway plan and Figure 2 illustrates the unfolding of the elevation of the handrail and stair geometry. This additional condition should be included as it is of the same nature as those conditions already recognized and cited in the exception.



Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: COOPER-RB-2-R311.7.7.1

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee feels this is a good change that is a necessary addition to clarify the condition of continuity of the handrail at windows.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jake Pauls, representing self, requests Disapproval.

Commenter's Reason: RB49-09/10 is a bad code change. It permits significant discontinuities in handrail continuity at points in a stairway where such continuity is especially important, for example in moving between rectangular and winder treads. It makes a dangerous part of the stairway more dangerous**.**

Here it should be noted that the Stairway Manufacturers' Association (SMA) has contributed a great deal to reducing the usability and safety of required handrails for stairways. This is yet another step away from reasonably safe stairways because it allows ones handhold—to the limited extent that a handhold is even possible with the railing sections SMA favors, particularly the Type II railings—to be broken as a angular transition is introduced instead of a smooth curve. Smooth curves were traditionally possible when stairway design and construction was the highest example of the art and technology of joinery. It was done in wood as well as metal, there are even excellent examples of smooth transitions or curves being done in Type I handrails of wood. Figure 1 shows an extreme example of how badly handrails are done on some new home stairways at winders. Not only does the configuration look awful, it is even worse to hold on to than to look at. This change permits and encourages this kind of crude design and construction. If the stairway industry is going to mix rectangular and winding steps it should spend some effort to rediscovering how traditional craftsmen accomplished much more elegant and functional solutions to the problem of curved handrails. Moreover they did it without computers, using only pencil and paper.

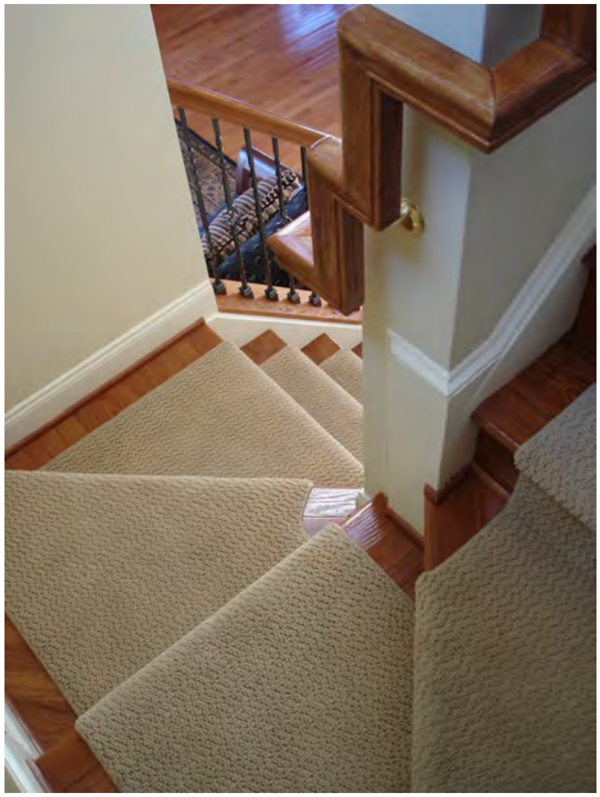


Figure 1. Crude fittings permitted at winders by relaxed Code rules.

Final Action: AS AM AMPC____ D

RB51-09/10
R312.1, R312.2

Proposed Change as Submitted

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

R312.1 Where required. Guards shall be located along ~~open-sided walking surfaces, including~~ open sides of decks, porches, balconies, raised floor surfaces, stairs, ramps and landings~~,~~ that are located more than 30 inches ~~measured vertically to~~ above the floor or grade below ~~at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard.~~

Guards shall be provided on porches, balconies, and decks enclosed with insect screening when the porch, balcony, or deck floor is located more than 30 inches (762 mm) above the floor or grade below.

R312.2 Height. Required guards ~~at open-sided walking surfaces, including stairs, porches, balconies or landings,~~ shall be not less than 36 inches (914 mm) high ~~measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads~~.

Exceptions:

1. Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Reason: The current language referencing "open sided walking surfaces" is vague, undefined and unenforceable. It isn't clear if this means ***any*** surface upon which someone could walk, defined walking surfaces, or only those surfaces that are part of a dwelling. One could interpret a driveway adjacent a stepped lot line being a regulated "open sided walking surface" and require a guard along its entire length. One could interpret the upper surface of a retaining wall as a walking surface requiring a guard. If a yard is a walking surface, one could interpret egress window wells as needing a guard. Is this what is intended? Conceivably we could have guards crisscrossing residential lots in willy nilly fashion whenever we have elevation changes. If a retaining wall exists on my neighbors property and there is a 3 foot drop from the top of this wall to the grade below and my driveway or my sidewalk is within 36 inches of this retaining wall, is a guard required even if the elevation change does not occur on my property? It would seem so! The code requires that I measure up to 36 inches away from the walking surface. Then, is it his responsibility to install the guard or is it mine? His lot creates the perceived hazard, not mine. If I install the guard on my property, there is still space on the other side of the guard to walk. Is the neighbor also required to install a guard? If my deck is 24 inches above grade below and 2 feet from my lot line and my neighbor has a 16 inch high retaining wall adjacent the lot line, does my deck require a guard? Is it me that creates the hazard or is it my neighbor? Who is responsible for the guard?

The new language addressing insect screening changes the original intent of these terms. When the code states that insect screening shall not be considered a guard, is it implying that windows must have fall protection and that screening does not constitute a guard? One must ask not just how a building official might interpret this language but how might a jury interpret this language if faced with a fall from a window that had only window screening. Might they conclude the code required additional protection?

Last, the code requires that guard height be measured from "adjacent fixed seating". How far must a fixed seat be from the edge of the surface in question before it isn't considered "adjacent"? Must it be in contact with the guard? If I say my house is adjacent to the park, do I mean my house is on the immediate border of the park or some short distance away? And, if I have a fixed seat next to the edge of a walking surface, is it an open walking surface that would require a guard or not? I can no longer walk on the surface near the elevation change.

This is a horribly worded code section that cannot be understood by the public and cannot be easily interpreted by the building official. The language is vague, ambiguous, and confusing. That is the worst kind of language to try to enforce.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DAVIDSON-RB-7-R312.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that although there isn't a specific definition of open sided walking surfaces, it is understood what a walking surface is and the difference is not significant enough to limit to the items proposed. This change would delete the fixed seating requirements. The committee likes getting rid of open sided walking surface. The proponent should get together with the proponent of E100-09/10, Part II and rework and bring back.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment 1:

Rick Davidson, representing self, requests Approval as Submitted.

Commenter's Reason: The requirements for guards in the 2006 IRC were clear, succinct, and direct. It read:

> ***Guards.*** *Porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.*

Guards were only required for "porches, balconies, ramps or raised floor surfaces" and "open sides of stairs".

It was clear that the rule did not apply to retaining walls, landscaping features, driveways, or any other location on the property except for those locations specifically listed.

Then the code was "improved". The language in the 2009 IRC reads:

> ***Where required.*** *Guards shall be located along open-sided walking surfaces, including stairs, ramps and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard.*

Now the code requires guards "along open-sided walking surfaces". Interpreted literally, virtually any place on the lot, inside or outside of the dwelling could be considered a "walking surface". No longer is the guard requirement applicable to something that is constructed as a part of the dwelling but physical features of the site may also trigger guard requirements. Comments made during the hearings in Baltimore suggested that it was the intent of the language to require guards along retaining walls. This opens the door to requiring guards around window wells and the difficulties that creates. There is no direction given in the language to provide guidance for interpretation and there will be no uniformity in its enforcement.

This is a huge departure from what was required in the 2006 IRC that limited guards to features normally considered part of the dwelling.

Even the IRC Committee is confused about the language. In their reason statement for disapproving this code change they stated: "The committee feels that although there isn't a specific definition of open sided walking surfaces, it is understood what a walking surface is and the difference is not significant enough to limit to the items proposed." Then they further stated: "The committee likes getting rid of open sided walking surface." And last, "The proponent should get together with the proponent of e100-09/10, Part II and rework and bring it back."

The language that is proposed is the same language that was in the first three editions of the IRC. It covered all of those scenarios likely found in residential dwelling construction.

The current language also creates confusion regarding the use of insect screening. The 2006 IRC language was patterned after that found in the IBC and read: "Porches and decks which are enclosed with insect screening shall be equipped with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below." It was clear that the intent was to prohibit screening that was commonly used in screen porches and similar structures from meeting the requirements of a guard.

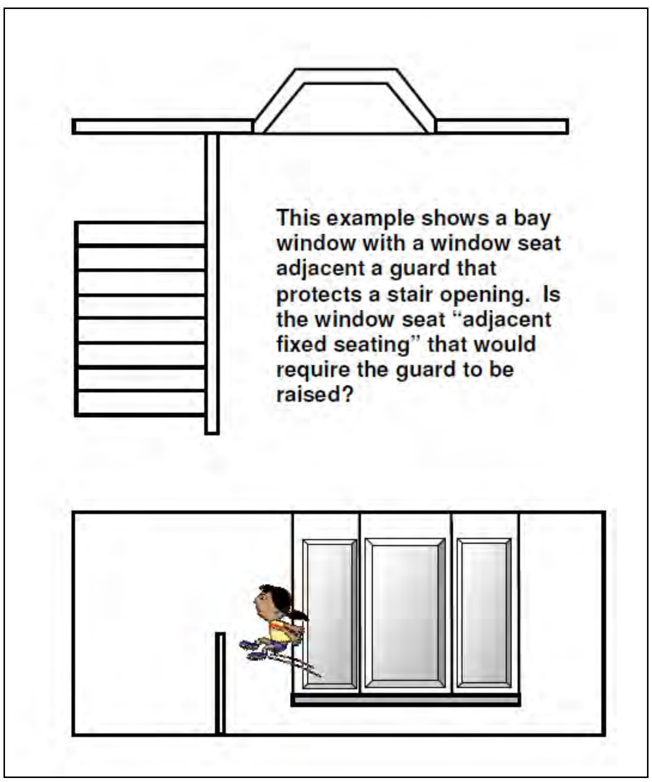
The language in the 2009 IBC has not changed. It continues to read: "1013.4 Screen porches. Porches and decks which are enclosed with insect screening shall be provided with *guards* where the walking surface is located more than 30 inches (762 mm) above the floor or grade below." It is clear that the screening language in the IBC applies only to screen porches.

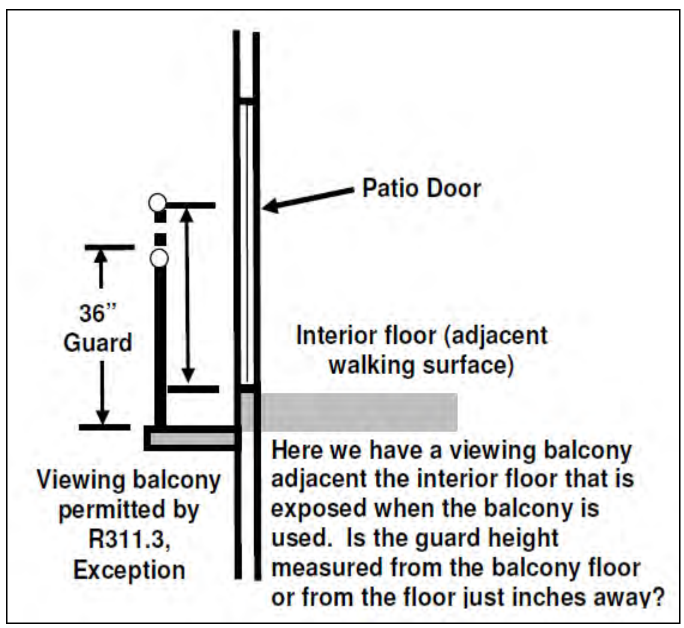
The new language in the IRC simply states: "Insect screening shall not be considered as a guard." There is no qualifying language that references screen porches. It states that screening can't be used as a guard along "open sided walking surfaces". Now we are back to what constitutes an "open sided walking surface". The language is already being challenged in the courts to include certain windows. Since the most common application of insect screening is for windows, it is reasonable to make that connection. That should not be the direction of the code. The language in the IRC is significantly different than that found in the IBC.

The last issue that the proposal addresses is that of measuring the height of guards from "adjacent fixed seating". There has been no data to support the notion that fixed seating occurring near a guard is dangerous. And isn't it much more likely that moveable seating and other furnishings will be placed adjacent guards also creating a "hazard" and they are unregulated. The 2009 language is a solution looking for a problem. As the rule applies to decks, people have decks so they can sit outside and enjoy the views and fresh air, not the inside of a guard. And it isn't uncommon to have window seats near a guard as shown in one of the following illustrations. The hypocrisy is that the window seat could be next to an open window with no regulation but a guard that may be considered "adjacent" would need to tower 36 inches above the window seat.

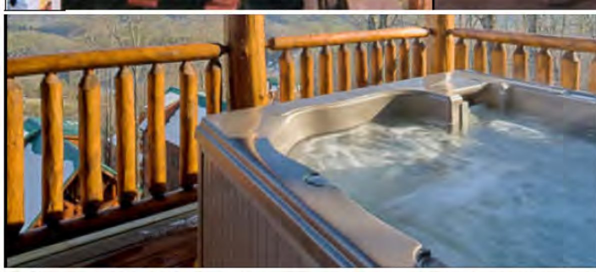
Because the code requires that guards be able to resist a single concentrated load of 200 pounds at any point along the top of the guard, attaching a five or six foot tall guard to meet this requirement becomes expensive and unnecessary for residential construction.

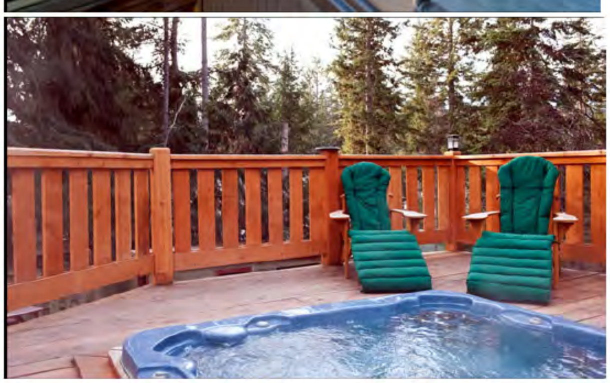
The current language creates all sorts of unintended consequences, is confusing and difficult to interpret, and removed language from the code that was never shown to be a problem.



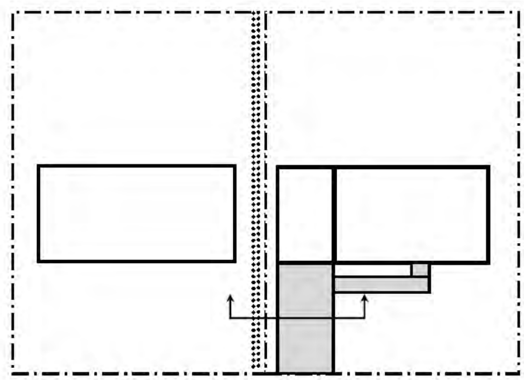


This picture illustrates two issues that arise with the current language on guards. First, we have a walking surface that is more than 30 inches above a point within 36 inches of the open side of the walking surface. Therefore a guard 36 inches high is required. Then we have adjacent fixed seating in the form of the seating around the edge of the hot tub. The seating is 42 inches above the walking surface. Therefore the total height of the guard at this location will be 78 inches. The IRC requires that the guard be able to resist a "single concentrated load (of 200 pounds) applied in any direction along the top." This will require some very substantial mounting hardware to attach the guard to the patio to resist such forces.





Each of these photos illustrates a possible application of a guard next to adjacent fixed seating. In all of the pictures one could interpret the code to require that the guard be 36 inches higher than the adjacent fixed seating. In the photo to the lower left, the edge of the hot tub is approximately 6 inches above the floor of the deck. Therefore the railing should be raised for that portion of the railing that is considered "adjacent the fixed seating.



If the retaining wall is more than 30 inches high, must a guard be placed along the driveway which creates an open sided walking surface if the edge of the driveway is less than 36 inches from the wall? The retaining wall is on the neighbor's property. Who must install the guard, the owner creating the hazard or the owner creating the walking surface? Could the owner of the driveway place a guard along the driveway or must it be installed at the lot line?

Public Comment 2:

Gerald Anderson, City of Overland Park, KS, requests Approval as Modified by this Public Comment.

Replace proposal as shown:

R312.1 Where required. Guards shall be located along open-sided walking surfaces,~~ including~~ on stairs, ramps ~~and~~ landings, decks, porches, balconies and other raised floor surfaces~~,~~ that are located more than 30 inches measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard.

Guards shall be provided on porches, balconies, and decks enclosed with insect screening when the porch, balcony, or deck floor is located more than 30 inches (762 mm) above the floor or grade below.

R312.2 Height. Required guards ~~at open sided walking surfaces, including stairs, porches, balconies or landings,~~ shall be not less than 36 inches (914mm) high. ~~measured above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads~~.

Exceptions:

1. Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Commenter's Reason: As the original proponent has stated, the current code language regarding "open sided walking surfaces" is vague, undefined and unenforceable. The primary problem is that the code doesn't restrict where one might find an open sided walking surface. As the code is currently written one might find an open sided walking surface along a small retaining wall out in the middle of a yard. The code has never required a guard in such a space. This change is needed in order to more clearly specify where guards are required.

Final Action: AS AM AMPC____ D

RB60-09/10
R315, R315.1.1, R315.1.2, R315.1.3, Chapter 44

Proposed Change as Submitted

Proponent: Scott Dornfeld, City of Delano, MN

1. Delete without substitution:

~~**SECTION R315**~~
~~**CARBON MONOXIDE ALARMS**~~

~~**R315.1 Carbon monoxide alarms.** For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in *dwelling units* within which fuel-fired *appliances* are installed and in dwelling units that have attached garages.~~

~~**R315.2 Where required in existing dwellings.** Where work requiring a *permit* occurs in existing *dwellings* that have attached garages or in existing dwellings within which fuel-fired *appliances* exist, carbon monoxide alarms shall be provided in accordance with Section R315.1.~~

~~**R315.3 Alarm requirements.** Single station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.~~

2. Delete standard as follows:

UL
~~2034-2008 Standard for Single and Multiple Station Carbon Monoxide Alarms~~

Reason: A new rule should never be imposed unless it can be shown that there is a significant hazard posed that can be directly influenced by the rule. It is not the goal of the I-Codes, the stated purpose of which is to provide minimum standards, to eliminate all hazards such that no one will ever be killed or injured as a result of the design of or a defect in a building. It is simply too expensive and impractical to do so. Such is the case with the addition of carbon monoxide requirements in the IRC that nationwide will increase costs to homeowners in the hundreds of millions of dollars with a potentially negligible impact on CO deaths. Additionally, it requires that the alarms be installed any time work is done and a permit is required. This means if I have my house reroofed, I must install CO alarms (but not smoke alarms). I would be required to install them if I have an attached garage even when studies show the likelihood of carbon monoxide poisoning occurring from motor vehicles is extremely low and even if portions of the garage are permanently open to the outside.

Following are some excerpts taken from a publication by the Consumer Product Safety Commission entitled ***"Non-Fire Carbon Monoxide Deaths Associated with the Use of Consumer Products 2003 and 2004 Annual Estimates".***

P. 4 - During 2004, the most recent year for which nearly complete data are available, there were an estimated 162 carbon monoxide (CO) poisoning deaths associated with the use of a consumer product under the jurisdiction of the U.S. Consumer Product Safety Commission (CPSC). There were an estimated 154 fatalities in 2003. Carbon monoxide poisonings referred to in this report do not include those where the CO gas resulted from a fire or a motor vehicle, were intentional in nature or were directly work-related.

Comment: The number of CO deaths was often cited as being in the thousands, not 150-160, which is the accurate number.

Table 1
Estimated Non-Fire Carbon Monoxide Poisoning Deaths
By Associated Fuel-Burning Consumer Product, 1999-2004.

Consumer Product	2002 - 2004+		Annual Estimate					
	Average Estimate	Average Percent	1999	2000	2001	2002	*2003+*	*2004+*
Total Deaths	*166*	*100%*	109	137	122	181	*154*	*162*
Heating Systems	*82*	*49%*	50	81	72	97	*66*	*84*
Unspecified Gas Heating	*7*	*4%*	5	1	5	2	*4*	*14*
LP Gas Heating	*29*	*18%*	22	28	24	41	*22*	*25*
Natural Gas Heating	*30*	*18%*	20	42	28	32	*27*	*30*
Coal/Wood Heating	*3*	*2%*	0	2	6	4	*2*	*4*
Kerosene/Oil Heating	*6*	*4%*	2	8	6	8	*6*	*4*
Diesel Fuel	*< 1*	*< 1%*	*	*	*	1	*	*
Heating Systems, Not Specified	*7*	*4%*	1	*	3	9	*5*	*7*
Charcoal Grills or Charcoal	*7*	*4%*	17	8	10	11	*8*	*3*
Gas Water Heaters	*3*	*2%*	1	3	1	1	*7*	*1*
Gas Grills, Camp Stoves, Lanterns	*5*	*3%*	14	4	1	5	*2*	*8*
Gas Ranges/Ovens	*3*	*2%*	6	12	9	3	*3*	*4*
Other Appliances	*1*	*1%*	1	0	0	0	*2*	*1*
Multiple Appliances	*8*	*5%*	6	2	7	12	*8*	*4*
Engine-Driven Tools	*54*	*33%*	13	27	22	51	*57*	*55*
Generators	*44*	*27%*	7	19	21	41	*50*	*41*
Other Engine-Driven Tools	*10*	*6%*	6	8	1	10	*7*	*14*

\+ Data collection for 2003 and 2004 is incomplete. Italicized estimates may change in the future.
* No reports received by CPSC staff.
Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, CPSC Injury or Potential Injury Incident File, CPSC In-Depth Investigation File, National Center for Health Statistics Mortality File, 1999 - 2004.
Note: Reported average percentages by product may not add to total due to rounding.

P. 6 - Of the 47 estimated deaths in 2003 and 2004 that were associated with LP gas heating systems, 32 (68%) involved unvented portable propane heaters. These unvented portable propane heaters were fueled by a propane tank and were not a component of an installed heating system. Unvented portable propane heaters were either camping heaters that used disposable propane tanks, one pound propane bottles, or tank top heaters that used bulk tanks larger than one pound.

Comment: Unvented portable propane heaters cannot be used as a primary heat source in a building. Therefore these incidents likely occurred when they were used for temporary heat or in locations outside a home such as a camping unit. Requiring CO alarms in homes will have no impact on CO deaths that occur in camping trailers and locations other than the home. Requiring CO alarms in homes because someone might bring an unvented heater into their house and improperly use it is unwarranted.

P. 6 - In 2003 and 2004, an estimated 11 CO deaths (3% of the 316 total consumer product estimate) were associated with charcoal or charcoal grills; an estimated eight deaths (3% of the total consumer product estimate) were associated with a gas water heater; gas grills, camp stoves and lanterns were associated with an estimated eight deaths (3% of the total consumer product estimate); gas ranges and ovens were associated with an estimated seven deaths (2% of the total consumer product estimate); and three deaths were either associated with consumer products that did not fit into the categories given above or there was insufficient detail to categorize the appliance. One fatality was associated with a propane-fueled refrigerator, one was associated with a product simply defined as a "propane appliance" and another as a "gas-fueled appliance".
These incidents were categorized as "Other appliances". Additionally, in 2003 and 2004 an estimated 12 deaths were associated with multiple appliances (4% of the total consumer product estimate). The multiple appliances category included all incidents where multiple fuel-burning products were used simultaneously such that a single source of the CO could not be determined. Of the 12 multiple appliance fatalities, six were associated with a generator and another product. These other products were a kerosene heater (three deaths), an LP gas heater (two deaths) and a wood stove. Other fatalities where multiple products were simultaneously used and associated with a CO poisoning death involved a portable propane heater and a gas-powered snow thrower; a portable propane heater and a propane lantern; a kerosene heater and a propane heater; a natural gas heater and hot water heater; a propane furnace and a propane oven in a travel camper; and a natural gas furnace and natural gas oven.

Comment: While it may seem cruel, at times one needs to invoke the "any idiot rule". The code should not require CO alarms to deal with people operating charcoal grills or lawn mowers in their living rooms.

P. 6 - An estimated 112 CO poisoning deaths (35% of the estimated total from 2003 and 2004) were associated with engine-driven tools, which includes generators, riding mowers, a concrete cutter, a gas-fueled welder, power washers, a water pump, an air compressor and an ATV. Generator associated deaths comprise the majority of this category. There were an estimated total of 91 generator-related CO poisoning deaths in 2003 and 2004 (81% of all engine-driven tool fatalities and 29% of the total consumer product estimate).

P. 7 - Of the 123 liquid fueled appliance-related fatalities in 2003 and 2004, 112 (91%) were associated with all engine-driven tools (generators, lawn mowers, power washers, concrete saws, etc.). Generators accounted for 91 of the estimated 123 fatalities (74%) in the Liquid Fueled Appliances category.

Table 2

Estimated Non-Fire Carbon Monoxide Poisoning Deaths

Associated with Consumer Products Organized by Fuel Type, 1999-2004.

Consumer Product	2002-2004+ Average Estimate	2002-2004+ Average Percent	Annual Estimate 1999	2000	2001	2002	*2003+*	*2004+*
Total Deaths	*166*	*100%*	109	137	122	181	*154*	*162*
Gas Fueled Appliances	*84*	*51%*	67	91	71	92	*72*	*89*
Room / Space Heater	*33*	*20%*	20	39	23	35	*30*	*34*
Natural Gas Fueled	*8*	*5%*	3	17	5	9	*8*	*8*
Propane Fueled	*19*	*12%*	16	21	17	21	*19*	*18*
Other / Unspecified	*5*	*3%*	1	1	1	5	*3*	*8*
Furnace	*40*	*24%*	25	33	37	48	*28*	*43*
Natural Gas Fueled	*22*	*13%*	16	25	23	24	*19*	*23*
Propane Fueled	*10*	*6%*	6	8	7	20	*3*	*7*
Other / Unspecified	*8*	*5%*	3	*	7	4	*6*	*13*
Range, Oven	*3*	*2%*	6	12	9	3	*3*	*4*
Water Heater	*3*	*2%*	1	3	1	1	*7*	*1*
Refrigerator	*<1*	*<1%*	1	*	*	*	*1*	*
Lantern	*2*	*1%*	8	3	*	2	*1*	*4*
Gas Grill, Camp Stove	*2*	*1%*	5	1	1	3	*1*	*2*
Other	*1*	*<1%*	1	*	*	*	*1*	*1*
Solid Fueled Appliances	*11*	*7%*	17	10	16	15	*10*	*7*
Charcoal / Charcoal Grill	*7*	*4%*	17	8	10	11	*8*	*3*
Wood / Coal Heater	*3*	*2%*	*	2	6	4	*2*	*4*
Coal Furnace	*1*	*<1%*	*	1	1	1	*	*1*
Wood / Coal Stove	*1*	*1%*	*	1	5	1	*2*	*1*
Chimney / Fireplace	*1*	*1%*	*	*	*	2	*	*2*
Liquid Fueled Appliances	*61*	*37%*	16	34	28	59	*63*	*60*
Oil Heater / Heating	*1*	*1%*	*	4	5	3	*1*	*
Kerosene Heater / Heating	*5*	*3%*	2	3	1	4	*5*	*4*
Generators	*44*	*27%*	7	19	21	41	*50*	*41*
Other Engine-Driven Tools	*10*	*6%*	6	8	1	10	*7*	*14*
Lantern / Product / Appliance	*<1*	*<1%*	1	1	*	1	*	*1*
Multiple Products Involved	*8*	*5%*	7	2	8	13	*8*	*4*

\+ Data collection is incomplete for 2003 and 2004. Italicized estimates may change in the future.

* No reports received by CPSC staff.

Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, CPSC Injury or Potential Injury Incident File, CPSC In-Depth Investigation File, National Center for Health Statistics Mortality File, 1999 - 2004.

Note: Reported average percentages by product may not add to total due to rounding.

Table 3
Estimated Non-Fire Carbon Monoxide Poisoning Deaths Associated with Engine-Driven Tools, 1999-2001 vs. 2002-2004.

Engine-Driven Tools	1999-2001 Average Estimate	2002-2004+ Average Estimate	Annual Estimate 1999	2000	2001	2002	2003+	2004+
Total	**21**	*54*	**13**	**27**	**22**	**51**	*57*	*55*
Generators	**16**	*44*	**7**	**19**	**21**	**41**	*50*	*41*
Other Engine-Driven Tools	**5**	*10*	**6**	**8**	**1**	**10**	*7*	*14*
Lawn Mowers[1]	5	*6*	6	7	1	5	*6*	*8*
Gas Welder	*	*1*	*	*	*	2	*1*	*
Concrete Saw	*	*1*	*	*	*	1	*	*1*
Power Washer	*	*1*	*	*	*	*	*	*2*
ATV	*	*1*	*	*	*	1	*	*1*
Snow Blower	< 1	*	*	1	*	*	*	*
Air Compressor	*	*< 1*	*	*	*	*	*	*1*
Water Pump	*	*< 1*	*	*	*	*	*	*1*

1 Lawn Mowers includes riding mowers, garden tractors and gas-fueled powered push mowers.
\+ Data collection is incomplete for 2003 and 2004. Italicized estimates may change in the future.
* No reports received by CPSC staff.
Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, CPSC In-Depth Investigation File, CPSC Injury or Potential Injury Incident File, National Center for Health Statistics Mortality File, 1999 - 2004.
Note: Reported average percentages by product may not add to total due to rounding.

P. 11 - Table 6 shows that in 2003 and 2004, an estimated 230 CO poisoning deaths occurred in homes, including manufactured and mobile homes. From 2002-2004, an annual average of 72 percent of CO poisoning deaths occurred in homes, including manufactured and mobile homes. In 2003 and 2004, an estimated 45 deaths took place in temporary shelters, such as tents, recreational vehicles, cube vans, seasonal cabins, and trailers (including horse trailers). In 2002- 2004, an annual average of 17 percent of CO poisoning deaths took place in temporary shelters. In 2003 and 2004, 25 of the 45 estimated deaths in temporary shelters were most commonly associated with portable gas or LP gas heating or cooking appliances. Generator usage in a temporary shelter was the second largest product category with an estimated 11 deaths in 2003 and 2004. Other scenarios included charcoal and charcoal grills, LP gas lanterns, kerosene heaters and a kerosene cooker. A consistently small percentage of deaths occurred in passenger vans, trucks, or automobiles in which victims were spending the night. For 2003 and 2004, of the estimated 13 CO fatalities in this category, nine were associated with portable LP gas heaters.

Comment: CO alarm requirements in the IRC would not impact incidents in mobile homes, tents, RV's, seasonal cabins, trailers, passenger vans, trucks, and automobiles.

Table 6
Estimated Non-Fire Carbon Monoxide Poisoning Deaths by Location of Death, 1999-2004.

Location of Death	2002-2004+ Average Estimate	2002-2004+ Average Percent	Annual Estimate 1999	2000	2001	2002	2003+	2004+
Total	***166***	***100%***	**109**	**137**	**122**	**181**	***154***	***162***
Home	*119*	*72%*	60	88	85	128	*110*	*120*
Temporary Shelter	*28*	*17%*	35	34	24	39	*23*	*22*
Auto	*7*	*4%*	7	2	10	8	*8*	*5*
Other	*10*	*6%*	7	13	3	5	*10*	*15*
Unknown	*1*	*1%*	*	*	*	2	*2*	*

\+ Data collection is incomplete for 2003 and 2004. Italicized estimates may change in the future.
* No reports received by CPSC staff.
Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, CPSC In-Depth Investigation File, CPSC Injury or Potential Injury Incident File, National Center for Health Statistics Mortality File, 1999 - 2004.
Note: Reported average percentages by product may not add to total due to rounding.

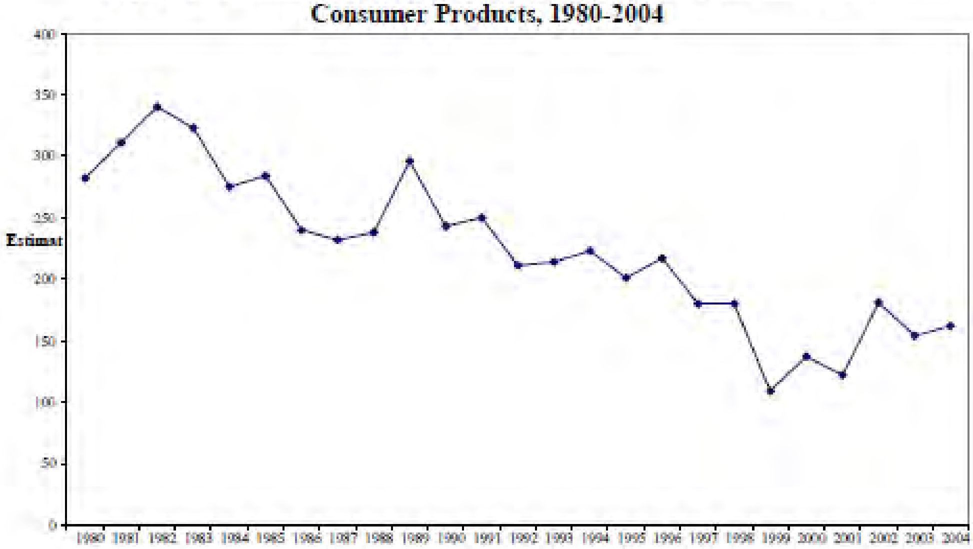
Appendix B: National Estimates of Consumer Product-Related CO Poisoning Deaths, 1980 - 2004

Estimated Non-Fire Carbon Monoxide Poisoning Deaths Associated with Consumer Products, 1980-2004

Year	Estimate
1980	282
1981	311
1982	340
1983	323
1984	275
1985	284
1986	240
1987	232
1988	238
1989	296
1990	243
1991	250
1992	211
1993	214
1994	223
1995	201
1996	217
1997	180
1998	180
1999*	109
2000	137
2001	122
2002	181
2003	154
2004	162

* The Tenth Revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) was implemented.
Source: U.S. Consumer Product Safety Commission / EPHA.

Figure 1: Estimated Non-Fire CO Poisoning Deaths Associated with Consumer Products, 1980-2004



Reading through even these brief excerpts, one wonders if requiring CO alarms would have any impact on CO related deaths at all given the circumstances surrounding most deaths. Furthermore, the number of deaths decreased without government regulation from 340 in 1982 to 162 in 2004. This decrease occurred during a time when the population increased from about 225 million to 296 million in 2004. The steadily decreasing number of deaths and their location doesn't indicate that requiring CO alarms would have any statistical impact on deaths.

Regarding the matter of CO deaths and attached garages, following are excerpts from an article entitled:
The Role of Catalytic Converters in Automobile Carbon Monoxide Poisoning[*] A Case Report by Bradley Vossberg, MD and Judah Skolnick, MD, FCCP
[*] From the Frazier Rehab Center, Jewish Hospital Health Network, Louisville, KY.

Inhaling motor vehicle exhaust fumes is a common method used by people attempting to commit suicide; however, the decreased carbon monoxide concentrations found in the exhaust of late-model automobiles equipped with catalytic converters are changing the clinical presentation of exhaust inhalation.

Closed-environment exposure to MVEGE from automobiles not equipped with catalytic converters can result in death within 30 min. The introduction of catalytic converters beginning with 1975 new-car models dropped CO emission rates to 6.00 g/min. By 1989, the average new-car

CO emission at idling was 0.22 g/min. The catalytic conversion process removes CO, hydrocarbons, and nitrogen oxide; the resultant emission is a more desirable mixture of nitrogen, CO_2, and water. Contemporary three-way catalytic converters eliminate > 99% of CO emissions.

Given the increased efficiency of modern catalytic converters, patients presenting with closed-environment MVEGE exposure may have much lower HbCO levels than would have been previously expected; in some cases, the HbCO level may be normal. Other important factors to be considered are the role of supplemental O_2 given at the scene and the time taken to obtain the HbCO level.

Attached garages do not pose a risk. By definition, an attached garage is three walls and a roof. A garage door is not required. There are no requirements that the garage be air tight or enclosed to a degree that would create any danger, even if CO levels were high.

Clearly, expecting CO alarms to have any positive impact on CO death rates is extremely optimistic and likely unrealistic. If we are going to require the public to spend their money on safety related devices, surely we can find a more productive area on which to spend it.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: DORNFELD-RB-2-R315

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that deleting carbon monoxide detectors would weaken the code relative to life safety. Carbon monoxide detectors are within the intent of the IRC and the ICC membership voted to place them into the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rick Davidson, representing self, requests Approval as Submitted.

Commenter's Reason: One of the most egregious acts that our organization can impose on the public is the adoption of rules that provide little or no benefit to improving life, health and safety yet increase the cost of owning a home.

The rule requiring the installation of carbon monoxide alarms is one of those acts.

There have been attempts at placing carbon monoxide alarms in the code for perhaps a decade. The membership has voted every one of them down because there was no factual evidence to indicate that there was a problem that warranted or could be solved by costly regulation.

Is carbon monoxide a problem? There is no question that carbon monoxide kills people. But is it a problem in homes worthy of expensive corrective action? And are corrective actions available that will change the number of deaths that occur? Adopting rules aimed at preventing deaths may make people feel good but if they don't achieve their intended purpose, they are a costly failure.

Unlike some issues, there is a wealth of information available regarding carbon monoxide deaths. The Consumer Product Safety Commission regularly produces a document, the most recent of which is entitled "Non-Fire Carbon Monoxide Deaths Associated with the Use of Consumer Products 2006 Annual Estimates."

The report states that 180 accidental carbon monoxide deaths occurred in 2006 in the US. To put the number of CO deaths in perspective, how does the number of CO deaths compare with other accidental deaths? Compared to the 180 CO deaths in 2006:

784 people died in bicycle accidents in 2005 (nearly 4 ½ times more than died of CO poisoning).
3,579 people died from accidental drowning in 2006.
20,823 people died from accidental falls in 2006.
43,313 people died in auto crashes in 2008.
3,320 people died in fires in 2008.
18,573 people were murdered in 2006.
27,531 people died from accidental poisoning in 2006.
31 people died from dog attacks in 2006

The number of accidental CO deaths pales compared too many other common types of accidental deaths.

But, if we take a position that accidental CO deaths are a problem, is the solution of putting CO alarms in new homes going to have an impact, any impact, on the number of CO deaths.

The CPSC 2006 report listed a number of key findings. Among them:

- *"There were an estimated 180 unintentional non-fire CO poisoning deaths associated with consumer products under CPSC's jurisdiction. The estimated annual average from 2004-2006 was 181 deaths."*
- *"Engine-Driven Tools were associated with the largest percentage of non-fire CO poisoning fatalities at 58 percent (104 deaths). Heating Systems-related CO fatalities were associated with 28 percent (50 deaths) and five of the remaining six product categories [Charcoal Grills or Charcoal (10 deaths), Gas Water Heaters (4 deaths), Gas Grills, Camp Stoves, Lanterns (4 deaths), Other Appliances (1 deaths), and Multiple Appliances (7 deaths)] combined were associated with a total of 14 percent. There were no reported deaths in the Gas Ranges/Ovens category."*

Comment: 180 accidental CO deaths occurred. 58% of the CO deaths were a result of engine-driven tools. How many could have been prevented if CO alarms were in new homes? Some of these deaths occurred in garages, tents, campers and locations other than the home. If one subtracts the 104 deaths from engine-driven tools, 10 deaths from charcoal grills, and 4 deaths from gas grills, camp stoves, and the like, that leaves only 62 deaths occurring from heating systems, water heaters, and other appliances likely to be found in a home. Clearly, CO alarms would have prevented few if any of the 114 CO deaths attributed to engine-driven tools, camps stoves, charcoal grills and similar devices not found in homes. That leaves 62 deaths that may have been impacted by CO alarms.

• *"Of the estimated 104 CO fatalities in 2006 that were associated with Engine-Driven Tools, 82 percent (85 deaths) involved generators. Additionally, generator usage was associated with three of the estimated seven multiple appliance CO poisoning fatalities."*
• *"There is a statistically significant increasing trend in consumer product-related non-fire CO fatalities from 1999 to 2006 that is attributable to generators."*

Comment: Generators are not a home appliance and should not be operated in a home. Should homes be provided with CO alarms because someone may run engine driven tools in their home? Where does this stop? Is the solution to this problem putting alarms in homes or are there better solutions such as public education or better labeling and instructions for engine-driven tools. The entire US population should not have to pay hundreds of millions of dollars to install CO alarms in their homes because 50 people operated gas powered tools or charcoal grills inside their homes.

• *"Of the estimated 50 Heating Systems-related fatalities in 2006, 90 percent involved gas heating. Natural gas heating accounted for 46 percent of heating system-related fatalities, liquefied petroleum (LP or propane) gas heating accounted for 38 percent, and an additional six percent were only identified as unspecified gas heating. Kerosene/oil heating and unspecified heating systems accounted for the remaining eight percent."*

Comment: Since the adoption and enforcement of model codes in rural areas of the country is sporadic to non-existent, those areas are seen as less likely to benefit from a CO alarm mandate because there is no agency to educate the public or enforce rules. Because of the cost of installing gas lines, natural gas is usually only available in communities or more highly developed areas. Rural areas are more dependent on propane, fuel oil, and kerosene. Of the 50 estimated CO deaths attributable to heating systems, 23 occurred with a natural gas appliance. The remainder of the deaths was attributed to propane, fuel oil, and kerosene. These deaths are more likely to have occurred in areas that wouldn't be reached by code adoption. How many of these 50 estimated deaths could be saved with a CO alarm mandate?

• *"Seventy-one percent of the estimated 180 CO deaths in 2006 occurred in a home; while an estimated 17 percent of deaths occurred in tents, campers, and other temporary shelters."*

Comment: 31 of the 180 CO deaths occurred outside the home. Requirements for CO alarms would have no impact on these deaths.

•*"CO poisoning fatalities in isolated locations account for a larger proportion of all CO fatalities (13% in 2004 through 2006) than the proportion of the U.S. population living in isolated areas (4%). The disparity is even higher at isolated non-home locations which account for 25 percent of all CO fatalities occurring at non-home locations."*

Comment: The model codes are not adopted uniformly across all areas of the country. Often, rural areas are not governed by codes. This statistic indicates that more isolated areas have a greater incidence of CO deaths. Could it be that rural areas have less supervision of building construction that leads to more CO deaths? What other explanations are there? What impact would a CO alarm mandate have on these areas?

• *"… for non-engine driven tool products, the mortality rate has decreased by 16 percent since 1999/2000, from 3.67 in 1999/2000 down to a 3.08 average mortality rate in 2004 through 2006."*

Comment: So with no requirements for CO alarms in the I-Codes, the mortality rate has decreased by 16% since 2000. With the number of deaths decreasing at a steady pace, how necessary is it to require CO alarms?

The report goes on to say:

"Of the estimated 19 deaths in 2006 that were associated with LP gas heating systems, 11 (58%) involved unvented portable propane heaters. These unvented portable propane heaters were fueled by a propane tank and were not a component of an installed heating system. Unvented portable propane heaters were either camping heaters that used disposable propane tanks, one pound propane bottles, or tank top heaters that used bulk tanks larger than one pound."

And,*"…an estimated 10 CO deaths (6% of the 180 total consumer product estimate) were associated with charcoal or charcoal grills"*

"…an estimated four deaths (2% of the total consumer product estimate) were associated with a subcategory of products which include gas grills, camp stoves, and lanterns; and one death was either associated with a consumer product that did not fit into the categories given above or there was insufficient detail to categorize the appliance involved. This latter incident involved the use of a grill inside a house, but it is unclear whether the grill was a gas grill or a charcoal or wood burning grill. This incident was categorized as Other Appliances."

"Additionally, in 2006, an estimated seven deaths were associated with multiple appliances (4% of the total consumer product estimate). The Multiple Appliances category includes all incidents where multiple fuel-burning products were used simultaneously such that a single source of the CO could not be determined. Of the estimated seven multiple appliance fatalities, three were associated with the simultaneous use of a gasoline-fueled generator and an LP heater. Of the estimated seven multiple appliance fatalities, six were associated with some type of LP heater."

"An estimated 104 CO poisoning deaths (58% of the estimated total from 2006) were associated with the category of Engine-Driven Tools, which includes generators, riding mowers or garden tractors, pressure washers, a snowmobile, a snow thrower, an air compressor, a water pump, and a non-vehicular internal compression engine."

There is much discussion in the report regarding the type of appliances that cause the CO problems. Often they are found to be old, poorly maintained products. This indicates that the problems aren't in new homes and requiring CO alarms in new homes won't solve these problems.

The current rules require CO alarms if the home contains an attached garage. Presumably, the reason for this requirement is the assumption that automobiles in garages generate sufficient carbon monoxide to be a hazard. There is no data to indicate this is so.

According to the US Environmental Protection Agency and in recognition of the fact that cold engines give off more CO, the 1990 Clean Air Act calls for 1994 and later cars and light trucks to meet federal carbon monoxide standards at 20 degrees Fahrenheit whereas the old rules required those standards be met at 75 degrees Fahrenheit. So the risk of increased CO levels emitting from cold engines is significantly reduced.

Furthermore, following are excerpts from an article entitled:

The Role of Catalytic Converters in Automobile Carbon Monoxide Poisoning* **A Case Report by Bradley Vossberg, MD and Judah Skolnick, MD, FCCP**
* From the Frazier Rehab Center, Jewish Hospital Health Network, Louisville, KY.

> *Inhaling motor vehicle exhaust fumes is a common method used by people attempting to commit suicide; however, the decreased carbon monoxide concentrations found in the exhaust of late-model automobiles equipped with catalytic converters are changing the clinical presentation of exhaust inhalation.*
>
> *Closed-environment exposure to MVEGE from automobiles not equipped with catalytic converters can result in death within 30 min. The introduction of catalytic converters beginning with 1975 new-car models dropped CO emission rates to 6.00 g/min. By 1989, the average new-car CO emission at idling was 0.22 g/min. The catalytic conversion process removes CO, hydrocarbons, and nitrogen oxide; the resultant emission is a more desirable mixture of nitrogen, CO_2, and water.* ***Contemporary three-way catalytic converters eliminate > 99% of CO emissions.***
>
> *Given the increased efficiency of modern catalytic converters, patients presenting with closed-environment MVEGE exposure may have much lower HbCO levels than would have been previously expected; in some cases, the HbCO level may be normal. Other important factors to be considered are the role of supplemental O_2 given at the scene and the time taken to obtain the HbCO level.*

More findings related to automobile carbon monoxide poisoning can be found in a technical paper entitled "***Reducing the Risk of Accidental Death Due to Vehicle-Related Carbon Monoxide Poisoning***" by **Linsey C. Marr, Glenn C. Morrison, William W. Nazaroff, and Robert A. Harley,** *Department of Civil and Environmental Engineering, University of California, Berkeley, California.* This technical paper reports on studies and analysis of computer modeling undertaken to determine the risk of death from CO poisoning in homes and garages. Among the findings: "The risk of death ranged from 16-21% for a 3-hr exposure ***in*** a garage to 0% for a 1-hr exposure in a house."

With any study with so many variables, one can question the validity of the study. This one is no different. Among the difficulties in modeling the conditions were numerous variables including:

Age and condition of the motor vehicle
Air exchange rates for the garage and dwelling
Size of the garage and dwelling
Length of time the vehicle is running
Amount of fuel in the fuel tank
Age and health of the individual
Temperature and weather conditions
Newer vehicles have more effective catalytic converters
Socioeconomic factors may result in older, less efficient vehicles stored outside or garages with higher air exchange rates

But the study was based on very conservative conditions and it was pointed out that the risks may be overestimated.

The study points out that unintentional CO deaths from automobiles do occur. But most all of these deaths occurred ***in*** the garage. The most frequent cause of CO deaths were a driving into a garage (often under the influence of alcohol or drugs) and leaving the engine running (42% of deaths) and starting the car to perform vehicle maintenance (25%) or to provide heat (23%).

Importantly, the study points out that even these deaths are dropping at a rate of about 7% a year as older vehicles are replaced by newer, more efficient ones. In fact, in the technical paper by **M. Shelef** titled "***Unanticipated benefits of automotive emission control: Reduction in fatalities by motor vehicle exhaust gas***" SAE Technical Paper No. 922335, Society of Automotive Engineers: Warrendale, PA, 1992, Shelef argued that reducing CO poisoning deaths may be the biggest benefit from current motor vehicle emission control programs, even though the programs are motivated by concentration standards for outside air.

After reading the various reports and studies on automobile carbon monoxide emissions, it is difficult to come to any conclusion that automobile generated carbon monoxide creates any sort of hazard in the home and the proponent has provided no statistical evidence that it does.

But beyond that, it is necessary to look at what you are asked to believe is common practice. That is that a homeowner would start their car parked in a cold garage, go into the home leaving the door open, and allow the carbon monoxide as well as the noise and cold air to enter the house unabated and ignored. Then you are further led to believe that the homeowner would allow this to happen long enough for carbon monoxide levels to build to dangerous levels, never mind why they started the automobile in the first place which they are supposed to have forgotten. I suggest that people will not leave the door to a frigid garage open, they will not want the cold air and noise to infiltrate their home, and they will not leave the automobile running for extended periods of time but will continue on with whatever caused them to start the automobile in the first place.

The current rules require CO alarms in homes that have any fuel burning appliances. But some appliances have an extremely high safety record when it comes to CO incidents. No deaths were attributed to CO poisoning from gas ranges or ovens in 2006. Only four deaths occurred from water heaters. 2,426,264 people died during 2006. The number of deaths attributable to CO poisoning from water heaters is .0001648% of the total number of deaths. Given the low number of deaths compared to overall US mortality rates, deaths attributable to CO poisoning is statistically irrelevant.

Is there a problem with CO poisoning in the home that occurs to a degree that warrants expensive regulation? I would say that the evidence indicates there is not.

What will this rule cost the American public? If an average of 1 million new homes are built each year and only one alarm is required in each home and if it costs $50 to install that one alarm, the cost to the American public is $50 million! Furthermore, since alarms must be installed in existing homes whenever any permit is required and since there may be 10, 15, 20 homes that have repairs for each new home, the cost can quickly reach the hundreds of millions of dollars. And at the end of the five year life expectancy of the alarms, will they be replaced like they should? If they are, the costs above will double. If there are 20 or 30 lives that are currently lost that could be prevented with CO alarms, is it worth it to the public to spend hundreds of millions of dollars to do that? I suggest is it is not.

It has been argued that several states have adopted CO regulations. That is true and Minnesota is one of them. Deaths attributable to CO poisoning in Minnesota are extremely rate. However, some years ago, the tragic death of a young girl occurred in a home where an older heating system had not been properly maintained. As is often the case, grieving parents fail to take responsibility for what occurred and stated that if carbon monoxide alarms had been required in all homes that perhaps their daughter wouldn't have died. The grandparents of the young girl approached the Minnesota IRC Advisory Committee about placing a mandate in the state building code that adopted the 2006 IRC. However, amendments to the state code needed to pass a need and reasonable test and there were insufficient reasons to require them to be installed. The grandparents then went to several legislators who crafted a poorly worded law that makes CO alarms mandatory in all dwellings in the state except those owned by the state. The state legislature has no burden to prove that their rules are necessary or reasonable. The rule is not in the Minnesota State Building Code and there is no enforcement mechanism. The law sold a few alarms and creates necessary work for some attorneys.

It is important that unnecessary regulation not be approved and that any that has been approved be removed. If you believe in costly unnecessary regulation, then you should vote to maintain CO alarms. If you believe that there should be a reason why rules exist, then you should support this proposal.

Public Comment 2:

Steve Orlowski, National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R315.1 Carbon monoxide alarms. For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in *dwelling units* within which fuel-fired *appliances* are installed and in dwelling units that have attached garages <u>with a communicating opening.</u>

R315.2 Where required in existing dwellings. Where work requiring a *permit* occurs in existing *dwellings* ~~that have attached garages or in existing dwellings within which fuel-fired *appliances* exist~~, carbon monoxide alarms shall be provided in accordance with Section R315.1 <u>for the following:</u>

1. <u>Mechanical or gas work requiring a *permit* in which fuel-fired *appliances* are being replaced or installed.</u>
2. <u>Addition and/or renovation of attached garages with communicating openings requiring building permit.</u>

Commenter's Reason: In an attempt to provide clearer guidance into the requirements for where and when a CO detector is required, NAHB urges the final action assembly to approve the following modification. There are situations where one- and two- family dwellings are constructed with an attached garage that does not open directly into the dwelling unit, such as is found with homes with breezeways that separate the garage from the dwelling but share the same roof. When there is no direct communication between the garage and the dwelling unit or when there is adequate ventilation to reduce the transmission of any potential CO emission from entering the dwelling, CO detection should not be required.

As for the second modification, the original proponent is correct that there are many in the code enforcement community that interpret the existing language to include any work that is performed under a permit , requires existing homes to be equipped with a carbon monoxide detector. The premises for requiring any retrofitting requirement must be tied to the potential cause of the hazard and not an unrelated act. Carbon monoxide detectors should only be required when the work being performed is related to potential causes of carbon monoxide. Bathroom renovation, kitchen upgrades and additions that do not involve fuel-fired appliances should not trigger the installation of carbon monoxide detectors.

Final Action: AS AM AMPC____ D

RB64-09/10

R202 (New), R317.5 (New), R317.5.1 (New), Chapter 44 (New)

<u>Proposed Change as Submitted</u>

Proponent: Marcelo Hirschler, GBH International, representing the American Fire Safety Council

1. Add new text as follows:

<u>**PLASTIC LUMBER.** a manufactured product made primarily from thermoplastic materials (filled or unfilled) and typically supplied in sizes that correspond to traditional lumber board and dimensional lumber sizes.</u>

<u>**R317.5 Plastic lumber.** Plastic lumber used in exterior deck boards shall bear a *label* indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 6662 and ASTM D 7032.</u>

<u>**R317.5.1** Plastic lumber decks shall be installed in accordance with the manufacturer's instructions.</u>

2. Add new standard as follows:

ASTM
<u>D 6662-09</u> <u>Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards</u>

Reason: Numerous plastic lumber decks are used throughout the US, but the IRC and IBC do not reference them. Wood-plastic composite decks, complying with ASTM D 7032, are permitted in the IRC (section R317.4). This proposal adds plastic lumber decks, with the requirements from ASTM D 7032 and also the requirements from ASTM D 6662.

ASTM D 6662 is a specification for plastic lumber decking boards that requires the plastic lumber to comply with properties based on the following ASTM standards:
ASTM D 2565 Standard Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications
ASTM D 2915 Standard Practice for Evaluating Allowable Properties for Grades of Structural Lumber
ASTM D 4329 Standard Practice for Fluorescent UV Exposure of Plastics
ASTM D 6109 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products
ASTM D 6341 Standard Test Method for Determination of the Linear Coefficient of Thermal Expansion of Plastic Lumber and Plastic Lumber Shapes Between −30 and 140°F [−34.4 and 60°C]
ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM G 151 Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
ASTM G 154 Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
ASTM G 155 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

ASTM D 7032 (already referenced in the IRC) is a Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails). It requires the material to comply with flexural properties (ASTM D 6109), accelerated decay (ASTM D 2017), Xenon-arc exposure (ASTM D 2565), resistance to termites (ASTM D 3345), structural lumber grade classifications (ASTM D 2915), and so on.

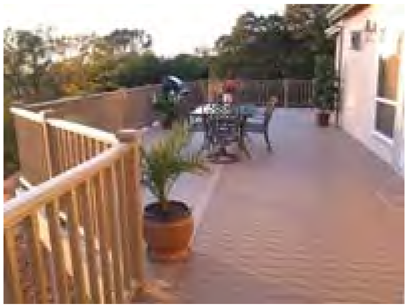
With regard to fire properties, ASTM D 6662 requires that plastic lumber meet ASTM E 84, Steiner tunnel test, with a flame spread index of no more than 200, with a material that is required to remain in place during the test. The wording with regard to ASTM E 84 flame spread testing in ASTM D 6662 is much more explicit than the wording in the test method itself. The following wording is included in the ASTM D 6662 standard: "6.4.2 The test specimen shall either be self-supporting by its own structural characteristics or held in place by added supports along the test specimen surface. The test specimen shall remain in place throughout the test duration, without such severe sagging that it interferes with the effect of the gas flame on the test specimen. Test results are invalid if the bulk of the test specimen melts or drops to the furnace floor."

ASTM D 7032 also requires wood-plastic composite decks to comply with a flame spread index of no more than 200 when tested to ASTM E 84. However, ASTM D 7032 does not have the additional requirements that the material stay in place.

By requiring that plastic lumber comply with the requirements of ASTM D 6662 and ASTM D 7032 the code would include all physical property and fire test requirements associated with both types of decking materials. Just for information: wood normally complies with a flame spread index of no more than 200. ICC ES has an Evaluation criterion for thermoplastic composite lumber products (AC 109), based on ASTM D 7032, which is used for approving plastic lumber decks.

Structural plastic lumber combines the benefits of long lasting, weather resistant plastic lumber with the structural characteristic of dimensional wood lumber. It is made primarily from recycled plastics from post-consumer waste like plastic milk and detergent bottles. It then includes strengthening additives, UV–inhibited pigments, anti-oxidant processing aids and foaming agents for a highly stable material that is superior to wood lumber in some measures.

A few photographs of actual decks follow.



Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ASTM D 6662-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: HIRSCHLER-RB-4-R202-R317.5

Public Hearing Results

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: The committee feels there are a number of different products this could apply to and just limiting it to deck boards is going to create a number of issues. The definition is too broad, primarily is vague and thermoplastic requires chemical knowledge. Also, the issue of labeling as stated on the committee's previous action on S207-09/10, Part II. This should be reworked and brought back later.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler, GBH International, representing American Fire Safety Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1. Revise text as follows:

PLASTIC LUMBER DECKING BOARD. a manufactured product made ~~primarily from thermoplastic~~ of plastic materials (filled or unfilled) which is generally rectangular in cross-section and is typically supplied in sizes that correspond to traditional lumber board and dimensional lumber sizes.

R317.5 PLASTIC LUMBER DECKING BOARDS. Plastic lumber decking boards used in exterior decks ~~deck boards~~ shall bear a label indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 6662 and ASTM D 7032.

R317.5.1 Plastic lumber decking boards ~~decks~~ shall be installed in accordance with the manufacturer's instructions.

2. Add new text as follows:

R502.1.8 EXTERIOR PLASTIC LUMBER DECKING BOARDS. Plastic lumber decking boards used in exterior decks shall comply with the provisions of Section R317.5.

3. Add new standard as follows:

ASTM
D 6662-09 Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards

Commenter's Reason: The technical committee was concerned that if the definition of plastic lumber was introduced into the code, plastic lumber could be considered to be a new material and permitted to be used for applications beyond plastic lumber decking boards. This comment fixes that problem by defining plastic lumber decking boards, and that directly correlates with the intended application in R317.5. The committee was also concerned about the use of the terms "thermoplastic" and "primarily" and they have been eliminated from the definition.

Note that the IRC currently allows wood plastic composites to be used in exterior deck boards and requires them to be labeled (which, of course, would be done on the non exposed surface). The proposed wording exactly mirrors that wording. The applicable acceptance criteria used by ICC Evaluation Services are those of AC 109, Acceptance Criteria for Thermoplastic Composite Lumber Products, which covers not just wood plastic composites but all types of plastic lumber. However, the IRC is silent with regard to plastic lumber decking boards unless they are "made primarily from wood or cellulose-based materials and plastic". Plastic lumber decking boards often contain no wood or cellulose-based materials and are thus excluded from the IRC. This proposal would cover such materials.

The requirements that plastic lumber decking boards have to meet, with this proposal, are not just those of ASTM D 7032 but they will additionally have to meet the requirements of ASTM D 6662, which impose more severe fire testing requirements. As shown in the text below, ASTM D 6662 requires that the boards be tested to ASTM E 84 (Steiner tunnel) and that they pass the same flame spread index as wood deck boards. ASTM D 6662 also states that the ASTM E 84 test specimens are not allowed to fall to the tunnel floor or otherwise interfere with the effect of the gas flame on the test specimen. This is a more severe requirement than the fire test requirement in ASTM D 7032 or than the fire test requirements in many other material specifications.

Text of ASTM D 6662 on fire testing:
6.4 Fire Properties:
6.4.1 The flame spread index of plastic lumber decking boards shall be determined by testing in accordance with Test Method E 84.
6.4.2 The test specimen shall either be self-supporting by its own structural characteristics or held in place by added supports along the test specimen surface. The test specimen shall remain in place throughout the test duration, without such severe sagging that it interferes with the effect of the gas flame on the test specimen. Test results are invalid if the bulk of the test specimen melts or drops to the furnace floor. Appendix X1 of Test Method E 84 provides guidance on mounting methods.
6.4.3 Products shall have a flame spread index no greater than 200 when tested in accordance with Test Method E 84.

NOTE 12 — For combustible construction, codes often require fire performance at least equivalent to that of wood. A maximum flame spread index of 200 when tested in accordance with Test Method E 84 is considered to be equivalent to that of wood. For outdoor applications, there is no requirement specified for smoke developed index.
NOTE 13—Fire retardants are available to increase the resistance to ignitability and flame spread of plastic lumber and shall be incorporated as needed.
6.4.4 The plastic lumber industry has developed a qualification fire test based on end-use of the material in decking. This method, a modification of Test Methods E 108 originally intended for roofing materials, is presented in Appendix X4 along with a commentary for its use.

Text of IRC on wood plastic composite decks:

WOOD PLASTIC COMPOSITE. A composite material made primarily from wood or cellulose-based materials and plastic.

R317.4 Wood plastic composites. Wood plastic composites used in exterior deck boards, handrails and guardrail systems shall bear a label indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 7032.

R317.4.1. Wood plastic composites shall be installed in accordance with the manufacturer's instructions.

R502.1.7 Exterior wood plastic composite deck boards. Wood plastic composites used in exterior deck boards shall comply with the provisions of Section R317.4.

Final Action: AS AM AMPC____ D

RB67-09/10
R322.3.2, R322.3.3

Proposed Change as Submitted

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing the Department of Homeland Security, Federal Emergency Management Agency

Revise as follows:

R322.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high hazard areas shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of ~~mat or raft foundations,~~ piling, pile caps, columns, grade beams and bracing, is:
   1.1. Located at or above the design flood elevation, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees (0.35 rad) from the direction of approach, or
   1.2. Located at the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees (0.35 rad) from the direction of approach.
2. Basement floors that are below *grade* on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

   Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5.

R322.3.3 Foundations. Buildings and structures erected in coastal high-hazard areas shall be supported on pilings or columns and shall be adequately anchored to those pilings or columns. Pilings shall have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift). Water loading values used shall be those associated with the design flood. Wind loading values shall be those required by this code. Pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling. Pile systems design and installation shall be certified in accordance with Section R322.3.6. ~~Mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the mat, raft or other foundation is subject to scour or erosion from wave-velocity flow conditions.~~ Slabs, pools, pool decks and walkways shall be located and constructed to be structurally independent of buildings and structures and their foundations to prevent transfer of flood loads to the buildings and structures during conditions of flooding, scour or erosion from wave-velocity flow conditions, unless the buildings and structures and their foundation are designed to resist the additional flood load.

Reason: The purpose of this code change is to clarify that an observed practice of using mat or raft foundations that are above eroded grade is not consistent with the regulations of the National Flood Insurance Program (NFIP) regarding foundations in coastal high hazard areas (V Zones). See §60.3(e)(4), below. The NFIP regulations require use of pile or column foundations in V Zones, and do not explicitly provide for use of mat or raft foundations. Note that ASCE 24 *Flood Resistant Design and Construction*, a referenced standard in the IRC, allows use of mat or raft foundations under limited circumstances; notably, it requires that such elements be at or below eroded grade. The language in R322.3.2 does not impose a limitation on the elevation of mats, and rafts and thus could lead to violations of the NFIP requirements which would also have significant cost implications for federal flood insurance premiums. ASCE 24 is permitted to be used as an alternate to the IRC provisions for coastal high hazard areas (see R301.2.4.1 and R322.1.1). In addition, designers may use ASCE 24 as guidance, even if not required.

44 CFR §60.3(e)(4) Provide that all new construction and substantial improvements in Zones V1-30 and VE, and also Zone V if base flood elevation data is available, on the community's FIRM, are elevated on pilings and columns so that . . . *[remainder not shown]*

Cost Impact: The code change proposal has no cost impact because it is consistent with local ordinances that are adopted by local jurisdictions for participation in the NFIP.

ICCFILENAME: QUINN-RB-5-R322.3.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that observation of non-compliance of a code provision is not sufficient justification to remove a requirement. The use of mat or raft foundation under limited conditions should remain in the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rebecca C. Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency, Department of Homeland Security, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R322.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high-hazard areas shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of ~~mat or raft foundations,~~ piling, pile caps, columns, grade beams and bracing, is:
   1.1. Located at or above the design flood elevation, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees from the direction of approach, or
   1.2. Located at the base flood elevation plus one foot (305 mm), or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees from the direction of approach.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings, and for support of parking slabs, pool decks, patios, and walkways.

   Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5.

R322.3.3 Foundations. All buildings and structures erected in coastal high-hazard areas shall be supported on pilings or columns and shall be adequately anchored to <u>such</u> ~~to those~~ pilings or columns. Pilings shall have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift). Water loading values used shall be those associated with the design flood. Wind loading values shall be those required by this code. Pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling. Pile systems design and installation shall be certified in accordance with Section R322.3.6. <u>Spread footing, mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the spread footing, mat, raft or other foundation is subject to scour or erosion from wave–velocity flow conditions. If permitted, spread footing, mat, raft or other foundations that support columns shall be designed in accordance with ASCE 24.</u> Slabs, pools, pool decks and walkways shall be located and constructed to be structurally independent of buildings and structures and their foundations to prevent transfer of flood loads to the buildings and structures during conditions of flooding, scour or erosion from wave-velocity flow conditions, unless the buildings and structures and their foundation are designed to resist the additional flood load.

Commenter's Reason: The original proposal would have completely deleted reference to mat or raft foundations because an observed practice of using mat or raft foundations that are above eroded grade is not consistent with the regulations of the National Flood Insurance Program (NFIP) regarding piling and column foundations in coastal high hazard areas (V Zones). This public comment responds to testimony that mat or raft foundations could be acceptable under the NFIP if designed in accordance with ASCE 24 *Flood Resistant Design and Construction*, a referenced standard in the IRC. The modification proposes to add "spread footing" because the specific language in ASCE 24 consistently refers to use of spread footings along with mat or raft foundations (see ASCE 24 Sec. 4.5.1, 4.5.7, and Sec. 4.5.8).

Final Action: AS AM AMPC____ D

RB72-09/10
R403.1.3

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, City of San Jose, CA, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters)

Revise as follows:

R403.1.3 Seismic reinforcing. Concrete footings located in Seismic Design Categories D_0, D_1 and D_2, as established in Table R301.2 (1), shall have minimum reinforcement. Bottom reinforcement shall be located a minimum of 3 inches (76 mm) clear from the bottom of the footing.

In Seismic Design Categories D_0, D_1 and D_2 where a construction joint is created between a concrete footing and a stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing, have a standard hook and extend a minimum of 14 inches (357 mm) into the stem wall.

In Seismic Design Categories D_0, D_1 and D_2 where a grouted masonry stem wall is supported on a concrete footing and stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing and have a standard hook.

In Seismic Design Categories D_0, D_1 and D_2 masonry stem walls without solid grout and vertical reinforcing are not permitted.

> **Exception:** In detached one- and two-family *dwellings* which are three stories or less in height and constructed with stud bearing walls~~, plain concrete footings without longitudinal reinforcement supporting walls and~~ isolated plain concrete footings supporting columns or pedestals are permitted.

Reason: In seismic design categories D_0, D_1 and D_2, the flexural demands placed upon footings by the variety of braced wall panels configurations described in IRC Chapter 6, some of which require a hold-down device at one end or each end make the use of plain concrete footings unacceptable. The footing is an integral part of the seismic force load path and deserves to be constructed in as robust a manner as the braced wall panels it is supporting. The exception to use plain concrete isolated footing pads at columns or pedestals is retained because these are not use to support or anchor braced walls unless designed in accordance with accepted engineering practice per Section R602.10.7 Item 2.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: MAIEL-RB-2-R403.1.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This change would make the IRC inconsistent with the IBC and the NEHRP recommendations. The proponent should rework and bring back later.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, City of San Jose, CA, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters), requests Approval as Submitted.

Commenter's Reason: In seismic design categories D0, D1 and D2 the flexural demands placed upon footings of stud wall framed detached one- and two-family dwellings make the use of plain concrete footings devoid of any longitudinal reinforcing unacceptable. IRC Section R301.1 specifically states "This code shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through the load-resisting elements *to the foundation*." The foundation is an integral part of the seismic force-resisting load path and deserves to be constructed in a manner consistent with the seismic-resisting braced wall panels it is supporting. The current specific allowance for absence of any longitudinal reinforcing will also prevent any vertical reinforcing from being placed in the footing, since there is nothing to tie any vertical bar to; consequently the current provision is allowing totally unreinforced footings in dwellings up to three stories in height.

Since the mid-1990's wood light-frame prescriptive provisions for alternative wall bracing using tie-downs (as currently shown in IRC Figure R602.10.3.2) have required that the foundation at these alternative panels utilize one No. 4 bar top and bottom. Also, more recent IBC alternative wall bracing provisions utilizing a portal frame concept (Section 2308.9.3.2) that includes providing tie-downs similarly specifies footings with one No. 4 bar top and bottom. Unfortunately the equivalent portal frame provisions in IRC Section R602.10.3.4 do not address the footing's reinforcement. In addition, tie-downs are also specified in IRC Table R602.12(2) when stone or masonry veneer is installed, and in IRC Section R602.10.1.4.1 when brace wall panels are offset from the end of the wall line, yet neither of these IRC provisions mention minimum footing reinforcement. Further, IRC Section R301.1.1 explicitly allows use of AF&PA Wood Frame Construction Manual (WFCM) as a permitted alternative, but in that document all walls providing lateral resistance are required to use various types of tie-downs. Each time a tie-down is installed, the footing should be capable of resisting the flexural demands induced by that connection, yet the current Section R403.1.3 exception 1 ignores this need.

While we recognize there is a cost of installing this minimum reinforcing, we believe that most builders of dwellings in Seismic Design Categories D0, D1 and D2 are already providing this level of reinforcing, and that the cost of repairing cracks caused to interior and exterior finishes not to mention the foundation itself would far exceed the cost of minimal reinforcement of footings during the original construction.

With regard to any inconsistency of this proposal with the NEHRP Provisions, it must be noted that the applicable NEHRP provision (Sec. 9.4.2.2 Exception 1) has not been updated since its publication in 2004 (FEMA 450-1/2003) while during that period many of the IRC's provisions for the use of tie-downs at the ends of brace wall panels have been added to the code.

Final Action: AS AM AMPC____ D

RB73-09/10

R202 (New), R403.1.6

Proposed Change as Submitted

Proponent: Gary Ehrlich, National Association of Home Builders (NAHB)

1. Add new definitions as follows:

SILL PLATE. A horizontal wood member anchored to the foundation and supporting floor joists.

SOLE PLATE. A horizontal wood member at the bottom of a wood stud wall, attached to a concrete slab.

2. Revise as follows:

R403.1.6 Foundation anchorage. Where wood sill and sole plates and cold-formed steel framed walls are supported directly on continuous foundation~~s~~ walls or monolithic slabs with integral footings required by the provisions of this code, they shall be anchored to the foundation in accordance with this section.

Wood sole plates at all exterior walls ~~on monolithic slabs~~, wood sole plates of *braced wall panels* at building interiors on monolithic slabs with integral footings, and all wood sill plates shall be anchored to the foundation with ½ inch (12.7 mm) diameter anchor bolts spaced a maximum of 6 feet (1829 mm) on center or approved anchors or anchor straps spaced as required to provide equivalent anchorage to the ½-inch-diameter (12.7 mm) anchor bolts. Bolts shall ~~be at least ½ inch (12.7 mm) in diameter and shall~~ extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundations with integral footings that are not part of a *braced wall panel* shall be positively anchored with *approved* fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.

Exceptions:

~~1. Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts.~~

~~2~~ 1. Walls 24 inches (610 mm) total length or shorter connecting offset *braced wall panels* shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).
~~3~~ 2. Connection of walls 12 inches (305 mm) total length or shorter connecting offset *braced wall panels* to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).

Reason: The purpose of this proposal is to revise the language for anchorage of light-frame wood and cold-formed steel stud walls to the foundations of the house. Without these revisions, we are concerned that the code will present an enforcement nightmare for plan reviewers and inspectors, and lead to anchor bolts and continuous footings being required where they are not necessary and have not traditionally been provided.

The ICC Ad-Hoc Committee on Wall Bracing revised this section during the 2007/2008 code cycle with the intent of insuring that sufficient anchorage is provided on braced wall lines and panels inside a dwelling to transfer lateral loads to either monolithic (thickened) slab foundations or continuous footings. While we agree that providing a continuous load path is important, the change was overly broad in its application and will present an enforcement problem. For instance, the first sentence of the 2009 IRC Section R403.1.6 effectively requires all light-frame walls to be provided with anchor bolts to the foundation. Thus, a non-bearing interior partition that is not part of a braced wall line but which just happens to sit atop a foundation wall or continuous foundation (e.g. at a partial basement, crawlspace, or interior knee wall) would be required to be fastened to the wall or footing below with 1/2" diameter anchor bolts at 6 foot spacing. We are also concerned the new language (in particular the change for walls on interior monolithic slabs) does not explicitly permit anchor bolts to be replaced by wedge anchors, expansion bolts, mudsill straps, or other equivalent anchorage, and also that it may require thickened slabs or continuous footings where they have not traditionally been provided or are not required by other sections of the IRC.

Further, there was no technical justification provided for the increased anchorage requirements. Whole-building structural tests have shown that our current methods of construction are stronger than current engineering practice and engineering design standards give them credit for. An actual house in the field tested by researchers in New Zealand performed 50% better than predicted by engineering design, even with sill plates attached only by single nails, rather than anchor bolts. We also note that the bottom plate of a braced wall line on the interior and supported on floor framing (including a raised floor system over a crawlspace or pier-and-beam foundation) can be attached to the framing with 3-16d nails at 16" spacing, but the same plate on a continuous footing will require 1/2" anchor bolts at 7" spacing. Thus, by implementing these new requirements for additional anchor bolts on braced wall lines inside our structures we are essentially contradicting 40 years of research into light-frame wood construction. We are not aware of any racking failures on interior braced wall lines that would justify adding bolts to these lines.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EHRLICH-RB-5-R202-R403.1.6

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The definition of sill plate and sole plate is unclear. The proponent should get with industry and rework this with the modification that was ruled out of order and bring this back to Final Action.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, P.E., National Association of Home Builders, Bonnie Manley, P.E., AISI, representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SILL PLATE. A horizontal wood member anchored to the foundation and supporting floor joists.

SOLE PLATE. A horizontal wood member at the bottom of a wood stud wall~~, attached to a concrete slab~~.

R403.1.6 Foundation anchorage. Where wood sill and sole plates ~~and cold-formed steel framed walls~~ are supported directly on continuous foundation walls or monolithic slabs with integral footings required by the provisions of this code, they shall be anchored to the foundation in accordance with this section.

<u>Cold-formed steel floor and wall framing shall be fastened to wood sill or sole plates anchored to the foundation in accordance with this section, or shall be anchored directly to the foundation in accordance with Section R505.3.1 or R603.3.1.</u>

Wood sole plates at all exterior walls, wood sole plates of *braced wall panels* at building interiors on monolithic slabs with integral footings, and all wood sill plates shall be anchored to the foundation with 1/2 inch (12.7 mm) diameter anchor bolts spaced a maximum of 6 feet (1829 mm) on center or *approved* anchors or anchor straps spaced as required to provide equivalent anchorage to the 1/2-inch-diameter (12.7 mm) anchor bolts. Bolts shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundations with integral footings that are not part of a *braced wall panel* shall be positively anchored with *approved* fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. ~~Cold-formed steel framing systems shall be fastened to the wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1~~.

Exceptions:

1. Walls 24 inches (610 mm) total length or shorter connecting offset *braced wall panels* shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).
2. Connection of walls 12 inches (305 mm) total length or shorter connecting offset *braced wall panels* to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).

Commenter's Reason: The purpose of this public comment is to address the concerns raised by the IRC-B/E Committee. First, this change implements the floor modification which was ruled out-of-order. The modification, requested by the Steel Framing Alliance, moves the anchorage requirements for cold-formed steel out of the larger paragraph, which mostly concerns wood framing. The relocated paragraph becomes "charging language" which points the user to the appropriate CFS provisions in Chapters 5 and 6. This greatly clarifies the anchorage requirements for cold-formed steel. Second, this change removes the "attached to a concrete slab" language from the sole plate definition. A sole plate can occur at any level of the building, not just at the foundation. The text of Section R403.1.6 makes it clear that the section addresses only those sole plates which do occur at foundation walls or monolithic slabs.

Final Action: AS AM AMPC____ D

RB80-09/10

R404.1.9 (New), R404.1.9.1 (New), R404.1.9.2 (New), R404.1.9.3 (New), R404.1.9.4 (New), R404.1.9.5, R602.10.7

Proposed Change as Submitted

Proponent: Gary Ehrlich, National Association of Home Builders (NAHB)

1. Add new text as follows:

<u>**R404.1.9 Isolated masonry piers.** Isolated masonry piers shall be constructed in accordance with this section and the general masonry construction requirements of Section R606. Hollow masonry piers shall have a minimum nominal thickness of 8 in. (203 mm), with a nominal height not exceeding four (4) times the nominal thickness and a nominal length not exceeding three (3) times the nominal thickness. Where hollow masonry units are solidly filled with concrete or grout, piers shall be permitted to have a nominal height not exceeding ten (10) times the nominal thickness. Footings for isolated masonry piers shall be sized in accordance with Section R403.1.1.</u>

<u>**R404.1.9.1 Pier cap.** Hollow masonry piers shall be capped with 4 inches (102 mm) of solid masonry or concrete, a masonry cap block, or shall have cavities of the top course filled with concrete or grout unless a sill plate of 2-inch (51 mm) minimum nominal thickness and bearing on two face shells is provided. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm). Where required, termite protection for the pier cap or sill plate shall be provided in accordance with Section R318.</u>

<u>**R404.1.9.2 Masonry piers supporting floor girders.** Masonry piers supporting wood girders complying with Tables R502.5(1) and R502.5(2) shall be permitted in accordance with this section. Piers supporting girders for interior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 10 feet (3 048 mm) from top of footing to bottom of sill plate or girder. Piers supporting girders for exterior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 4 feet (1 220 mm) from top of footing to bottom of sill plate or girder. Girders and sill plates shall be anchored to the pier or footing in accordance with Section R403.1.6 or Figure R404.1.5(1).</u>

<u>**R404.1.9.3 Masonry piers supporting braced wall panels.** Masonry piers supporting braced wall panels shall be constructed in accordance with Figure R602.10.7.</u>

<u>**R404.1.9.4 Seismic design of masonry piers.** Masonry piers in all dwellings located in Seismic Design Category D0, D1, D2, and townhouses in Seismic Design Category C, shall be designed in accordance with accepted engineering practice.</u>

<u>**R404.1.9.5 Masonry piers in flood hazard areas.** Masonry piers for dwellings in flood hazard areas shall be designed in accordance with Section R322.</u>

2. Revise as follow:

R602.10.7 Braced wall panel support. *Braced wall panel* support shall be provided as follows:

1. Cantilevered floor joists, supporting *braced wall lines*, shall comply with Section R502.3.3. Solid blocking shall be provided at the nearest bearing wall location. In Seismic Design Categories A, B and C, where the cantilever is not more than 24 inches (610 mm), a full height rim joist instead of solid blocking shall be provided.
2. Raise floor system ~~Elevated~~ post or pier foundations exceeding 4 feet (1 220 mm) in height and supporting *braced wall panels* shall be designed in accordance with accepted engineering practice. Raised floor system masonry pier foundations not exceeding 4 feet (1 220 mm) in height, and isolated masonry piers in basements, shall be permitted to be designed in accordance with Section R404.1.9.
3. Masonry stem walls with a length of 48 inches (1220 mm) or less supporting *braced wall panels* shall be reinforced in accordance with Figure R602.10.7. Masonry stem walls with a length greater than 48 inches (1220 mm) supporting *braced wall panels* shall be constructed in accordance with Section R403.1 *Braced wall panels* constructed in accordance with Sections R602.10.3.2 and R602.10.3.3 shall not be attached to masonry stem walls.

Reason: The purpose of this proposal is to introduce provisions for isolated masonry piers used as foundations for raised wood floor systems. Masonry pier foundations are a common construction method. However, besides a brief mention in R606.6, no other guidance is given for the construction of these piers, other than a reference in R602.10.6 calling for engineered design of piers supporting braced wall panels.

Language is proposed for Chapter 4 to provide prescriptive guidance for isolated masonry piers constructed inside a basement or crawlspace. The language proposed for R404.1.9 for masonry piers is based on the empirical design limits contained in the MSJC. The language is adopted from the paragraph on Foundation Piers in NCMA's TEK Note 5-3A: "Concrete Masonry Foundation Wall Details". Further limits are provided for piers supporting floor girders, braced wall panels, and for piers in high-seismic or flood hazard areas.

The language in R602.10.6 is modified and coordinated with the proposed R404.1.9 language to allow prescriptive design of short exterior masonry piers and of isolated interior masonry piers complying with R404.1.9. Taller masonry piers supporting an elevated deck, sunroom, or other substantially raised portion of a dwelling are relegated to engineered design. It was the original intent of R602.10.6 to address these full-height piers, not to require engineered design for every raised wood floor/crawlspace regardless of pier height.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EHRLICH-RB-6-R404.1.9-R602.10.7

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee likes the concept but feels that there is potential for conflict or unintended consequences with Section R606.6. There is a concern about the sill plate bearing on the face shells. The proponent should rework and bring this back later.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment1:

Gary J. Ehrlich, PE, National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R404.1.9 Isolated masonry piers. Isolated masonry piers shall be constructed in accordance with this section and the general masonry construction requirements of Section R606. Hollow masonry piers shall have a minimum nominal thickness of 8 in. (203 mm), with a nominal height not exceeding four (4) times the nominal thickness and a nominal length not exceeding three (3) times the nominal thickness. Where hollow masonry units are solidly filled with concrete or grout, piers shall be permitted to have a nominal height not exceeding ten (10) times the nominal thickness. Footings for isolated masonry piers shall be sized in accordance with Section R403.1.1.

R404.1.9.1 Pier cap. Hollow masonry piers shall be capped with 4 inches (102 mm) of solid masonry or concrete, a masonry cap block, or shall have cavities of the top course filled with concrete or grout ~~unless a sill plate of 2-inch (51 mm) minimum nominal thickness and bearing on two face shells is provided. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm)~~. Where required, termite protection for the pier cap ~~or sill plate~~ shall be provided in accordance with Section R318.

R404.1.9.2 Masonry piers supporting floor girders. Masonry piers supporting wood girders sized per Tables R502.5(1) and R502.5(2) shall be permitted in accordance with this section. Piers supporting girders for interior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 10 feet (3 048 mm) from top of footing to bottom of sill plate or girder. Piers supporting girders for exterior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 4 feet (1 220 mm) from top of footing to bottom of sill plate or girder. Girders and sill plates shall be anchored to the pier or footing in accordance with Section R403.1.6 or Figure R404.1.5(1). Floor girder bearing shall be in accordance with Section R502.6.

R404.1.9.3 Masonry piers supporting braced wall panels. Masonry piers supporting braced wall panels shall be ~~constructed~~ designed in accordance with ~~Figure R602.10.7~~ accepted engineering practice.

R404.1.9.4 Seismic design of masonry piers. Masonry piers in all dwellings located in Seismic Design Category D0, D1, D2, and townhouses in Seismic Design Category C, shall be designed in accordance with accepted engineering practice.

R404.1.9.5 Masonry piers in flood hazard areas. Masonry piers for dwellings in flood hazard areas shall be designed in accordance with Section R322.

R602.10.7 Braced wall panel support. Braced wall support shall be provided as follows:

1. Cantilevered floor joists, supporting *braced wall lines*, shall comply with Section R502.3.3. Solid blocking shall be provided at the nearest bearing wall location. In Seismic Design Categories A, B and C, where the cantilever is not more than 24 inches (610 mm), a full height rim joist instead of solid blocking shall be provided.
2. Raised floor system post or pier foundations ~~exceeding 4 feet (1 220 mm) in height~~ ~~and~~ supporting *braced wall panels* shall be designed in accordance with accepted engineering practice. ~~Raised floor system masonry pier foundations not exceeding 4 feet (1 220 mm) in height, and isolated masonry piers in basements, shall be permitted to be designed in accordance with Section R404.1.9.~~
3. Masonry stem walls with a length of 48 inches (1220 mm) or less supporting *braced wall panels* shall be reinforced in accordance with Figure R602.10.7. Masonry stem walls with a length greater than 48 inches (1220 mm) supporting *braced wall panels* shall be constructed in accordance with Section R403.1 *Braced wall panels* constructed in accordance with Sections R602.10.3.2 and R602.10.3.3 shall not be attached to masonry stem walls.

Commenter's Reason: The purpose of this public comment is to address the issues raised by the IRC-B/E Committee. The Committee expressed concerns about the provision to allow hollow cells at the top of the pier if a sill plate section is used to support the floor framing. The public comment deletes this language, restoring the solid-bearing requirement. A pointer to the existing Chapter 5 language for bearing of floor framing on concrete and masonry supports is provided.

The Committee was also concerned about potential conflicts with Chapter 6. These masonry pier provisions do not conflict with any of the requirements in Section R606. Chapter 6 is primarily intended for above-grade, full-story walls. Chapter 4 is the proper section for requirements dealing with foundations. Other requirements for masonry foundations such as basement walls and pier-and-curtain wall systems, appear in Chapter 4, as well as the requirements for crawlspaces. Adding requirements to Chapter 4 for masonry piers used as foundation elements maintains this consistency.

These provisions are necessary to insure masonry pier foundations used to support wood floor framing are an accepted code practice. Currently, interpretation of the code is inconsistent, and some jurisdictions have not permitted these systems. This is why the wood industry felt it necessary to submit RB71-09/10 to clarify these pier-and-beam systems are permitted. Further, this proposal will provide engineers with guidance to use in designing masonry pier foundations for IRC applications. This will result in potential savings for homeowners on foundation construction costs.

Public Comment 2:

Gary J. Ehrlich, PE, National Association of Home Builders, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R404.1.9.3 Masonry piers supporting braced wall panels. Masonry piers supporting braced wall panels shall be ~~constructed~~ designed in accordance with ~~Figure R602.10.7~~ accepted engineering practice.

> **Exception:** For one- and two-story buildings where the basic wind speed does not exceed 90mph, the wind exposure category is B or C, the wall height does not exceed 10 feet, the eave-to-ridge height does not exceed 10 feet, and the maximum spacing between braced wall lines does not exceed 30 feet, square masonry piers shall be permitted to support braced wall panels. The masonry piers shall be 16 inches nominal in width and shall not exceed 48 inches in height. The masonry piers shall be grouted solid and reinforced with 1-#4 vertical bar each cell.

R602.10.7 Braced wall panel support. Braced wall support shall be provided as follows:

1. Cantilevered floor joists, supporting *braced wall lines*, shall comply with Section R502.3.3. Solid blocking shall be provided at the nearest bearing wall location. In Seismic Design Categories A, B and C, where the cantilever is not more than 24 inches (610 mm), a full height rim joist instead of solid blocking shall be provided.
2. Raised floor system post or pier foundations ~~exceeding 4 feet (1 220 mm) in height~~ ~~and~~ supporting *braced wall panels* shall be constructed per Section R404.1.9.3 or designed in accordance with accepted engineering practice. ~~Raised floor system masonry pier foundations not exceeding 4 feet (1 220 mm) in height, and isolated masonry piers in basements, shall be permitted to be designed in accordance with Section R404.1.9.~~
3. Masonry stem walls with a length of 48 inches (1220 mm) or less supporting *braced wall panels* shall be reinforced in accordance with Figure R602.10.7. Masonry stem walls with a length greater than 48 inches (1220 mm) supporting *braced wall panels* shall be constructed in accordance with Section R403.1 *Braced wall panels* constructed in accordance with Sections R602.10.3.2 and R602.10.3.3 shall not be attached to masonry stem walls.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The purpose of this public comment is to provide additional prescriptive guidance for builders and code officials in constructing raised floor systems supported on masonry piers.

A desire was expressed for a prescriptive detail for a reinforced pier to handle lateral loads. Accordingly, we have added language under proposed new Section R404.1.9.3 to allow a 16x16 CMU pier with 4-#4 vertical bars under braced wall lines and braced wall panels in low-wind areas. The prescriptive design was generated using wind loads from the calculations used to develop the wind bracing table in Section R602.10 and using strength design per TMS 402-08 Building Code Requirements for Masonry Structures. All of the strength design load combinations per Section 2.4 of ASCE 7 were considered. The limitations on number of stories, braced wall line spacing, story and ridge heights are necessary to keep the required reinforcing to a minimum.

This additional prescriptive detail will provide building officials with the guidance to be able to review and approve masonry pier foundations without necessarily having to require engineered designs. In addition to keeping with the intent of the IRC to supply prescriptive provisions, this proposal will result in savings for homeowners who will not have to pay additional engineering costs and who will also save on foundation construction costs.

Final Action: AS AM AMPC____ D

RB82-09/10

R405.1, R405.1.1 (New), R405.2, R405.2.1, R405.2, R405.2.2, R405.3

Proposed Change as Submitted

Proponent: James Jorgensen, PE, City of Lenexa, KS, representing the Metropolitan Kansas Chapter of ICC

1. Revise as follows:

R405.1 Concrete or masonry foundations. Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below *grade*. Drainage tiles, gravel or crushed stone drains, perforated pipe or other *approved* systems or materials shall be installed ~~at or~~ below the floor level of the area to be protected and shall discharge ~~by gravity or mechanical means~~ into an *approved* drainage system in accordance with Section R405.3.. Gravel or crushed stone drains shall extend at least 1 foot (305 mm) beyond the outside edge of the footing and 6 inches (152 mm) above the top of the footing, be at least 12 inches deep, and be ~~covered~~ surrounded by ~~with~~ an *approved* filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper.~~, and~~ The drainage tiles or perforated pipe shall be placed on a minimum of 2 inches (51 mm) of washed gravel or crushed rock at least one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches (152 mm) of the same material. Perforated pipe drains shall be covered with an approved filter membrane or an approved filter membrane shall surround the gravel/crushed rock covering the drain. Drains shall be placed level or at a positive slope to the point of collection for removal from the structure.

Exceptions:

1. A drainage system is not required when the foundation is installed on well-drained ground or sand-gravel mixture soils according to the Unified Soil Classification System, Group I Soils, as detailed in Table R405.1.
2. Perforated pipe drains may be placed on top of a concrete footing in lieu of a bed of gravel or rock provided it is below the floor level of the usable space.

2. Add new text as follows:

R405.1.1 Perforated pipe drains. Perforated pipe drains and drain tile shall have a minimum interior diameter of 4 inches.

3. Revise as follows:

R405.2 Wood foundations. Wood foundations enclosing habitable or usable spaces located below *grade* shall be adequately drained in accordance with Sections R405.2.1 ~~through~~, R405.2.~~3~~2 and R405.3.

R405.2.1 Base. A porous layer of gravel, crushed stone or coarse sand shall be placed to a minimum thickness of 4 inches (102 mm) under the *basement* floor. Provision shall be made for automatic draining of this layer and the gravel or crushed stone wall footings. To drain the base layer, interior drains complying with Section R405.1 shall be provided below the base layer, around the perimeter of the enclosed area and connected to the drainage system.

R405.2.2 ~~Vapor retarder~~ Moisture barrier. A 6-mil-thick (0.15 mm) polyethylene ~~vapor retarder~~ moisture barrier shall be applied over the porous layer with the *basement* floor constructed over the polyethylene.

~~R405.2~~ R405.3 Drainage system. In other than Group I soils, an approved drainage system shall be provided to ~~a sump shall be provided to~~ drain the ~~porous~~ base layer and footings. The system shall discharge by gravity or mechanical means and shall be capable of removing any accumulated water and discharging it to an approved location to move water away from the structure. Where drainage is by mechanical means a sump shall be provided. The sump shall be at least 24 inches (610 mm) in diameter or 20 inches square (0.0129 m2), shall extend at least 24 inches (610 mm) below the bottom of the *basement* floor ~~and shall be capable of positive gravity or mechanical drainage to remove any accumulated water. The drainage system shall discharge into an *approved* sewer system or to daylight~~. For gravity drainage systems solid pipe shall be provided between the termination point and the connection at the structure and shall terminate in a manner to facilitate cleaning.

Reason: The foundation drainage requirements in the code need clarification to be a more effective component of the code. These requirements have not been updated for many years. A frequent complaint on existing homes is water infiltration into the basement areas. More and more basement areas are used as primary living space. Repairs to dwellings resulting from ineffective installation of the foundation drainage system are costly and is preventable. The codes lack of clarity on this issue leads to ineffective enforcement.

In R405.1 the location of the drains "at or below" the floor level allows for installations that may be ineffective at removing water from the foundation area by allowing water to enter the usable space before it can be drained away. Clarifying that the drains must be below the floor level (top of the floor surface) provides more clarity. Where gravel or crushed stone drains are used the code does not specify a depth of the drain, only that it extends 6 inches above the level of the footing. Since the minimum floor thickness is 4 inches the drain is above the level of the floor which is ineffective. Many standards that address drainage systems require that stone drains be completely enclose to prevent fines from clogging the drainage system. Simply covering the material with a filter membrane does not prevent fines from clogging the drains.

The term "approved filter membrane" does not provide good direction for code officials or builders. Although my research indicates that many roadway projects use AASHTO M288-00 for class 3 for use in drains and French drains I am not sure if this is what is commonly supplied with prefabricated socks for perforated drains. Clarification can be provided in a future code change.

The current code required gravel and stone drains to be covered with a filter membrane, however; the code is silent on the requirements for the protection of perforated drains. To prevent fines from penetrating the openings in the perforated pipe protection by a filter membrane is required around the pipe or around the stone/gravel covering the pipe.

The requirements for removal of water by gravity or mechanical means as been moved to the section on drainage where it can more comprehensively addressed.

The code does not specify a minimum size for drain tile therefore a minimum size of 4 inches interior diameter has been provided. Three inches may be acceptable for some smaller dwellings with short distances to the point of collection but the cost difference is minimal and 4 inches is more effective.

Drains should not have sharp rises or falls that provide for collection points for fine material leading to clodding of the drains over time, therefore a provision for providing a level or positive slope has been added. Section R405.2.1 has been modified to clarify that to drain the porous layer below the base drains complying the R405.1 are required and they shall be installed around the perimeter of the space and below the base layer. Drainage system R405.3. Current Section R405.2.3 only applies to wood foundations. R405.1 only requires that the drains from the protected area discharge to an approved location without clarifying the process. It is inconsistent for wood foundations to be very specific regarding the sump and drainage of the porous layer and have no clarity for concrete and masonry foundations. R405.3 includes the old language in R405.1 for drainage by gravity or mechanical means and adds clarification that for gravity drains the termination point should be such that it could be cleaned of any accumulated debris at the termination from the house to the termination point.

Cost Impact: There may be a slight increase in the initial cost of construction if a jurisdiction did not previously require that perforated drains or crushed gravel drains be protected with an approved filter membrane or provide a means of draining the base layer under basement floors.

ICCFILENAME: JORGENSEN-RB-1-R405.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal adds many difficult provisions that appear to be arbitrary. Bringing the wood foundation drainage in is not appropriate. There is no justification to increase the drain to 4 inches. Changing vapor retarder to moisture barrier adds confusion and will cause a conflict within the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Jorgensen, PE, City of Lenexa, KS, representing Kansas City Metropolitan Chapter ICC, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R405.1 Concrete or masonry foundations. Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade. Drainage tiles, gravel or crushed stone drains, perforated pipe or other approved systems or materials shall be installed at or below the area to be protected and shall discharge by gravity or mechanical means into an approved drainage system. Gravel or crushed stone drains shall extend at least 1 foot (305 mm) beyond the outside edge of the footing and 6 inches (152 mm) above the top of the footing and be covered with an approved filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper. Perforated drains shall be surrounded with an approved filter membrane or the filter membrane shall cover the washed gravel or crushed rock covering the drain. ~~and the d~~ Drainage tiles or perforated pipe shall be placed on a minimum of 2 inches (51 mm) of washed gravel or crushed rock at least one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches (152 mm) of the same material.

> **Exception:** A drainage system is not required when the foundation is installed on well-drained ground or sand-gravel mixture soils according to the Unified Soil Classification System, Group I Soils, as detailed in Table R405.1.

Commenter's Reason: The code is silent on the methods for protection of openings in perforated foundation pipes. A filter membrane is required over crushed stone drains and strips of building paper are required over drain tile joint opening; however, the code does not specifically require protection of the perforations in perforated foundation drains. Since the perforations surround perforated drains a statement has been added to require protection around perforated drains with an approved filter membrane. As an option the filter membrane may be placed over the gravel or crushed stone cover over the perforated drains.

Final Action: AS AM AMPC____ D

RB84-09/10

R501.3 (New), Chapter 44 (New)

Proposed Change as Submitted

Proponent: Jeff Hugo, CBO, National Fire Sprinkler Association

1. Add new text as follows:

R501.3 Fire Protection. All new one and two family dwellings using floor framing components or systems composed of prefabricated I joists, trusses, and cold formed steel shall be fire sprinklered throughout according to NFPA 13, NFPA 13R, NFPA 13D or Section P2904.1.

2. Add new standard to Chapter 44 as follows:

NFPA

13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height

Reason: Lightweight construction consisting of prefabricated I joists, trusses, and cold formed steel are excellent materials in many ways. They save labor, time, natural resources, and call backs. However, widespread fire experience shows that floors framed out of these materials do not have the same durability in the event of a fire as solid sawn lumber and are not only hazardous to the occupants evacuating the home, but especially to responding emergency personnel, such as fire fighters.

Several research studies have been performed showing the potential failures of these flooring assemblies during fires and the potential for floor collapse during fire fighter operations. Additional research has shown the ability of fire sprinklers to prevent the fire from reaching the point where it could cause the same kind of damage. This research shows that with fire sprinkler systems in the home, the prefabricated I joists, trusses and cold formed steel materials are safe to use. But without fire sprinklers, these materials could fail catastrophically during a fire.

This requirement is important to put into the IRC even if the requirement for sprinklers is maintained because there are many jurisdictions that will not accept the blanket requirement for sprinklers, but will maintain this option for using sprinklers with this specific type of construction.

Bibliography:

Tyco Fire Suppression & Building Products. A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions. 2008

Su, J.Z., N.; Bawaly, A.C.; Lougheed, G.D.; Taber, B.C.; Leroux, P.; Proulx, G.; Kashef, A.; McCarthey, C.; Thomas, J.R. Fire Performance of Houses, Phase I. Study of Unprotected Floor Assemblies in Basement Fire Scenarios, Summary Report. 12/15/2008

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: The proposed new standard, NFPA 13R, is currently referenced in the *International Building Code.*

ICCFILENAME: HUGO-RB-1-R501.3

Public Hearing Results

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: Sprinklers are a code requirement and this section is not needed. The committee recognizes some jurisdictions will amend out the sprinklers, but we cannot add requirements based on "what ifs". This proposal does not address light-frame construction and gives no option if there are no sprinklers.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeff Hugo, CBO, National Fire Sprinkler Association, requests Disapproval.

Commenter's Reason: I disagree with the committee's statement. The codes are full of "what ifs", and it is the building official's job to contemplate these situations to protect the citizens in their communities.

This proposal does address light frame construction; note the section it is quoted in - IRC Section R503.1. No other proponent or proposal could clearly identify or prove by the referenced testing that other than fire sprinklers can adequately protect the light framing construction for the citizens and those who need to enter the structure. According to the referenced testing, the best that could be done is 30 minutes without sprinklers. 30 minutes until collapse, but what is often missed are the reports stating that the minimum live loading is lost in much less time (20 minute range). Response times of fire departments, time to setup and gather information, identify the location of those trapped…is less than 30 minutes the best we can do for our fire fighters?

We know by several years of debating in the IBC and IFC that no vertical or horizontal fire resistive barrier can be effective without proper penetration protection. If covering over light weight construction is preferred over sprinklers, no protection of penetrations is required, leaving the building official, home owner, and fire fighter with a false sense of security. Building officials knowing the IBC will have wide ranging interpretations thus affecting the home builders from jurisdiction to jurisdiction to guess, again. This was not the point of creating a single code.

Lighting, duct openings, vent/drain piping, stairs to name a few, will allow fire to spread through the concealed spaces very quickly. If a covering is preferred, then the IRC debates for years to come will have attempts to draftstop, protect penetrations with listed material, etc., which will add costs beyond the sprinkler system installed to protect the light weight framing.

Final Action: AS AM AMPC____ D

RB85-09/10

R501.3 (New), Chapter 44 (New)

Proposed Change as Submitted

Proponent: Larry Wainright, Qualtim, Inc., representing the Structural Building Components Association

1. Add new text as follows:

R501.3 Fire Protection of Floors: Floors within dwelling units shall be protected on the underside by a minimum of 1/2" gypsum board applied in accordance with Section R702.3.

Exceptions:

1. Crawl spaces where the maximum clear height from the underside of the subfloor to the void space floor is 3 feet or less and is not intended for mechanical equipment use or storage.
2. The building is protected with an automatic sprinkler system designed to NFPA 13, 13D, 13R, or Section P2904 of this code.
3. Floors of any material or combination of materials achieving a 30-minute fire-resistance rating in accordance with ASTM E 119 or UL 263.
4. Floors that are protected by a material or combination of materials in accordance with the test procedures of ASTM E 84 or UL 723 that exhibits a flame spread index not exceeding 25, no evidence of progressive combustion and a flame front that does not progress more than 10 ½ feet (3200 mm) beyond the centerline of the burner at any time during an extended 30 minute test.

2. Add new standard to Chapter 44 as follows:

NFPA
<u>13R—07</u> <u>Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height</u>

Reason: This proposal would require the underside of floors to be protected, providing a greater level of fire protection than unprotected floors. This would apply to all construction types, thereby creating no competitive advantage for specific building types.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: The proposed new standard, NFPA 13R, is currently referenced in the *International Building Code*.

ICCFILENAME: WAINRIGHT-RB-8-R501.3

Public Hearing Results

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: Based on the committee's previous action on RB31-09/10. ASTM E84 is not the appropriate test for structural integrity. The floor furnace test is more appropriate. The proponent should work with the proponent of RB86-09/10 through RB88-09/10 to bring back a solution that protects the fire fighters and the occupants.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

<u>**R501.3 Fire protection of floors.** Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard membrane, 5/8 inch (15.9 mm) wood structural panel membrane, or equivalent on the underside of light frame construction, steel bar joists and wood chord / metal web joists and shall be draftstopped in accordance with Section R302.12.</u>

<u>Exceptions:</u>

1. <u>Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, NFPA 13R or NFPA 13.</u>
2. <u>Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.</u>
3. <u>Portions of floor assemblies shall not require protection when complying with the following:</u>
   - <u>3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story</u>
   - <u>3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.</u>

Add new standard to Chapter 44 as follows:

<u>**NFPA 13R—07** Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height.</u>

Commenter's Reason: RB 85-09/10 merely proposes to require a minimum of ½" gypsum wallboard, or equivalent on all unprotected floor assemblies with exceptions for sprinklered buildings, certain crawlspaces and other limited areas that would otherwise be difficult to cover due to obstructions. SBCA's position on this subject is to provide a requirement that applies equally to all building component types and does not provide a competitive advantage to specific types of construction where they would be exempt from the requirements.

The following link shows statistics of firefighter deaths. It is a global report that shows all firefighter deaths and their causes from 1980-2008. This report shows that less than 5% of all firefighter deaths occur from injuries sustained in structural collapses.
http://www.sbcindustry.com/images/fire/firefatalstats.pdf

The following spreadsheet is a list of NIOSH reports showing firefighter fatalities that involved a structural collapse. Of those reports, 11 involved firefighter deaths from the collapse of solid sawn lightweight construction and 9 (with potentially 2 more) involved I-joists, MPC wood trusses, and steel trusses combined. This shows that there is no compelling evidence to suggest that engineered products are any more dangerous than solid sawn materials in real fire situations.
Links to the full NIOSH reports are included for more details.

NIOSH Report date	Construction	SBCs	State	Fatality #	Familiar name	NIOSH Report # (link)
4/4/2008	Solid Sawn 2x10- Floor collapse		OH	2	Collerain	F2008-09
7/5/2008	Brick parapet wall collapse		TX	1		F2008-21
7/22/2008	Solid Sawn - Floor collapse		IL	1		F2008-26
1/26/2007		I-Joist- Floor collapse	TN			F2007-07
2/4/2007	Canopy collapse on garage - traditional wooden construction		PA	2		F2007-08
2/21/2006	Wall collapse-ordinary construction		AL	2		F2006-07
6/25/2006		I-Joist Floor collapse	IN	1		F2006-24
8/13/2006		I-Joist/Floor trusses - Floor collapse	WI	1	Green Bay	F2006-26
12/30/2006	Collapsed awning- 2x4 framing lumber		TX	1		F2007-01
2/19/2005	Solid Sawn roof collapse (wood framed building		TX	1		F2005-09
1/9/2004	Solid sawn - floor collapse		PA	1		F2004-05
4/8/2004	Brick façade collapse		TN	1		F2004-37
1/20/2003	Crushed by concealed chimney - balloon frame		PA	1		F2003-04
6/15/2003		Open web steel truss- roof collapse	TN	2		F2003-18
2/11/2002	Brick veneer collapsed. Wood frame platform construction		TX	1		F2002-07
3/4/2002	Wood frame w/masonry veneer - floor collapse		NC	1		F2002-11
3/7/2002		LW Pre-engineered trusses w plywood sheathing & various floor coverings	NY	2		F2002-06
7/4/2002	Duplex -twin frame of a balloon frame - roof collapse		NJ	3		F2002-32
9/14/2002	Balloon frame- roof collapse		IA	1		F2002-40
9/30/2002	Parapet wall collapse		IN	1		F2002-44
11/1/2002	Exterior wall collapse- balloon frame		PA	1		F2002-49
11/25/2002	2x10s heavy timber roof - collapse		OR	3		F2002-50
2/25/2001	Wall collapse-ordinary construction		WI	1		F2001-09
3/8/2001		MPC wood trusses - floor collapse	OH	1		F2001-16
3/18/2001	2nd floor collapse - unspecified construction		MO	2		F2001-15
6/16/2001		MPC roof trusses-roof collapse	SC	1		F2001-27
2/14/2000		MPC roof trusses-roof collapse - McDonalds	TX	2		F2000-13
4/20/2000		MPC floor trusses- floor collapse	AL	1		F2000-26
12/28/2000		MPC roof trusses-roof collapse	AR	4 injured		F2001-03
1/10/1999	Balloon frame- roof collapse (singled our balloon framing in notes of action)		CA	1		99-F03
1/19/1999	Chimney Collapse - fire investigator		NY	1		99-F06
3/8/1998		Wooden truss roof collapse (unsure if SBC)	CA	1		98-F07

NIOSH Report date	Construction	SBCs	State	Fatality #	Familiar name	NIOSH Report # (link)
6/5/1998	2nd level collapse - wood frame		NY	2 and 4 seriously injured		98-F17
6/11/1998	Roof porch collapse - tin roofing supported by 4 colums		VA	1		98-F18
9/5/1998	Parapet wall collapse - heavy wood truss construction		VT	1		98-F20
8/29/1998	2x10s roof - collapse		MS	2		98-F21
12/31/1998	Balloon frame walls & heavy wood gabled roof - roof collapse		GA	1		99-F04
2/17/1997	Wood framing - floor collapse		KY	1		97-04
3/18/1996		Roof trusses 2x6 collapse - not sure if SBCs	VA	2		96-17
Total:	11	9 (with potential 2 more)				

Public Comment 2:

Jonathan Humble, representing American Iron & Steel Institute and the Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.7 Floor separation. Floor assemblies within dwelling units shall have a minimum of ½ inch (12.7 mm) gypsum board applied to the underside of the framing members in accordance with R702.3, when not required elsewhere in this code. This provision shall not supersede Sections R302.3, R302.4 or R302.5 where fire resistance ratings or greater thicknesses of gypsum board are required. Penetrations through the gypsum board shall be allowed for stairways, ducting, piping, and electrical and telecommunications outlet boxes, wiring and conduits.

Exceptions:

1. Floor assemblies located over crawl spaces, where the crawl space does not contain mechanical equipment or water heater(s).
2. Dwellings protected with an automatic sprinkler system designed and installed in accordance with NFPA 13D or in accordance with Section P2904.

(Renumber remaining sections)

Commenter's Reason: We propose to modify the original proposal with a product and provision neutral approach to code enforcement. At the 2009 code hearings there were five (5) proposals on the same subject. Each had their own spin on the approach to a design which would accomplish the goal of providing the fire service with some separation of spaces from spaces where framing members that are normally exposed in dwellings today. In this case that separation is gypsum board, not unlike the protection outlined in IRC Section R302.6. Unfortunately, it was the number of variations and subsequent opinions of preference which convinced the code development committee to recommend disapproval for all five of those proposals (e.g. RB31, RB85, RB86, RB87, and RB88).

The modification acts on the following aspects:

Title:

The title chosen is "floor separation" which more appropriately describes the intent.

Neutral Approach:

The modification before you attempts to neutralize those original opinions by focusing on the basic applications necessary for that separation. The modification is product neutral, meaning it applies to all light frame constructions without exception. In addition, the provision is proposed for inclusion into Chapter 3 which further retains that neutrality.

Coordination:

The modification coordinates the other provisions which require gypsum board by referencing the specific sections and the priority, in the second sentence.

Penetrations:

The modification also addresses the impact of stairs, ducting, piping and electrical wiring and conduit penetrating the gypsum board ceiling, in the third sentence.

Exceptions

The modification includes only those exceptions that were found to be a common theme amongst the five original proposals, and practical for this application.

Final Action: AS AM AMPC____ D

RB86-09/10
R501.3 (New)

Proposed Change as Submitted

Proponent: Sal DiCristina, representing Code Solutions, Inc.

Add new text as follows:

R501.3 Fire floor protection: Floors within dwelling units utilizing light-frame construction shall be protected on the underside by a minimum of 5/8" gypsum board applied in accordance with Section R702.3.

Exceptions:

1. Crawl spaces where the maximum clear height from the underside of the subfloor to the void space floor is 3 feet or less and is not intended for mechanical equipment use or storage.
2. The building is protected with an automatic sprinkler system designed to NFPA 13D or Section P2904 of this code.
3. Floors in which the exposed materials are protected by materials achieving a 30-minute fire-resistance rating in accordance with ASTM E 119 or UL 263.
4. Floors in which the exposed materials on the underside are protected by a fire-retardant coating that shall have, when tested in accordance with ASTM E 84 or UL 723 in the form in which it is applied, a listed flame spread index of 25 with no evidence of significant progressive combustion when the test is continued for an additional 20 minute period. In addition, the flame front shall not progress more than 10 ½ feet (3200 mm) beyond the centerline of the burners at any time the test.

Reason: This proposal is essentially the same as a proposal submitted by Battalion Chief Sean DeCrane of the Cleveland Fire Department with the addition of an exception number 4. We support Chief DeCrane's objectives, however, we believe additional flexibility is needed to provide the required level of protection in the vast array of construction configurations that may be encountered in the field.

The purpose of this additional method of protection is to provide an economical method to protect the underside of a floor without the need to apply a covering membrane that would restrict access. This would be important for unfinished basement and lower levels, or crawl spaces that do not meet exception 1.

It is important to note that the parameters required in proposed Exception 4 prevents the underside of the floor from ignited for a period of at least 30 minutes which matches the level of protection Mr. DeCrane seeks in Section R501.3.

ASTM 84 and UL 723 are already utilized in the IRC in Section R302 Fire Resistant Construction, however, the parameters above exceed those in R302 to ensure that a minimum of 30 minutes of protection is provided to the underside of the floors.

Of greater note is that material meeting the requirements of exception 4 meet or exceed the level of protection provided by fire-retardant treated wood (FRTW) that is permitted by Sections R802.1 and R802.1.3 of the IRC for protected roof framing.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: DICRISTINA-RB-1-R501.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the proponent's request and the committee's previous action on RB85-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble, American Iron & Steel Institute, representing The Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.7 Floor separation. Floor assemblies within dwelling units shall have a minimum of ½ inch (12.7 mm) gypsum board applied to the underside of the framing members in accordance with R702.3, when not required elsewhere in this code. This provision shall not supersede Sections R302.3, R302.4 or R302.5 where fire resistance ratings or greater thicknesses of gypsum board are required. Penetrations through the gypsum board shall be allowed for stairways, ducting, piping, and electrical and telecommunications outlet boxes, wiring and conduits.

Exceptions:

1. Floor assemblies located over crawl spaces, where the crawl space does not contain mechanical equipment or water heater(s).
2. Dwellings protected with an automatic sprinkler system designed and installed in accordance with NFPA 13D or in accordance with Section P2904.

(Renumber remaining sections)

Commenter's Reason: We propose to modify the original proposal with a product and provision neutral approach to code enforcement. At the 2009 code hearings there were five (5) proposals on the same subject. Each had their own spin on the approach to a design which would accomplish the goal of providing the fire service with some separation of spaces from spaces where framing members that are normally exposed in dwellings today. In this case that separation is gypsum board, not unlike the protection outlined in IRC Section R302.6. Unfortunately, it was the number of variations and subsequent opinions of preference which convinced the code development committee to recommend disapproval for all five of those proposals (e.g. RB31, RB85, RB86, RB87, and RB88).

The modification acts on the following aspects:

Title:

The title chosen is "floor separation" which more appropriately describes the intent.

Neutral Approach:

The modification before you attempts to neutralize those original opinions by focusing on the basic applications necessary for that separation. The modification is product neutral, meaning it applies to all light frame constructions without exception. In addition, the provision is proposed for inclusion into Chapter 3 which further retains that neutrality.

Coordination:

The modification coordinates the other provisions which require gypsum board by referencing the specific sections and the priority, in the second sentence.

Penetrations:

The modification also addresses the impact of stairs, ducting, piping and electrical wiring and conduit penetrating the gypsum board ceiling, in the third sentence.

Exceptions

The modification includes only those exceptions that were found to be a common theme amongst the five original proposals, and practical for this application.

Final Action: AS AM AMPC____ D

RB87-09/10

R501.3 (New)

Proposed Change as Submitted

Proponent: Sean DeCrane, Cleveland, OH Fire Department, representing the International Association of Fire Fighters

Add new text as follows:

R501.3 Fire floor protection. Floors within dwelling units utilizing light-frame construction shall be protected on the underside by a minimum of 5/8" gypsum board applied in accordance with Section R702.3.

Exceptions:

1. Crawl spaces where the maximum clear height from the underside of the subfloor to the void space floor is 3 feet or less and is not intended for mechanical equipment use or storage.
2. The building is protected with an automatic sprinkler system designed to NFPA 13D or Section P2904 of this code.
3. Floors in which the exposed materials are protected by materials achieving a 30-minute fire-resistance rating in accordance with ASTM E 119 or UL 263.

Reason: On August 13, 2006 a Wisconsin fire fighter was killed, and a second fire fighter injured, when the floor they were operating on collapsed sending them into the basement. One fire fighter fell directly into the room of origin and was killed, the second fire fighter landed on the opposite side of a block wall and survived by shielding herself and making an escape through a rear window. They checked the floor to ensure it was safe and solid, just prior to collapse they heard a loud crack. T

The floor they were operating on was unprotected lightweight construction that collapsed without warning. In the ensuing investigation, the National Institute for Occupational Safety and Health released report F2006-26[1]. One of the recommendations is to "modify current building codes to require that lightweight trusses be protected with a fire barrier". This should not only pertain to truss construction. There are additional forms of construction that can be determined to be lightweight, cold form steel, bar joists, wooden engineered I-beam, etc., the recent trend in residential construction is to use products that are financially beneficial. It is the belief of many of us in the fire service that as the industry engineers products to a more finite point we are losing our safety factors.

In their report 2007-12 released May 16, 2008, NIOSH[2] recommended "Ensure fire fighters are trained for extreme conditions such as high winds and rapid fire progression associated with lightweight construction". They further stated, "In this era of new lightweight construction, training procedures covering strategy and tactics in extreme operations conditions, such as high winds and lightweight building construction (i.e. materials and design) are needed for all levels of fire fighters. Lightweight constructed buildings fail rapidly with little warning, complicating rescue efforts. The potential for fire fighters to become trapped or involved in a collapse may be increased. There are twenty-nine actions for fire fighters can take to protect themselves when confronted with buildings utilizing lightweight building components as structural members. They range from looking for signs or indicators that these materials are used in buildings (such as, newer structures, large unsupported spans, and heavy black smoke being generated) to getting involved in newer building code development".

On September 27, 2007 NIOSH released report 2006-24[3] The first recommendation of the report read "Ensure that fire fighters and incident commanders are aware unprotected pre-engineered I-joist floor systems may fail at a faster rate than solid wood joists when exposed to direct fire impingement, and they should plan interior operations accordingly". The discussion of the recommendation is quite lengthy but identifies the advantages of the construction industry using this type of construction but also relates the dangers to fire fighters, "The Illinois Fire Service Institute, at the University of Illinois, conducted tests to help determine the structural stability of sample floor systems. These studies suggest that engineered wooden I-beams can fail in as little as 4 minutes and 40 seconds under controlled test conditions". The report also states that weakened floors are difficult to detect from above as the floor surface may appear intact.

On November 16, 2007, NIOSH released report F2007-07[4]. In this Fire Fighter Death in the Line-of-Duty report, NIOSH recommends "building code officials and local authorities having jurisdiction should consider modifying the current codes to require that lightweight trusses are protected with a fire barrier on both the top and the bottom". The report further states "In this incident, the floor trusses for the first floor did not have any protection on the bottom cord, which immediately exposed the trusses to fire in the basement. Unfinished basements are very common throughout the country. Basements typically house additional fire exposures such as alternative heating sources, hot water heaters, clothes dryers, etc.. It is critical for trusses and lightweight engineered wood I-beams that are used in a load-bearing assembly to be protected with a thermal barrier such as gypsum wallboard. The function of the thermal barrier is a critical factor in the fire performance of the assembly".

In April, 2005, NIOSH released their report "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures"[5.] In their release they recommended the placement of a labeling system on buildings to indicate the type of construction. While this recommendation will probably not be acceptable to residents of a one or two family home, we can mandate that they increase the protection of the construction type to provide increased safety to the residents and the responding fire fighters.

In fact, NIOSH has been concerned enough with the performance of lightweight floors in fire conditions they released a Workplace Solutions report in February, 2009, *Preventing Deaths and Injuries of Fire Fighters Working Above Fire-Damaged Floor*[6]. Authors of the report recommend; "Builders, contractors, and owners should consider protecting all floor systems, including engineered wood I-joists, by covering the underside with fire-resistant materials".

Many of the opponents of this requirement have made claims that the fire service has failed to provide technical data to support our real world experiences with the lightweight products. Since the previous ICC code cycle there have been three specific reports released by three separate test groups performing tests for different reasons. I have included their results below.

The National Research Council Canada performed a series of tests in creating their report Fire Performance of Houses, Phase I: Study of Unprotected Floor Assemblies in Basement Fire Scenarios, released December 18, 2008. The goal of the report was "With the advent of new materials and innovative construction products and systems for use in construction of houses, there is a need to understand what impacts these materials and products will have on occupant life safety under fire conditions and a need to develop a technical basis for the evaluation of their fire performance".[7] These tests were not intentionally conducted for fire fighter safety but rather to identify the dangers to the civilian occupants and their ability to self evacuate. The report states "With the relatively severe fire scenarios used in the experiments, the times to reach structural failure for the wood I-joist, steel C-joist, metal plate and metal wood truss assemblies were 35-60% shorter than that for the solid wood joist assembly". Additionally, "For the solid wood joist assemblies, the structural failure occurred after deflection of the floor, mainly in the form of OSB subfloor failure (burn through). For all other floor assemblies, after deflection of the floor, the structural failure occurred either in the form of complete collapse into the basement or in the form of a "V" shaped collapse due to joist or truss failure". In keeping with the intent of occupant safety the report also found "One engineered floor assembly, which gave the shortest time to reach structural failure in the open basement scenario, failed structurally in the closed basement doorway scenario before the tenability limits were reached for healthy adults of average susceptibility". This calls into question, if it can not give the occupant time to self evacuate how will it perform when a fire fighter is performing Search and Rescue for that specific occupant. In summarizing the various test results the report found "The time gap between the onset of untenable conditions and the structural failure of the floor assembly was smaller for the engineered floor assemblies than for the solid wood joist assembly used in the experiments". This is very serious for the responding fire fighter performing life saving Search and Rescue for occupants who have lost consciousness due to the untenable conditions. These victims may still be savable but, the performances of the lightweight assemblies indicate that, savable victims may not be reached due to floor compromise.

In 2008 Tyco Fire Suppression & Building Products performed a series of fire tests. The intent of these tests was to demonstrate the impact residential sprinklers will have in improving fire safety in one and two-family occupancies when lightweight construction is present. The results of these tests were released in 2008 as A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions.[8] In the introduction of the report the author states, "One example of the difference in fire performance of a lightweight structural member compared to solid sawn lumber is the behavior of composite wood joists. When a composite wood joist is exposed to fire, the thin oriented strand board used as the web in the joist is quickly consumed, which results in an inability of the joist to carry the load and ultimately a failure of the supported floor assembly". Later in the introduction the report continues "Due to the greater mass per unit of surface area of the solid wood joist, it will support the floor assembly for much longer than its lightweight alternative when exposed to equivalent fire conditions". The first test involving an unsprinklered room fire led to flashover in 7:09 from ignition and floor assembly collapse at the 11:30 mark from ignition. That is roughly four minutes from flashover we had a collapse of almost the entire 16' x 16' floor area. The second test results reached flashover in only 5:15 from ignition, collapse in this test occurred at 8:34 from ignition, a stunning three minutes after flashover. This would be the time the fire fighters are entering the structure for suppression and Search and Rescue efforts.

These reports are still not enough for some critics so I am referencing a third report. Underwriters Laboratories, The Chicago Fire Department and the International Association of Fire Chiefs received a grant from the Department of Homeland Security to conduct a number of tests on various topics but the main issue was to conduct tests, and report the findings, to evaluate the performance of lightweight structural components when exposed to fire and if the components can be protected. They recently issued the subsequent report *Structural Stability of Engineered Lumber in Fire Conditions*.[9] Tests assemblies were subjected to the standards of the ASTM E119 Test Standard. Two assemblies did not include a ceiling, six of the assemblies included a ceiling consisting of ½ inch thick gypsum board and one assembly included a ¾ inch plaster ceiling. A load of 40 psf was placed along two of the four edges and two 300 lb fire fighter mannequins were applied to the floor assembly. Results from the tests indicated that unprotected 12" wooden I-joist reached structural failure at the 5:58 mark in the tests. The resulting failure covered a large area of the floor. The unprotected 2" x 10" wooden I-beams reached structural collapse at the 18:45 mark in the test, a difference of over twelve minutes. These twelve minutes are critical in Search and Rescue. Further tests demonstrated that when ½ inch gypsum was placed on the 12" I-joists the collapse did not occur until the 26:45 mark in the test. Just a simple ½ covering extended the collapse time approximately twenty minutes. When the ½ inch covering was applied to the wooden I-beams the collapse time was extended to 44:45 mark in the test. One important factor to point out regarding these tests is that the fire fighters are a dead load and not a live load. Would a simulated live load of fire fighters transferring additional psi with each step or crawl have contributed to an earlier collapse? When we review the Wisconsin fire where Engineer Arnie Wolf was killed, the fire fighters stated the floor felt solid but suffered a catastrophic collapse when they began their search pattern. These tests clearly outline the performances of the various construction practices and the dangers these performances present to fire fighters. Underwriters Laboratories and the Chicago Fire Department followed these tests with an online educational program, to view go to http://www.uluniversity.us/home.aspx, in an attempt to educate the nation's fire service on the hazards of operating in these environments.

This code change proposal is an attempt to provide a responsible means on residential construction. I have provided examples of fire fighters being killed in occupancies utilizing lightweight construction practices and the subsequent reports detailing the need to protect lightweight construction. I have also provided two reports generated by a neutral governmental agency recommending protection requirements for lightweight construction. These incidents, and others like them, have produced great hardships on the people involved, they have created widows, fatherless children, injured fire fighters and many who bear the pain of fatalities that could have been prevented. I strongly urge your support for this proposed code change.

1. National Institute for Occupational Safety and Health Report F206-26. July, 2007.
2. National Institute for Occupational Safety and Health Report F2007-12, May, 2008.
3. National Institute for Occupational Safety and Health Report F206-24, September, 2007.
4. National Institute for Occupational Safety and Health Report F2007-07, November, 2007.
5. National Institute for Occupational Safety and Health Alert, "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures".
6. National Institute for Occupational Safety and Health Workplace Solutions, *Preventing Deaths and Injuries of Fire Fighters Working Above Fire-Damaged Floors*, February, 2009.
7. National Research of Canada, Institute for Research in Construction; Fire performance of Houses, Phase I, Study of Unprotected Floor Assemblies in Basement Fire Scenarios, December, 2008.
8. Tyco Industries, *A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions*, September 2008.
9. Underwriters Laboratories, *Structural Stability of Engineered Lumber in Fire Conditions*, September 30, 2008

Floor assembly where Fire Engineer Arnie Wolf was killed

Residential use of cold form steel with penetrations and 24" on center

Even lighterweight materials – Georgia Pacific XJ-85

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: DECRANE-RB-1-R501.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the proponent's request and the committee's previous action on RB85-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Sean DeCrane, Cleveland, OH, Fire Department, representing the International Association of Fire Fighters; Azarang (Ozzie) Mirkhah, Las Vegas, NV, Fire & Rescue, representing Fire & Life Safety Section of the International Association of Fire Chiefs); Steven Orlowski, National Association of Home Builders, Dennis Pitts American Wood Council, American Forest & Paper Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch gypsum wallboard membrane, 5/8 inch wood structural panel membrane, or equivalent on the underside of the floor framing member.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   - 3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   - 3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance.

Commenter's Reason: This public comment was developed in response to the IRC Code Development Committee's comments regarding RB31, RB85, RB86, RB87 and RB88.

Public Comment 2:

Jonathan Humble, American Iron and Steel Institute, representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.7 Floor separation. Floor assemblies within dwelling units shall have a minimum of ½ inch (12.7 mm) gypsum board applied to the underside of the framing members in accordance with R702.3, when not required elsewhere in this code. This provision shall not supersede Sections R302.3, R302.4 or R302.5 where fire resistance ratings or greater thicknesses of gypsum board are required. Penetrations through the gypsum board shall be allowed for stairways, ducting, piping, and electrical and telecommunications outlet boxes, wiring and conduits.

Exceptions:

1. Floor assemblies located over crawl spaces, where the crawl space does not contain mechanical equipment or water heater(s).
2. Dwellings protected with an automatic sprinkler system designed and installed in accordance with NFPA 13D or in accordance with Section P2904.

(Renumber remaining sections)

Commenter's Reason: We propose to modify the original proposal with a product and provision neutral approach to code enforcement. At the 2009 code hearings there were five (5) proposals on the same subject. Each had their own spin on the approach to a design which would accomplish the goal of providing the fire service with some separation of spaces from spaces where framing members that are normally exposed in dwellings today. In this case that separation is gypsum board, not unlike the protection outlined in IRC Section R302.6. Unfortunately, it was the number of variations and subsequent opinions of preference which convinced the code development committee to recommend disapproval for all five of those proposals (e.g. RB31, RB85, RB86, RB87, and RB88).

The modification acts on the following aspects:

Title:
The title chosen is "floor separation" which more appropriately describes the intent.

Neutral Approach:
The modification before you attempts to neutralize those original opinions by focusing on the basic applications necessary for that separation. The modification is product neutral, meaning it applies to all light frame constructions without exception. In addition, the provision is proposed for inclusion into Chapter 3 which further retains that neutrality.

Coordination:
The modification coordinates the other provisions which require gypsum board by referencing the specific sections and the priority, in the second sentence.

Penetrations:
The modification also addresses the impact of stairs, ducting, piping and electrical wiring and conduit penetrating the gypsum board ceiling, in the third sentence.

Exceptions
The modification includes only those exceptions that were found to be a common theme amongst the five original proposals, and practical for this application.

Public Comment 3:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard membrane, 5/8 inch (15.9 mm) wood structural panel membrane, or equivalent on the underside of light frame construction, steel bar joists and wood chord/steel web joists.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, NFPA 13R or NFPA 13.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   - 3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   - 3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.

NFPA 13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height.

Commenter's Reason: This Public Comment merely proposes to require a minimum of ½" gypsum wallboard, or equivalent, on the underside of light frame construction, steel bar joists and wood chord/steel web joists with exceptions for limited areas, sprinklered buildings and certain crawlspaces. SBCA's position on this subject is to provide a requirement that applies equally to all building component types and does not provide a competitive advantage to specific types of construction where they would be exempt from the requirements. However, if that cannot be achieved, this public comment is one of several that will allow the membership to choose which items they believe need protection.

The following link shows statistics of firefighter deaths. It is a global report that shows all firefighter deaths and their causes from 1980-2008. This report shows that less than 5% of all firefighter deaths occur from injuries sustained in structural collapses.
http://www.sbcindustry.com/images/fire/firefatalstats.pdf

Public Comment 4:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard membrane, 5/8 inch (15.9 mm) wood structural panel membrane, or equivalent on the underside of light frame construction, steel bar joists and wood chord / steel web joists.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, NFPA 13R or NFPA 13.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.

NFPA 13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height.

Commenter's Reason: This Public Comment merely proposes to require a minimum of ½" gypsum wallboard, or equivalent, on all unprotected floor assemblies with exceptions for sprinklered buildings and certain crawlspaces. SBCA's position on this subject is to provide a requirement that applies equally to all building component types and does not provide a competitive advantage to specific types of construction where they would be exempt from the requirements.

The following link shows statistics of firefighter deaths. It is a global report that shows all firefighter deaths and their causes from 1980-2008. This report shows that less than 5% of all firefighter deaths occur from injuries sustained in structural collapses.
http://www.sbcindustry.com/images/fire/firefatalstats.pdf

The following spreadsheet is a list of NIOSH reports showing firefighter fatalities that involved a structural collapse. Of those reports, 11 involved firefighter deaths from the collapse of solid sawn lightweight construction and 9 (with potentially 2 more) involved I-joists, MPC wood trusses, and steel trusses combined. This shows that there is no compelling evidence to suggest that engineered products are any more dangerous than solid sawn materials in real fire situations.
Links to the full NIOSH reports are included for more details.

NIOSH Report date	Construction	SBCs	State	Fatality #	Familiar name	NIOSH Report # (link)
4/4/2008	Solid Sawn 2x10- Floor collapse		OH	2	Collerain	F2008-09
7/5/2008	Brick parapet wall collapse		TX	1		F2008-21
7/22/2008	Solid Sawn - Floor collapse		IL	1		F2008-26
1/26/2007		I-Joist- Floor collapse	TN			F2007-07
2/4/2007	Canopy collapse on garage - traditional wooden construction		PA	2		F2007-08
2/21/2006	Wall collapse-ordinary construction		AL	2		F2006-07
6/25/2006		I-Joist Floor collapse	IN	1		F2006-24
8/13/2006		I-Joist/Floor trusses - Floor collapse	WI	1	Green Bay	F2006-26
12/30/2006	Collapsed awning- 2x4 framing lumber		TX	1		F2007-01
2/19/2005	Solid Sawn roof collapse (wood framed building		TX	1		F2005-09
1/9/2004	Solid sawn - floor collapse		PA	1		F2004-05
4/8/2004	Brick façade collapse		TN	1		F2004-37
1/20/2003	Crushed by concealed chimney - balloon frame		PA	1		F2003-04
6/15/2003		Open web steel truss- roof collapse	TN	2		F2003-18
2/11/2002	Brick veneer collapsed. Wood frame platform construction		TX	1		F2002-07

NIOSH Report date	Construction	SBCs	State	Fatality #	Familiar name	NIOSH Report # (link)
3/4/2002	Wood frame w/masonry veneer - floor collapse		NC	1		F2002-11
3/7/2002		LW Pre-engineered trusses w plywood sheathing & various floor coverings	NY	2		F2002-06
7/4/2002	Duplex -twin frame of a balloon frame - roof collapse		NJ	3		F2002-32
9/14/2002	Balloon frame- roof collapse		IA	1		F2002-40
9/30/2002	Parapet wall collapse		IN	1		F2002-44
11/1/2002	Exterior wall collapse- balloon frame		PA	1		F2002-49
11/25/2002	2x10s heavy timber roof - collapse		OR	3		F2002-50
2/25/2001	Wall collapse-ordinary construction		WI	1		F2001-09
3/8/2001		MPC wood trusses - floor collapse	OH	1		F2001-16
3/18/2001	2nd floor collapse - unspecified construction		MO	2		F2001-15
6/16/2001		MPC roof trusses-roof collapse	SC	1		F2001-27
2/14/2000		MPC roof trusses-roof collapse - McDonalds	TX	2		F2000-13
4/20/2000		MPC floor trusses- floor collapse	AL	1		F2000-26
12/28/2000		MPC roof trusses-roof collapse	AR	4 injured		F2001-03
1/10/1999	Balloon frame- roof collapse (singled our balloon framing in notes of action)		CA	1		99-F03
1/19/1999	Chimney Collapse - fire investigator		NY	1		99-F06
3/8/1998		Wooden truss roof collapse (unsure if SBC)	CA	1		98-F07
6/5/1998	2nd level collapse - wood frame		NY	2 and 4 seriously injured		98-F17
6/11/1998	Roof porch collapse - tin roofing supported by 4 colums		VA	1		98-F18
9/5/1998	Parapet wall collapse - heavy wood truss construction		VT	1		98-F20
8/29/1998	2x10s roof - collapse		MS	2		98-F21
12/31/1998	Balloon frame walls & heavy wood gabled roof - roof collapse		GA	1		99-F04
2/17/1997	Wood framing - floor collapse		KY	1		97-04
3/18/1996		Roof trusses 2x6 collapse - not sure if SBCs	VA	2		96-17
Total:	11	9 (with potential 2 more)				

Public Comment 5:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard membrane, 5/8 inch (15.9 mm) wood structural panel membrane, or equivalent on the underside of light frame construction, steel bar joists and wood chord/steel web joists.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, NFPA 13R or NFPA 13.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Solid sawn wood joists of at least 2x10 nominal.
5. Metal Plate Connected Wood trusses.

NFPA 13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height

Commenter's Reason: This public comment merely proposes to require a minimum of ½" gypsum wallboard, or equivalent on all unprotected floor assemblies with exceptions for sprinklered buildings, certain crawlspaces and other limited areas that would otherwise be difficult to cover due to obstructions. In addition, solid sawn 2x10 lumber and MPC Wood Trusses are exempted. SBCA's position on this subject is to provide a requirement that applies equally to all building component types and does not provide a competitive advantage to specific types of construction where they would be exempt from the requirements. Recognizing that this may not be possible, this comment offers a compromise where those products that survive the longest in fires are exempted.

The following link shows statistics of firefighter deaths. It is a global report that shows all firefighter deaths and their causes from 1980-2008. This report shows that less than 5% of all firefighter deaths occur from injuries sustained in structural collapses. http://www.sbcindustry.com/images/fire/firefatalstats.pdf.

Public Comment 6:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard membrane, 5/8 inch (15.9 mm) wood structural panel membrane, or equivalent on the underside of light frame construction, steel bar joists and wood chord/steel web joists.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, NFPA 13R or NFPA 13.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Solid sawn wood joists of at least 2x10 nominal.
5. Metal Plate Connected Wood trusses
6. Cold formed steel trusses.

NFPA 13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height.

Commenter's Reason: This public comment merely proposes to require a minimum of ½" gypsum wallboard, or equivalent on all unprotected floor assemblies with exceptions for sprinklered buildings, certain crawlspaces and other limited areas that would otherwise be difficult to cover due to obstructions. In addition, solid sawn 2x10 lumber, MPC Wood Trusses and Cold Formed Steel Trusses are exempted. SBCA's position on this subject is to provide a requirement that applies equally to all building component types and does not provide a competitive advantage to specific types of construction where they would be exempt from the requirements. Recognizing that this may not be possible, this comment offers a compromise where those products that survive the longest in fires are exempted.

The following link shows statistics of firefighter deaths. It is a global report that shows all firefighter deaths and their causes from 1980-2008. This report shows that less than 5% of all firefighter deaths occur from injuries sustained in structural collapses. http://www.sbcindustry.com/images/fire/firefatalstats.pdf

Public Comment 7:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R501.3 Fire Protection of Floors: Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall have a minimum fire resistance of 15 minutes, determined from any of the following options or the sum from any combination thereof:

1. Time assigned to framing members, supporting not less than 50% of the full design load, when tested in accordance with ASTM E119 or UL 263, or determined in accordance with International Building Code Section 721.
2. Time assigned to a ceiling membrane or membranes in Table 501.3.
3. Finish rating time for a ceiling membrane not listed in Table 501.3.
4.

Table R501.3
Time Assigned to Ceiling Membranes

Description of Finish	Time (minutes)[1]
3/8" gypsum board	10
½" gypsum board	15
3/8" wood structural panel	5
½" wood structural panel	10
5/8" wood structural panel	15

[1] Times for individual membranes are additive.

Exceptions:

1. Floor assemblies located directly over a crawl space not intended as a habitable or a storage space and that does not contain fuel-fired appliances.
2. Floor assemblies located directly over a space protected with a sprinkler system designed to NFPA 13, 13D, 13R, or Section R313.
3. A portion of a floor assembly area not greater than 80 square feet per story provided that draft stopping is installed at the perimeter of the unconcealed portion of the floor to separate the concealed spaces from the unconcealed spaces.

NFPA 13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height.

Commenter's Reason: This public comment merely proposes to require a minimum of a 15 minute fire resistance rating for all floor assemblies not elsewhere required to be fire resistance rated. This can be achieved through ASTM E119 or UL 263 testing and/or the addition of ceiling membranes. This comment would give the building designer flexibility in deciding how to achieve the desired result and would provide the means for creative solutions.

Final Action: AS AM AMPC____ D

RB88-09/10

R502.14 (New), Chapter 44 (New)

Proposed Change as Submitted

Proponent: Joseph Fleming, representing the Boston Fire Department

1. Add new text as follows:

R502.14 Fire floor protection. Floors within dwelling units utilizing light-frame construction shall be protected on the underside by a minimum of 5/8" gypsum board applied in accordance with Section R702.3
Exceptions:

1. Crawl spaces where the maximum clear height is 3 feet or less and is not intended for use or storage.
2. The building is protected with an automatic sprinkler system designed to NFPA 13D or Section P2904 of this code.
3. Floors in which the exposed materials on the underside are protected by a Class A Fire-Retardant Coating as defined by NFPA 703.

2. Add new standard to Chapter 44 as follows:

NFPA
<u>703-09</u> <u>Fire-Retardant Treated Wood and Fire-Retardant Coatings for Building Materials</u>

Reason: When the Building Codes in the US transitioned to lightweight components in order to provide the same structural support at lower costs it was a well intentioned idea. However, it has had tragic unintended consequences in many circumstances. The lightweight components, which provided equivalent performance, at lower cost of construction, to the previously used “heavier components” during normal use, did not provided equivalent performance during structural fires. It may have been assumed that the lighter weight components would survive long enough to let occupants escape but what about occupants who are elderly, handicapped, or trapped because of ineffective smoke alarms. In these cases, firefighters have to conduct search and rescue operations. Often firefighters arrive in the middle of the night with no information about the occupants and must assume that someone needs to be rescued. In these circumstances firefighter’s lives, as well as the occupants they are searching for are being put at an unreasonable risk.

The lightweight construction was considered to provide the same “safety factor” as the older heavier construction because it performed in a similar manner under specific tests designed to measure its ability to support a load during normal conditions. However, it is important to keep in mind that these tests measured only one aspect, albeit a critical aspect, of the material’s safety. (A design with little flexibility due to conservative or incomplete assumptions has little "*robustness*". A design with a lot of flexibility due to liberal and complete assumptions has a lot of "*robustness"*.) The older heavier construction was extremely “robust,” in that it performed for a long time under fire conditions in the same manner that it performed under non-fire conditions. The same cannot be said for light weight construction. The lighter weight construction is not equivalent to the heavier constriction unless it is as “robust” as the heavier construction.

To correct mistakes of the past and to provide better assurance that the light weight construction is equivalent to and as ”robust” as the older heavier construction we must provide extra protection to allow it to perform under fire and non-fire conditions in the same manner that heavier construction material performs.

Specific examples where fire fighters have died, or been injured, due to, structural collapse during fire because of the use of this “less expensive” design have been documented by NIOSH Firefighter Fatality Reports.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: The proposed new standard, NFPA 703, is currently referenced in the *International Fire Code*.

ICCFILENAME: FLEMING-RB-2-R502.14

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: Based on the proponent's request and the committee's previous action on RB85-09/10.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble, American Iron & Steel Institute, representing The Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

<u>**R302.7 Floor separation**. Floor assemblies within dwelling units shall have a minimum of ½ inch (12.7 mm) gypsum board applied to the underside of the framing members in accordance with R702.3, when not required elsewhere in this code. This provision shall not supersede Sections R302.3, R302.4 or R302.5 where fire resistance ratings or greater thicknesses of gypsum board are required. Penetrations through the gypsum board shall be allowed for stairways, ducting, piping, and electrical and telecommunications outlet boxes, wiring and conduits.</u>

<u>**Exceptions:**</u>

1. <u>Floor assemblies located over crawl spaces, where the crawl space does not contain mechanical equipment or water heater(s).</u>
2. <u>Dwellings protected with an automatic sprinkler system designed and installed in accordance with NFPA 13D or in accordance with Section P2904.</u>

(Renumber remaining sections)

Commenter's Reason: We propose to modify the original proposal with a product and provision neutral approach to code enforcement. At the 2009 code hearings there were five (5) proposals on the same subject. Each had their own spin on the approach to a design which would accomplish the goal of providing the fire service with some separation of spaces from spaces where framing members that are normally exposed in dwellings today. In this case that separation is gypsum board, not unlike the protection outlined in IRC Section R302.6. Unfortunately, it was the number of variations and subsequent opinions of preference which convinced the code development committee to recommend disapproval for all five of those proposals (e.g. RB31, RB85, RB86, RB87, and RB88).

The modification acts on the following aspects:

Title:
The title chosen is "floor separation" which more appropriately describes the intent.

Neutral Approach:
The modification before you attempts to neutralize those original opinions by focusing on the basic applications necessary for that separation. The modification is product neutral, meaning it applies to all light frame constructions without exception. In addition, the provision is proposed for inclusion into Chapter 3 which further retains that neutrality.

Coordination:
The modification coordinates the other provisions which require gypsum board by referencing the specific sections and the priority, in the second sentence.

Penetrations:
The modification also addresses the impact of stairs, ducting, piping and electrical wiring and conduit penetrating the gypsum board ceiling, in the third sentence.

Exceptions
The modification includes only those exceptions that were found to be a common theme amongst the five original proposals, and practical for this application.

Final Action: AS AM AMPC____ D

RB91-09/10
R202 (New), R502.1.8 (New), R602.1.4 (New), R802.1.6 (New), Chapter 44 (New)

Proposed Change as Submitted

Proponent: Edward L. Keith, PE, APA-The Engineered Wood Association

1. Add new definition as follows:

STRUCTURAL COMPOSITE LUMBER. Structural members manufactured using wood elements bonded together with exterior adhesives. Examples of structural composite lumber are:

Laminated veneer lumber (LVL). A composite of wood veneer elements with wood fibers primarily oriented along the length of the member. Veneer thickness shall not exceed 0.25 in. (6.4 mm).

Parallel strand lumber (PSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.25 in. (6.4 mm) and the average length shall be a minimum of 300 times the least dimension.

Laminated strand lumber (LSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 in. (2.54 mm) and the average length shall be a minimum of 150 times the least dimension.

Oriented strand lumber (OSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 in. (2.54 mm) and the average length shall be a minimum of 75 times the least dimension.

2. Add new text as follows:

R502.1.8 Structural composite lumber. Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D5456.

R602.1.4 Structural composite lumber. Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D5456.

R802.1.6 Structural composite lumber. Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D5456.

3. Add new standard to Chapter 44 as follows:

ASTM
D5456-09 Standard Specification for Evaluation of Structural Composite Lumber Products

Reason: ASTM Standard D5456 09 is the standard by which structural composite lumber is evaluated. Structural composite lumber and this standard are already recognized in the 2006 IBC. Products manufactured to this standard are increasingly available in the market place and being used in residential construction even though not specifically recognized by the IRC. These products are being used as beams, headers, long length studs, floor and roof framing; and other applications where high strength, long length, and/or dimensional stability make sawn lumber unacceptable.

Recognition of the appropriate code-recognized standard on the identification marks required by the IRC will provide the designer, builder, plans examiner and building inspector with the assurance that structural composite lumber products are being manufactured with the appropriate quality control systems in place and that the design properties of the product are properly derived and maintained during production.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: The proposed new standard, ASTM D 5456, is currently referenced in the *International Building Code*.

ICCFILENAME: KEITH-RB-6-R202-R502.1.8-CH 44

Public Hearing Results

Analysis: Review of the proposed new standard indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

Committee Action: Approved as Submitted

Committee Reason: This change adds a much needed definition and standard for structural composite lumber as stated in the proponent's published reason.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edward L. Keith, APA – The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

STRUCTURAL COMPOSITE LUMBER. Structural members manufactured using wood elements bonded together with exterior adhesives. Examples of structural composite lumber are:

Laminated veneer lumber (LVL). A composite of wood veneer elements with wood fibers primarily oriented along the length of the member~~.~~, where the veneer element ~~Veneer~~ thicknesses are ~~shall not exceed~~ 0.25 inches (6.4 mm) or less.

Parallel strand lumber (PSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member~~. The~~, where the least dimension of the wood strand~~s shall not exceed~~ elements is 0.25 in. (6.4 mm) or less and ~~the~~ their average lengths ~~shall be a minimum~~ are a minimum of 300 times the least dimension of the wood strand elements.

Laminated strand lumber (LSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member~~. The~~, where the least dimension of the wood strand~~s shall not exceed~~ elements is 0.10 in. (2.54 mm) or less and ~~the~~ their average lengths ~~shall be a minimum~~ are a minimum of 150 times the least dimension of the wood strand elements.

Oriented strand lumber (OSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member~~. The~~, where the least dimension of the wood strand~~s shall not exceed~~ elements is 0.10 in. (2.54 mm) or less and ~~the~~ their average lengths ~~shall be a minimum~~ are a minimum of 75 times and less than 150 times the least dimension ~~or more~~ of the wood strand elements.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: While these provisions were approved by the Committee as proposed, it was suggested by the Committee that the Public Comment process be used to eliminate mandatory language from the definitions for consistency with the format of other definitions in the code. The above modification does so. With one exception the changes above in this Public Comment are non-technical. In the definition for OSL the further limitation "and less than 150 times" was returned to the definition. It was inadvertently left out of the original proposal but is a part of the definition in the standard. It is a necessary part of the definition to distinguish OSL from LSL.

Final Action: AS AM AMPC____ D

RB93-09/10
R502.2.2.1.1

Proposed Change as Submitted

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

R502.2.2.1.1 Placement of lag screws or bolts in deck ledgers. The lag screws or bolts shall be placed not less than 2 inches (51 mm)in from the top of the deck ledger, ¾ inches (19 mm) from the bottom of the deck ledger, 2 inches (51 mm) from the bottom of rimboard, bottom or top of the deck ledgers and between 2 and 5 inches (51 and 127 mm) in from the ends of the deck ledger. The lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger.

Reason: Placement provisions for lag screws and bolts in deck ledgers were added to the IRC last cycle; however, questions arose when designers compared the placement requirements with 2005 *National Design Specification*® (*NDS*®) *for Wood Construction* requirements for similar connections. The proposed changes bring the placement requirements into agreement with the minimum requirements in the 2005 *NDS*.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: PITTS-RB4-R502.2.2.1.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels the placement description is too confusing and should be presented in tabular form.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dennis Pitts, representing American Wood Council and American Forest & Paper Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R502.2.2.1.1 Placement of lag screws or bolts in deck ledgers and band joists. The lag screws or bolts in deck ledgers and band joists shall be placed ~~not less than 2 inches (51 mm)in from the top of the deck ledger, ¾ inches (19 mm) from the bottom of the deck ledger, 2 inches (51 mm) from the bottom of rimboard, bottom or top of the deck ledgers and between 2 and 5 inches (51 and 127 mm) in from the ends of the deck ledger. The lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger~~ in accordance with Table R502.2.1.1 and Figures R502.2.2.1.(1) and R502.2.2.1.(2).

TABLE R502.2.2.1.1
PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS				
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger [1]	2 inches [4]	¾ inch	2 inches [2]	1-5/8 inch [2]
Band Joist [3]	¾ inch	2 inches	2 inches [2]	1-5/8 inch [2]

For SI: 1 inch = 2.54 mm
Notes:

1. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Fig. R502.2.2.1.(1).
2. Maximum 5 inches (127 mm).
3. For engineered rim joists, the manufacturer's recommendations shall govern.
4. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Fig. R502.2.2.1.(1).

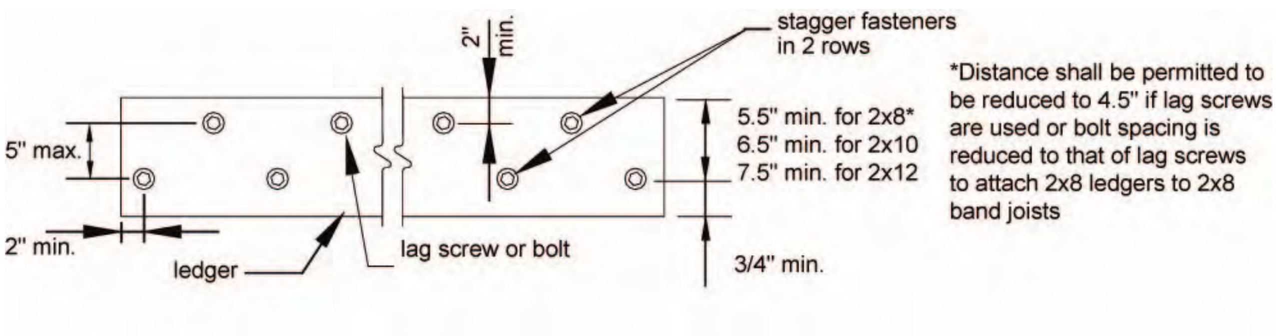


Fig. 502.2.2.1(1)
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS

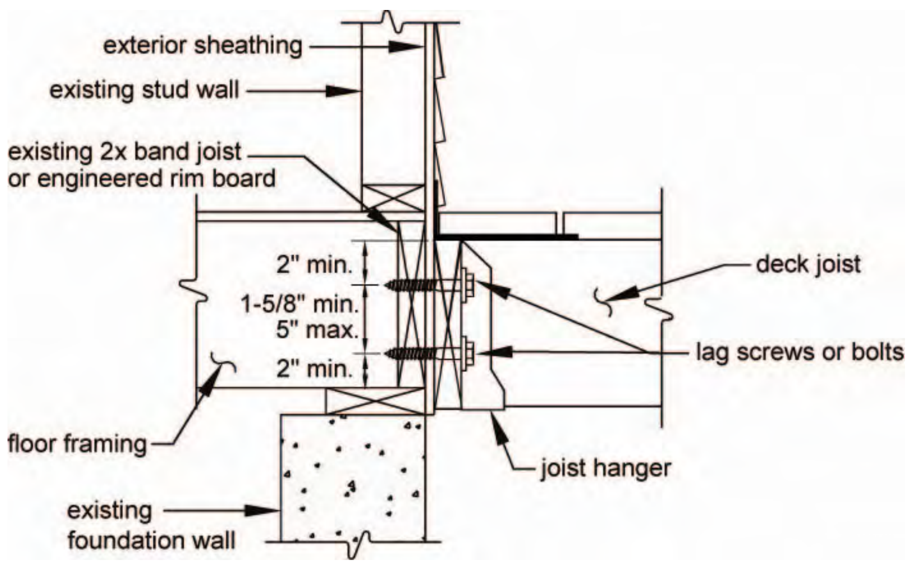


FIG.R502.2.2.1(2)
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS

Commenter's Reason: RB93-09/10 was intended to bring the requirements for the placement of screws or bolts in deck ledgers into agreement with the minimum requirements of the NDS®. The IRC B&E Committee members felt that "…the placement description is too confusing and should be presented in tabular form." This public comment puts the existing and the proposed requirements into a table and also provides illustrations to make those provisions clearer.

Final Action: AS AM AMPC____ D

RB94-09/10
R502.2.2.3, Figure R502.2.2.3

Proposed Change as Submitted

Proponent: Diana M. Hanson, representing North American Deck and Railing Association, Inc. (NADRA)

Delete without substitution:

~~**R502.2.2.3 Deck lateral load connection.** The lateral load connection required by Section R502.2.2 shall be permitted to be in accordance with FigureR502.2.2.3. Hold-down tension devices shall be installed in not less than two~~

~~locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N).~~

~~FIGURE R502.2.2.3~~
~~DECK ATTACHMENT FOR LATERAL LOADS~~

Reason: The language of R502.2.2.3 is ambiguous resulting in potential misinterpretation by builders of decks and code officials. The phrasing “may be permitted to be” when coupled with the referenced Figure R502.2.2.3, results in a misunderstanding that this *example* of how to meet the lateral load requirement of R502.2.2, is a requirement, when in fact it is not.

This section has been the cause of much confusion and misunderstanding since its adoption in 2007. The language of 502.2.2.3 and the related figure is merely a suggestion, not a prescription for the only way to achieve a compliant lateral connection, yet NADRA has had to field inquiries and hold discussions with many builders and code officials who understandably misinterpret this code section and figure.

R502.2.2.3 and related Figure R502.2.2.3 add needless complexity to the code, its enforcement, and application and is potentially prone to misinterpretation. Experience shows such figures have a propensity for taking precedent over actual code language, resulting in commonly accepted construction practices being overlooked, and onerous methods being mistakenly understood to be required by both the builder and the code official, raising the likelihood of increased costs to both materials and labor.

IRC 2009, R101.3 Purpose, states “The purpose of this code is to provide *minimum requirements* to safeguard the public safety…” [emphasis added]. The Figure 502.2.2.3 is taken directly from the FEMA 2007 publication which is specifically for seismic areas. Suggesting that good building practices should meet seismic area requirements is not in line with R101.3.

Further, the language of 502.2.2.3 stating “not less than two” hold-down tension devices makes little sense when the size of the deck being attached is not taken into account.

For the above stated reasons, we propose that Figure 502.2.2.3 and the language of R502.2.2.3 suggesting its use, be removed from the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HANSON-RB-2-R502.2.2.3-F. R502.2.2.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that a prescriptive method should not be removed from the code but alternate methods should be added. The proponent should work with industry and bring back a solution using other methods.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Diana Hanson, North American Deck and Railing Association, Inc. (NADRA), requests Approval as Submitted.

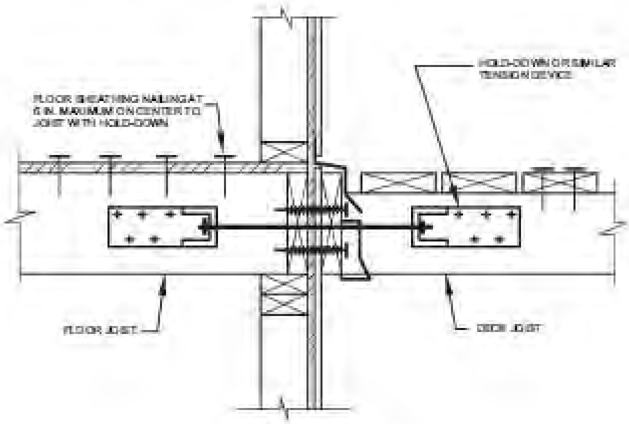
Commenter’s Reason: This public comment is for approval of RB94 As Submitted.

When the committee disapproved RB94 it gave as its reason that a prescriptive method should not be removed from the code, but that a solution providing other methods should be brought back.

We disagree in part, and agree in part.

We agree that carefully developed code that addresses the lateral load should be worked out and included in the IRC, and that industry should work together to achieve it.

However, we do not believe that to be a good enough reason to leave something in the code that is simply bad.



For SI: 1 inch = 25.4 mm

FIGURE 502.2.2.3
DECK ATTACHMENT FOR LATERAL LOADS

R502.2.2.3 Deck lateral load connection. The lateral load connection required by Section R502.2.2 shall be permitted to be in accordance with Figure R502.2.2.3. Hold-down tension devices shall be installed in not less than two locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N).

The above Figure 502.2.2.3 was borrowed from Figure 7-10 of the *2006 Homebuilders' Guide to Earthquake-Resistant Design and Construction* (FEMA 232), with stricter requirements added:

1. Where FEMA 232 requires attachment at 12" on center (per R602.3(1)), R502.2.2.3 indicates a fastener pattern of 6" on center; and
2. The FEMA 232 design does not designate a load requirement for its tension devices, however R502.2.2.3 requires that each tension device meet a load requirement of 1500 lbs.

What is in the code now is greater in specification than what FEMA suggested for earthquake prone areas!

Further, while the tension devices of R502.2.2.3 do provide some means to resist lateral loads applied to the ledger connection, lateral load resistance is actually not completely solved by this connection detail. To imply that it does, is misleading since it does nothing to secure the deck from swaying. Swaying can deform the plane of the deck and weaken the connections throughout the deck, as well as compromise the integrity of the supporting posts.

Moreoever, no conditions are given for the use of R502.2.2.3. Multi-level decks, decks that wrap around a corner and decks that jog in and out with creative angles or curves make it impossible to use the generic requirement for "tension devices in two locations" without reference to where those locations are. It is much too simplistic to require two such devices without considering the lateral load resistance of the specific deck.

Clearly, the method of R502.2.2.3 and the related figure is not a cure all for any and all decks. Yet, it is being misunderstood as such and is therefore dangerous. We are already seeing misguided interpretations beginning to affect our industry. As awareness of this figure grows, it is our expectation that that confusion will grow exponentially.

We hope you will vote to remove R502.2.2.3 and the related Figure 502.2.2.3 by approving RB94 as submitted.

Final Action: AS AM AMPC____ D

RB102-09/10
R202 (New), R602.3

Proposed Change as Submitted

Proponent: Jay H. Crandell, PE, d/b/a ARES Consulting, representing the Foam Sheathing Coalition

1. Add new definition as follows:

EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resistive barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments such as cornices, soffits, fascias, gutters and leaders.

2. Revise as follows:

R602.3 Design and construction. Exterior walls of wood-frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3.(2) or in accordance with AF&PA's NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(1) through R602.3(4). When used as wall bracing in accordance with Section R602.10 or other structural framing purposes in accordance with this chapter, ~~Structural~~ wall sheathing shall be fastened directly to ~~structural~~ framing members~~. Exterior wall coverings~~ and, when placed on the exterior side of an exterior wall, shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). ~~Wood structural panel sheathing used for exterior walls shall conform to the requirements of Table R602.3(3).~~ Wall sheathing used only for exterior wall covering purposes shall comply with Section R703.

Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

> **Exception:** Jack studs, trimmer studs and cripple studs at openings in walls that comply with Tables R502.5(1) and R502.5(2).

Reason: The definition of "exterior wall covering" from IBC Chapter 14 is introduced to the IRC for appropriate and consistent usage regardless of building type or occupancy. The proposed revision to section R602.3 then applies this definition and, as an editorial proposal, helps to clarify requirements for sheathing installation on exterior walls. Wall sheathing that is used for structural purposes (e.g., bracing) is addressed in Chapter 6 Wall Framing while wall sheathing that is used solely for exterior wall covering purposes is appropriately addressed in Chapter 7 Wall Covering. The special reference to wood structural panels at the exclusion of listing specific requirements for other sheathing types is deleted because the requirements for applicable wall sheathing materials, including wood structural panels, are adequately addressed by reference to Tables R602.3(1) through R602.3(4). This change will help ensure consistent use of the terms "exterior wall covering" and "wall sheathing" in the IRC and better organize the code to address distinct requirements depending on the application or function of wall sheathing.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CRANDELL-RB-1-R202-R602.3

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resistive barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments such as cornices, soffits, and fascias~~, gutters and leaders~~.

(Portions of proposal not shown remain unchanged)
Committee Reason: The committee feels this new language will be an added improvement and will distinguish between structural wall covering and exterior wall covering. The modification deletes gutters and leaders from the definition since they are not external wall coverings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dennis Pitts, American Wood Council & American Forest & Paper Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R602.3 Design and construction. Exterior walls of wood-frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3.(2) or in accordance with AF&PA's NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(1) through R602.3(4). ~~When used as wall bracing in accordance with Section R602.10 or other structural framing purposes in accordance with this chapter,~~ <u>W</u>~~w~~all sheathing shall be fastened directly to framing members and, when placed on the exterior side of an exterior wall, shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). <u>Wood structural panel sheathing used for exterior walls shall conform to the requirements of Table R602.3(3).</u> Wall sheathing used only for exterior wall covering purposes shall comply with Section R703.

Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

Exception: Jack studs, trimmer studs and cripple studs at openings in walls that comply with Tables R502.5(1).

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The proposed modifications further modify the change recommended for approval as modified by the IRC Committee. The proposal added a clause that limits the minimum fastening and resistance requirements for wall sheathing to only cases where the wall sheathing is being used as part of the wall bracing system per Section R602.10 or other undefined structural framing purposes in Chapter 6. Resisting out of plane wind forces is a major structural requirement on exterior sheathing. While the previous change did clarify some of the language in this section, it confused the issue of whether resistance of out-of-plane wind forces even need to be resisted by the exterior wall sheathing. This change clarifies that requirement while deleting an unnecessary reference to R602.10 in this section.

In addition, the previous change deleted a reference to the out-of-plane resistances provided in Table R602.3(3). This change proposed to re-insert that language while leaving the proposed language that permits exterior wall coverings to be designed per R703.

Public Comment 2:

Edward L. Keith, APA, The Engineered Wood Association, requests Disapproval.

Commenter's Reason: This code change requires only those areas of the wall that are used as bracing to be "capable of resisting wind pressures…" shown on the tables in Section R301.2.1.

The IRC bracing provisions permit distances of up to 21 feet between braced wall panels. That means that the same wind loads that are causing the lateral load on the structure and necessitating the use of braced wall panels may be ignored on these areas of the wall between the braced wall panels. This proposal provides a loop hole around the requirements of Section R301.2.1, reproduced below (important provisions are underlined for clarity):

R301.2.1 Wind limitations. *Buildings and portions thereof shall be limited by wind speed, as defined in Table R301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be determined from Figure R301.2(4). Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply.* <u>*Where loads for wall coverings*</u>*, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors* <u>*are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings*</u>*, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors…*

The code, as quoted above, requires that all exterior surfaces of a structure be able to resist these wind loads – including windows, doors and roof coverings. This proposal will provide an exception for the walls of the structure *if they do not contain bracing panels* by prescriptively permitting the use of non-structural sheathing such as foam insulation board. It is unreasonable to assume that the wind will act only on the braced wall panel locations! Note that the wall may use let-in bracing in some situations. In such a situation <u>no</u> area of the opaque wall has to be designed for wind as the proposed provision limits such inconveniences to areas of wall sheathing used as bracing. This proposal is seriously flawed by ignoring the life-safety consideration mandated by the IRC, not to mentioned the increased risk for property damage.

Section R301.1 contains the statement:

Buildings and structures constructed as prescribed by this code are deemed to comply with the requirements of this section.

The intent of this Section 301.1 is to permit methods with a proven <u>history</u> of adequate performance not to be required to meet the engineering requirements of the code. It is disingenuous to use these provisions to permit systems with known performance issues to be exempt from the structural requirements of the code. This is exactly what the proposed code change tries to do and what we hope to persuade you to block with this Public Comment.

Recent thunder storms in the Midwest (Evansville, Indiana and Southwest Missouri, areas of nominal 85 mph wind speed) have left countless houses stripped of siding and foam wall sheathing. In most cases the actual winds were well below the maximum design wind speeds. In some cases, only those walls sections containing the wall bracing panels provided any weather protection for the inside of the house (see photos below). Additional photos are available in the Spring and Summer issues of the 2008 Wood Design Focus.

Figure 1. – Foam and vinyl wall covering failure.
(Storm damage – Southern IN, 2005)

Figure 2. – Foam and vinyl wall covering failure while wall bracing panel remains.
(Storm damage, Springfield, MO, 2006)

Please note that the legacy codes, the ICC, as well as their corresponding product evaluation organizations have long required all structural products to meet all 3 of the following requirements:

1. They must be manufactured to proprietary or consensus based structural standards. These standards describe the minimum physical properties, testing criteria, and durability requirements that must be met by the material for its intended end use.
2. An established quality control program must be in place and supported by the manufacturer to insure that the minimum standards are being met by the production facility.
3. An approved third-party quality assurance inspection agency must be under contract to monitor the manufacturer's QC program and issue trademark stamps.

These requirements are designed to protect the public from unsafe construction. While foam insulation boards are manufactured to insulation standards, they meet none of the structural requirements specified for all other structural products. Unlike wood structural panels or structural fiberboard, foam insulation is not manufactured to any consensus-based structural product manufacturing standards. As such, the structural performance of foam sheathing is undefined and uncontrolled. Furthermore, the quality control and quality assurance programs adopted by the foam insulation manufacturers are limited to the control of insulation characteristics of the products, but not the structural performance. The use of non-structural sheathing for structural applications is a serious life-safety issue.

Sections R612.5 and R612.6 require the same level of protection for windows and doors as is required for wood structural panels and structural fiberboard products:

R612.5 Performance. *Exterior windows and doors shall be designed to resist the design wind loads specified in Table R301.2(2) adjusted for height and exposure per Table R301.2(3).*

R612.6 Testing and labeling. *Exterior windows and sliding doors shall be tested by an approved independent laboratory, and bear a label identifying manufacturer, performance characteristics and approved inspection agency to indicate compliance with AMA/WDMA/CSA 101/I.S.2/A440…*

It is interesting to note that these requirements for windows and doors will be maintained in place while the walls are prescriptively permitted to be protected only by non-structural foam insulation that has none of the historic manufacturing safeguards in place. We used to hope that our windows and doors were as strong as our walls in a storm; this proposal effectively reverses this expectation!

We understand the rush to meet the up and coming energy requirements, however the building codes cannot sacrifice the health and safety of our families and friends to do so. The only solution that we can morally and ethically support is one that provides for both the safety and energy efficiency.

We urge overturning of the committee due to the serious flaw of the proposal in ignoring the important life-safety issue.

Public Comment 3:

T. Eric Stafford, representing Institute for Business and Home Safety, requests Disapproval.

Commenter's Reason: We are requesting disapproval of RB102-09/10 due to several problems with the proposed language. The proposed language adds a new definition of exterior wall covering and attempts to discern a difference between "wall coverings" and coverings used for "structural" purposes. For wind design, all parts of the building are considered structural elements as the exterior wall covering are defined as components and cladding and have to be capable of transferring the external wind loads to the Main Wind-Force Resisting System (MWFRS). Accordingly, exterior wall coverings have to be designed for component and cladding loads.

Additionally, this table deletes the specific reference to Table R602.3(3) for attachment of wood structural panel sheathing in favor of referencing Section R703. Table R602.3(3) was added during the last code cycle to provide a prescriptive method for attaching wood structural panel sheathing to resist out-of-plane wind loads. This table was submitted by APA based on calculations of the panel and the attachment's ability to resist the applicable out-of-plane wind loads. Table R602.3(3) takes into account the panel span rating, wall stud spacing, panel nail spacing, wind speed, and exposure category – none of which is specifically considered in Table R703.4.

The proposed language is also inconsistent and will result in numerous misinterpretations. The new language states that when wall sheathing is used as bracing or other structural framing purposes, and placed on the exterior side of the wall, it has to be capable of resisting the wind pressures from Table R301.2(2) (component and cladding loads). However, if it qualifies as an exterior wall covering as proposed in the new language, attachment in accordance with Section R703 is permitted. This language is particularly inconsistent. If wall sheathing is placed on the exterior side of a wall, it should be capable of resisting the applicable wind pressures regardless of whether the sheathing is used as bracing or not. The proposed language is inconsistent and conflicting with itself. As written it could result in misinterpretations and confusion.

Final Action: AS AM AMPC____ D

RB104-09/10
R602.7, R602.7.1 (New), Table R602.7.1 (New), Figures R602.7.1(1)-(2) (New)

Proposed Change as Submitted

Proponent: Joseph Lstiburek, Building Science Corporation

1. Revise as follows:

R602.7 Headers. For header spans see Tables R502.5(1) and R502.5(2). Alternative header applications in accordance with this section shall be permitted.

2. Add new text, table and figures as follows:

R602.7.1 Single member headers in exterior bearing walls. Single member headers in exterior bearing walls shall be permitted in accordance with Table R602.7.1. Single headers shall be framed top and bottom with a flat-wise 2x member. To make up the remaining space, cripples shall be installed above the header. See Figure R602.7.1(1). Alternatively, the header can be sized to fill the space between the wall top plate and a flat-wise 2x member. See Figure R602.7.1(2). The header assembly shall bear on a minimum of one jack stud at each end.

TABLE R602.7.1
SPANS FOR MINIMUM No.2 GRADE SINGLE HEADER
FOR EXTERIOR BEARING WALLS[a,b,c]

SINGLE HEADERS SUPPORTING	SIZE	Wood Species	GROUND SNOW LOAD (psf)								
			≤ 20[d]			30			50		
			Building Width (feet)[e]								
			20	28	36	20	28	36	20	28	36
Roof and Ceiling	2x8	Spruce-Pine-Fir	4-10	4-2	3-8	4-3	3-8	3-3	3-7	3-0	2-8
		Hem-Fir	5-1	4-4	3-10	4-6	3-10	3-5	3-9	3-2	2-10
		Douglas-Fir or Southern Pine	5-3	4-6	4-0	4-7	3-11	3-6	3-10	3-3	2-11
	2x10	Spruce-Pine-Fir	6-2	5-3	4-8	5-5	4-8	4-2	4-6	3-11	3-1
		Hem-Fir	6-6	5-6	4-11	5-8	4-11	4-4	4-9	4-1	3-7
		Douglas-Fir or Southern Pine	6-8	5-8	5-1	5-10	5-0	4-6	4-11	4-2	3-9
	2x12	Spruce-Pine-Fir	7-6	6-5	5-9	6-7	5-8	4-5	5-4	3-11	3-1
		Hem-Fir	7-10	6-9	6-0	6-11	5-11	5-3	5-9	4-8	3-8
		Douglas-Fir or Southern Pine	8-1	6-11	6-2	7-2	6-1	5-5	5-11	5-1	4-6
Roof, ceiling and one center-bearing floor	2x8	Spruce-Pine-Fir	3-10	3-3	2-11	3-9	3-3	2-11	3-5	2-11	2-7
		Hem-Fir	4-0	3-5	3-1	3-11	3-5	3-0	3-7	3-0	2-8
		Douglas-Fir or Southern Pine	4-1	3-7	3-2	4-1	3-6	3-1	3-8	3-2	2-9
	2x10	Spruce-Pine-Fir	4-11	4-2	3-8	4-10	4-1	3-6	4-4	3-7	2-10
		Hem-Fir	5-1	4-5	3-11	5-0	4-4	3-10	4-6	3-11	3-4
		Douglas-Fir or Southern Pine	5-3	4-6	4-1	5-2	4-5	4-0	4-8	4-0	3-7
	2x12	Spruce-Pine-Fir	5-8	4-2	3-4	5-5	4-0	3-6	4-9	3-6	2-10
		Hem-Fir	5-11	4-11	3-11	5-10	4-9	4-2	5-5	4-2	3-4
		Douglas-Fir or Southern Pine	6-1	5-3	4-8	6-0	5-2	4-10	5-7	4-10	4-3
Roof, ceiling and one clear span floor	2x8	Spruce-Pine-Fir	3-5	2-11	2-7	3-4	2-11	2-7	3-3	2-10	2-6
		Hem-Fir	3-7	3-1	2-9	3-6	3-0	2-8	3-5	2-11	2-7
		Douglas-Fir or Southern Pine	3-8	3-2	2-10	3-7	3-1	2-9	3-6	3-0	2-9
	2x10	Spruce-Pine-Fir	4-4	3-7	2-10	4-3	3-6	2-9	4-2	3-4	2-7
		Hem-Fir	4-7	3-11	3-5	4-6	3-10	3-3	4-4	3-9	3-1
		Douglas-Fir or Southern Pine	4-8	4-0	3-7	4-7	4-0	3-6	4-6	3-10	3-5
	2x12	Spruce-Pine-Fir	4-11	3-7	2-10	4-9	3-6	2-9	4-6	3-4	2-7
		Hem-Fir	5-6	4-3	3-5	5-6	4-2	3-3	5-4	3-11	3-1
		Douglas-Fir or Southern Pine	5-8	4-11	4-4	5-7	4-10	4-3	5-6	4-8	4-2

For SI: 1 inch=25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.
b. Table is based on a maximum roof-ceiling dead load of 15 psf.
c. The header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header in lieu of the required jack stud.
d. The 20 psf ground snow load condition shall apply only when the roof pitch is 9:12 or greater. In conditions where the ground snow load is 30 psf or less and the roof pitch is less than 9:12, use the 30 psf ground snow load condition.

e. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.

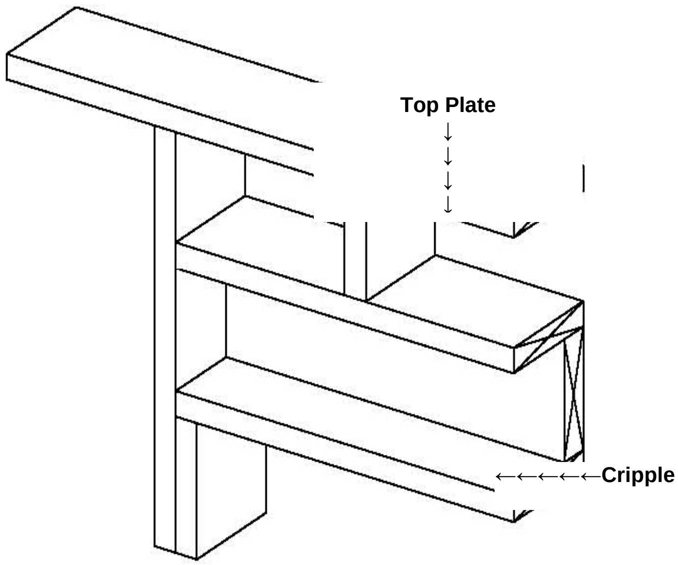


FIGURE R602.7.1(1)
SINGLE MEMBER HEADER IN EXTERIOR BEARING WALL

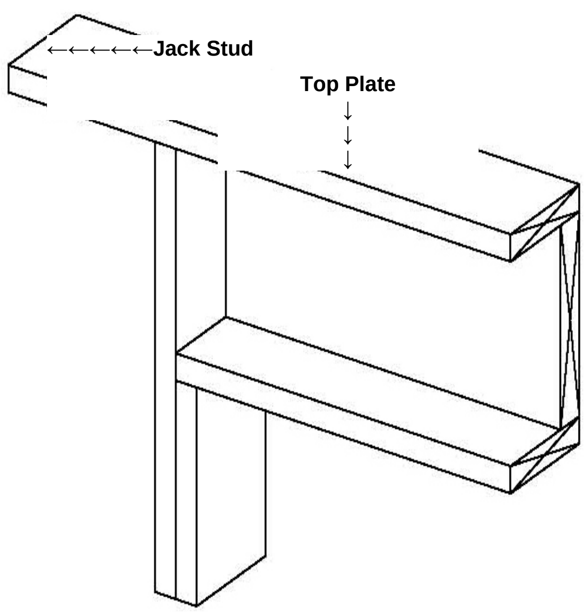


FIGURE R602.7.1(2)
ALTERNATE SINGLE MEMBER HEADER WITHOUT CRIPPLE

Reason: This proposal provides a means of implementing advanced, ←←←←←←**Jack Stud** ction practices for limited conditions where single headers can be used. Thus, insulation can be placed together with the single header to prevent heat loss through headers which otherwise create a thermal short-circuit in exterior walls. The table is evaluated in accordance with the NDS-2005 and ASCE 7-05 building loads. For ease-of-use, the table format is consistent with the principle header tables found in Chapter 5 of the code. The single header practice has been used successfully in thousands of homes since originally developed under the optimal value engineering "OVE" banner by the NAHB and HUD in the 1960's and more recently under the HUD/PATH and DOE Build America programs.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LSTIBUREK-RB-1-R602.7

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R602.7 Headers. For header spans see Tables R502.5(1) and R502.5(2) and 602.7.1~~. Alternative header applications in accordance with this section shall be permitted.~~

R602.7.1 Single member headers. ~~**in exterior bearing walls.**~~ ~~Single member headers in exterior bearing walls shall be permitted in accordance with Table R602.7.1. Single headers shall be framed top and bottom with a flat-wise 2x member. To make up the remaining space, cripples shall be installed above the header. See Figure R602.7.1(1). Alternatively, the header can be sized to fill the space between the wall top plate and a flat-wise 2x member. See Figure R602.7.1(2). The header assembly shall bear on a minimum of one jack stud at each end.~~ Single headers shall be framed with a single flat 2-inch nominal member or wall plate not less in width than the wall studs on the top and bottom of the header in accordance with Figures R602.7.1(1) and R602.7.1(2).

TABLE R602.7.1
SPANS FOR MINIMUM No.2 GRADE SINGLE HEADER
~~**FOR EXTERIOR BEARING WALLS**~~[a,b,c,f]

f. The header shall bear on a minimum of one jack stud at each end.

(Portion of proposal not shown remains unchanged)

Committee Reason: The committee feels this is a good change that provides value engineering of the framing and provides additional energy savings. The detail has been in use and has been tested. The modification simplifies the language and puts it into code format and adds a clarifying note to the table.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, City of San Jose, CA, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters), requests Disapproval.

Commenter's Reason: The Tri-Chapter recommends that this code proposal be denied until further structural analysis and evaluation can be performed. The lack of a solid header over wider window and door openings creates significant concerns over excessively "flexibility" around openings in exterior walls. This problem is much more significant when the exterior siding materials are rigid exterior building materials, such as exterior stucco plaster, where the recommended deflection criteria for stucco is limited to a maximum of l/360 (ASTM C926). For example, a single 2x12 header over a large window or door opening with up to an 8'-1" span would appear to fail to meet the deflection limitations for an exterior stucco wall when evaluating the potential bending in the header due to wind loading. As indicated, these "single headers" are only designed for vertical/gravity loading and are oriented in the "weak axis" for out-of-plane wind loading. Further, the allowance of a framing anchor attached to the full-height wall stud in lieu of the required jack stud results in additional problems of out-of-plane bending of the adjacent "single" king studs. For example, a single 2x4 king stud will fail to meet the maximum deflection criteria for out-of-plane bending when evaluating an 8'-0" opening and maximum wind speed and exposure as allowed in the IRC. The jack stud is no longer available to brace the king stud for out-of-plane wind forces. In addition to the out-of-plane bending problems identified above, the additional "flexibility and eccentricity" introduced by the use of "single headers" over wider window and door openings has not been evaluated. Even in minor earthquake and wind events, the additional flexibility around the wider window and door openings allowed in the proposed Table R602.7.1 are likely to result in more building damage due to excessive building movement.

We believe that whatever minimal energy savings is gained by the use of these single headers is more than offset by window failures and water intrusion issues that may result from excessive exterior wall deflection and building movement. We have seen examples of double pane window seals being broken, failure of window and door frames and seals, and water infiltration at door and window openings caused by excessive exterior wall deflection and building movement. The observed damages caused by excessive exterior wall deflection and building movement far exceeded the energy or materials savings that may otherwise result from this proposal.

Final Action: AS AM AMPC____ D

RB105-09/10

Table R602.3(1), R602.3.5 (new), Section R602.10 (including figures and tables), Table R802.11

Proposed Change as Submitted

Proponent: Chuck Bajnai, Chesterfield County, VA, Chairman, ICC Ad-Hoc Committee on Wall Bracing

1. Revise Table R602.3(1) as follows:

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER a,b,c	SPACING OF FASTENERS
	Roof		
1	Blocking between joists or rafters to top plate, toe nail	3-8d (2 ½" x 0.113")	--
2	Ceiling joists to plate, toe nail	3-8d (2 ½" x 0.113")	--
3	Ceiling joist not attached to parallel rafter, laps over partitions, face nail	3-10d	--
4	Collar tie to rafter, face nail, or 1-1/4” x 20 gage ridge strap	3-10d (3" x 0.128")	--
5	Rafter to plate, toe nail	2-16d (3 ½ "x 0.135")	--
6	Roof rafters to ridge, valley or hip rafters: toe nail face nail	 4-16d (3 ½" x 0.135") 3-16d (3 ½" x 0.135")	 -- --
	Wall		
7	Built-up ~~corner~~ studs –face nail	10d (3" x 0.128")	24" o.c.
8	Abutting studs at intersecting wall corners, face nail	16d (3 ½" x 0.135")	12”oc
~~8~~ 9	Built-up header, two pieces with ½”spacer	16d (3½” × 0.135")	16” o.c. along each edge
~~9~~ 10	Continued header, two pieces	16d (3½” × 0.135")	16” o.c. along each edge
~~10~~ 11	Continuous header to stud, toe nail	4-8d (2 ½" x 0.113")	-
~~11~~ 12	Double studs, face nail	10d (3" x 0.128")	24" o.c.
~~12~~ 13	Double top plates, face nail	10d (3" x 0.128")	24" o.c.
~~13~~ 14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3½” × 0.135")	-
~~14~~ 15	Sole plate to joist or blocking, face nail	16d (3½” × 0.135")	16” o.c.
~~15~~ 16	Sole plate to joist or blocking at braced wall panels	3-16d (3½” × 0.135")	16” o.c.
~~16~~ 17	Stud to sole plate, toe nail	3-8d (2 ½" x 0.113") or 2-16d (3½” × 0.135")	- -
~~17~~ 18	Top or sole plate to stud, end nail	2-16d (3½” × 0.135")	-
~~18~~ 19	Top plates, laps at corners and intersections, face nail	2-10d (3" x 0.128")	-
~~19~~ 20	1” brace to each stud and plate, face nail	2-8d (2 ½" x 0.113") 2 staples 1¾”	- -
~~20~~ 21	1” × 6” sheathing to each bearing, face nail	2-8d (2 ½" x 0.113") 2 staples 1¾”	- -
~~21~~ 22	1” × 8” sheathing to each bearing, face nail	2-8d (2 ½" x 0.113") 3 staples 1¾”	- -
~~22~~ 23	Wider than 1” × 8” sheathing to each bearing, face nail	3-8d (2 ½" x 0.113") 4 staples 1¾”	- -
	Floor		
~~23~~ 24	Joist to sill or girder, toe nail	3-8d (2 ½" x 0.113")	-
~~26~~ 25	Rim joist to top plate, toe nail (roof applications also)	8d (2 ½" x 0.113")	6” o.c.
26	Rim joist or blocking to sill plate, toe nail	8d (2 ½" x 0.113")	6” o.c.
~~24~~ 27	1” × 6” subfloor or less to each joist, face nail	2-8d (2 ½" x 0.113") 2 staples 1¾”	- -
~~25~~ 28	2” subfloor to joist or girder, blind and face nail	2-16d (3½” × 0.135")	-
~~27~~ 29	2” planks (plank & beam – floor & roof)	2-16d (3½” × 0.135")	at each bearing
~~28~~ 30	Built up girders and beams, 2-inch lumber layers	10d (3" x 0.128")	Nail each layer as follows: 32”o.c. at top and bottom and staggered. Two nails at ends and at each splice.
~~29~~ 31	Ledger strip supporting joists or rafters	3-16d (3½” × 0.135")	At each joist or rafter

(Remainder of table unchanged except item numbers)

2. Move existing Section R602.10.1.2.1 to new Section R602.3.5 and revise as follows:

R602.3.5 ~~**R602.10.1.2.1**~~ **Braced wall panel uplift load path.** Braced wall panels located at exterior walls that support roof rafters or trusses (including stories below top story) shall have the framing members connected in accordance with one of the following:

1. Fastening in accordance with Table R602.3(1) where:
   1.1. The basic wind speed does not exceed 90 mph (40 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, or
   1.2. The net uplift value at the top of a wall does not exceed 100 plf (146 N/mm). The net uplift value shall be determined in accordance with Section R802.11 and shall be permitted to be reduced by 40 plf (57 N/mm) for each full wall above and 40 plf (57 N/mm) for each floor platform above.
2. Where the net uplift value at the top of a wall exceeds 100 plf (146 N/mm), installing approved uplift framing connectors to provide a continuous load path from the top of the wall to the foundation or to a point where the uplift force is 100 plf (146 N/mm) or less. The net uplift value shall be as determined in Item 1.2 above.
3. Wall sheathing and fasteners designed in accordance with accepted engineering practice to resist combined uplift and shear forces.

3. Delete footnote "f" as follows:

TABLE R802.11
REQUIRED STRENGTH OF TRUSS OR RAFTER CONNECTIONS TO RESIST WIND UPLIFT FORCES[a, b, c, e, ~~f~~]
(Pounds per connection)
(No change to table values)

a. through e. *(No change)*
~~f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 600-pound rated connector is used on the roof framing, a 500-pound rated connector is permitted at the next floor level down).~~

4. Delete Section R602.10 and replace with the following:

R602.10 Wall bracing. Buildings shall be braced in accordance with this section. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1.

R602.10.1 Braced wall lines. For the purpose of determining the amount and location of bracing required in each story level of a building, braced wall lines shall be designated as straight lines on the building plan placed in accordance with this section.

R602.10.1.1 Length of a braced wall line. The length of a braced wall line shall be the distance between its ends. The end of a braced wall line shall be the intersection with a perpendicular braced wall line or an angled braced wall line as permitted in Section R602.10.1.4. In the absence of an intersecting braced wall line, the end shall be the farthest exterior wall of the building as shown in Figure R602.10.1.1.

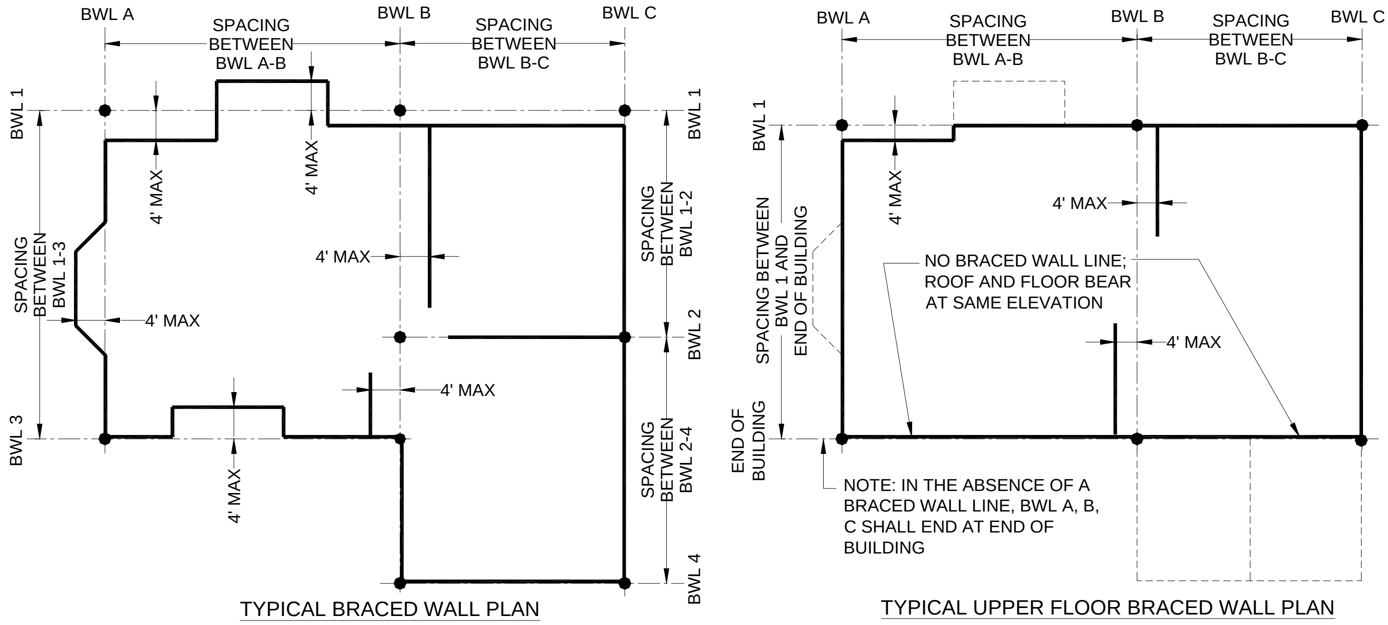


FIGURE R602.10.1.1
BRACED WALL LINES

R602.10.1.2 Offsets along a braced wall line. All exterior walls parallel to a braced wall line shall be permitted to offset up to 4 feet (1219 mm) from the designated braced wall line location as shown Figure R602.10.1.1. Interior walls used as bracing shall be permitted to offset up to 4 feet (1219 mm) from a braced wall line through the interior of the building as shown in Figure R602.10.1.1.

R602.10.1.3 Spacing of braced wall lines. There shall be a minimum of two braced wall lines in both the longitudinal and transverse direction as shown in Figure R602.10.1.1. Intermediate braced wall lines through the interior of the building shall be permitted. The spacing between parallel braced wall lines shall be in accordance with Table R602.10.1.3.

TABLE R602.10.1.3
BRACED WALL LINE SPACING

APPLICATION	**CONDITION**	**BUILDING TYPE**	**BRACED WALL LINE SPACING CRITERIA**	
			Maximum Spacing	**Exception to Maximum Spacing**
Wind bracing	85 mph to <110 mph	Detached, townhouse	60 feet	None
Seismic bracing	SDC A - C	Detached	Use wind bracing	
	SDC A – B	Townhouse	Use wind bracing	
	SDC C	Townhouse	35 feet	Up to 50 feet with adjustment of required length of bracing per Table R602.10.3(4)
	SDC D_0, D_1, D_2	Detached, townhouses, one- and two-story only	25 feet	Up to 35 feet to allow for a single room not to exceed 900 sq ft. Spacing of all other braced wall lines shall not exceed 25 feet.
	SDC D_0, D_1, D_2	Detached, townhouse	25 feet	Up to 35 feet when length of required bracing per Table R602.10.3(3) is adjusted in accordance with Table R602.10.3(4).

For SI: 1 foot = 304.8 mm

R602.10.1.4 Angled walls. Any portion of a wall along a braced wall line shall be permitted to angle out of plane for a maximum diagonal length of 8 feet (2438 mm). Where the angled wall occurs at a corner, the length of the braced wall line shall be measured from the projected corner as shown in Figure R602.10.1.4. Where the diagonal length is greater than 8 feet (2438 mm), it shall be considered a separate braced wall line and shall be braced in accordance with Section R602.10.1.

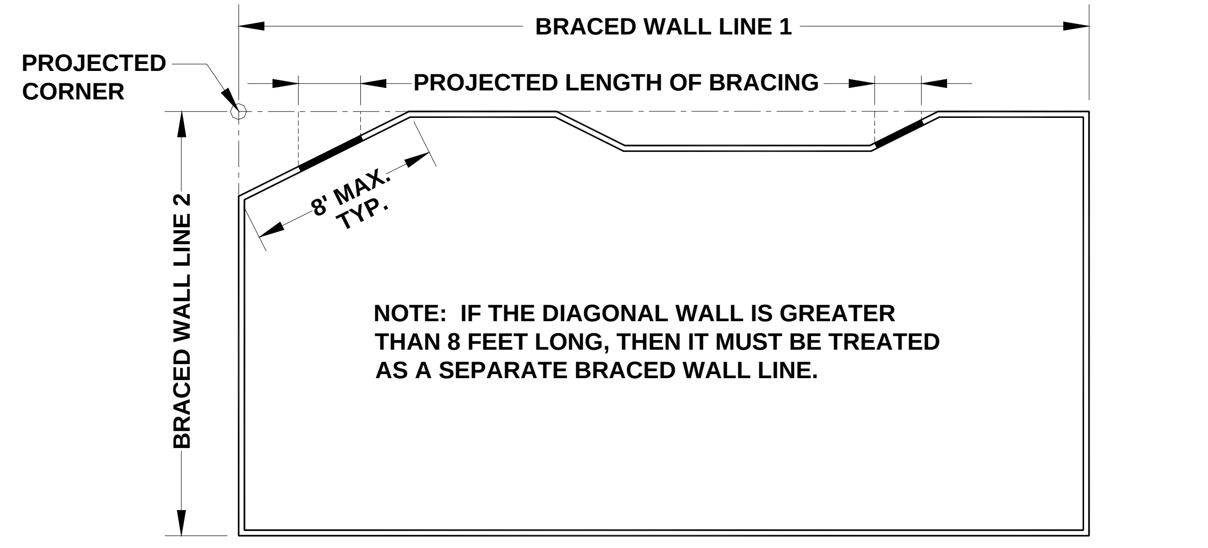


FIGURE R602.10.1.4
ANGLED WALLS

R602.10.2 Braced wall panels. Braced wall panels shall be full-height sections of wall that shall be continuous in the same plane. Braced wall panels shall be constructed and placed along a braced wall line in accordance with this section and the bracing methods specified in Section R602.10.4.

R602.10.2.1 Braced wall panel uplift load path. The bracing lengths in Table R602.10.3(1) apply only when uplift loads are resisted per Section R602.3.5.

R602.10.2.2 Locations of braced wall panels. A braced wall panel shall begin within 10 feet (3810 mm) from each end of a braced wall line as determined in Section R602.10.1.1. The distance between adjacent edges of two braced wall panels shall be no greater than 20 feet (6096 mm) as shown in Figure R602.10.2.2

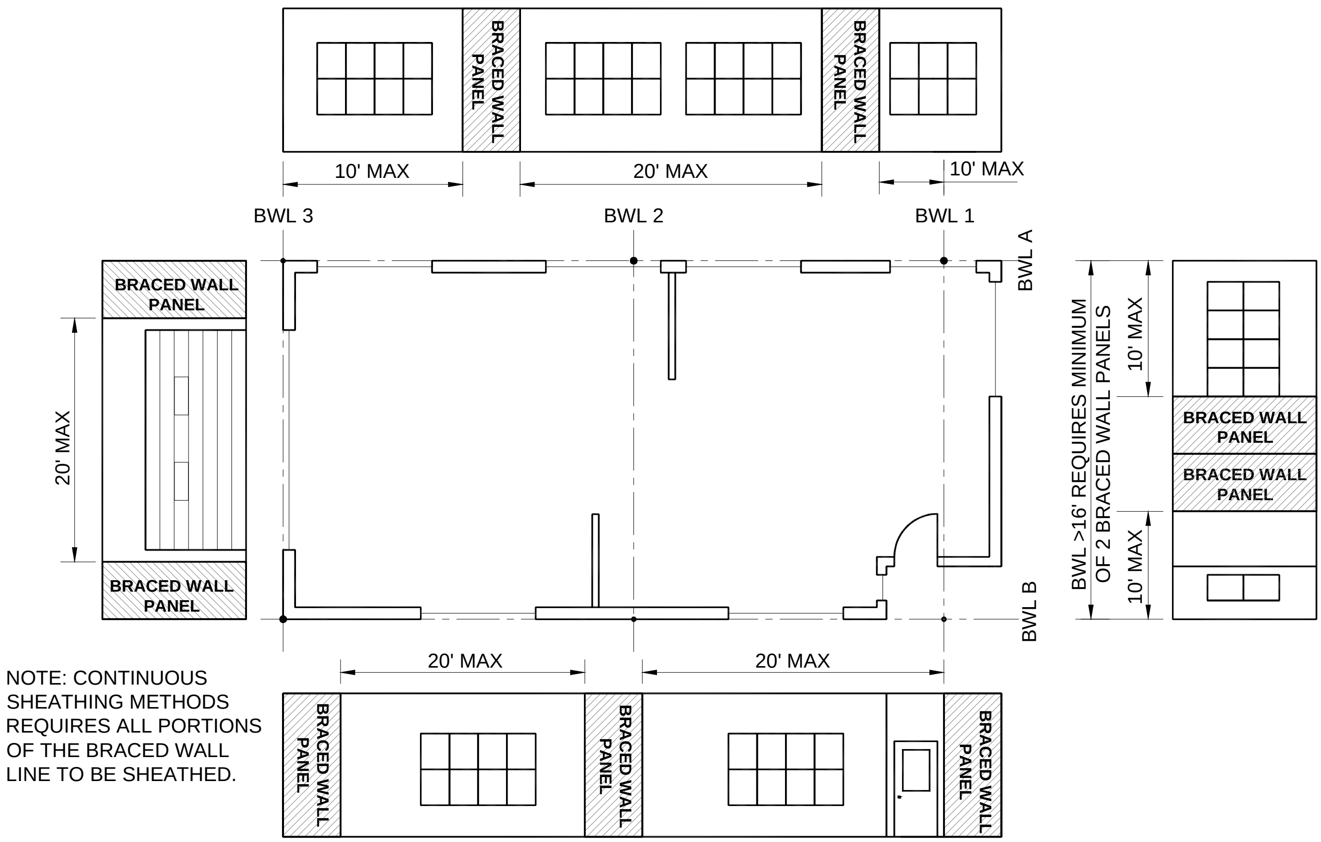


FIGURE R602.10.2.2
LOCATION OF BRACED WALL PANELS

R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D_0, D_1 and D_2. Braced wall panels shall be located at each end of a braced wall line.

Exception: Braced wall panels constructed of Methods WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a braced wall line provided each end complies with the following.

1. A minimum 24 in. wide (610 mm) panel for Methods WSP, CS-WSP, CS-G, CS-PF and 32 in. (813 mm) wide panel for Method CS-SFB is applied to each side of the building corner as shown in Condition 4 of Figure R602.10.7.
2. The end of each braced wall panel closest to the end of the braced wall line shall have an 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below as shown in Condition 5 of Figure R602.10.7.

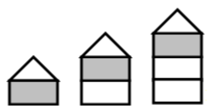
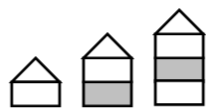
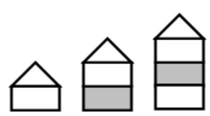
R602.10.2.3 Minimum number of braced wall panels. Braced wall lines with a length of 16 feet (4877 mm) or less shall have a minimum of one braced wall panel. Braced wall lines greater than 16 feet (4877 mm) shall have a minimum of two braced wall panels.

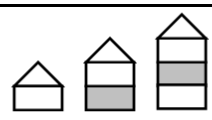
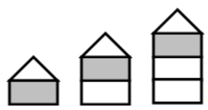
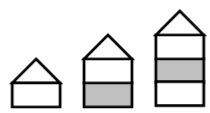
R602.10.3 Required length of bracing. The required length of bracing along each braced wall line shall be determined as follows.

1. All buildings in Seismic Design Categories A and B shall use Table R602.10.3(1) and the applicable adjustment factors in Table R602.10.3(2).
2. Detached buildings in Seismic Design Category C shall use Table R602.10.3(1) and the applicable adjustment factors in Table R602.10.3(2).
3. Townhouses in Seismic Design Category C shall use the greater value determined from Table R602.10.3(1) or R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4) respectively.
4. All buildings in Seismic Design Categories D_0, D_1 and D_2 shall use the greater value determined from Table R602.10.3(1) or R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4) respectively.

Only braced wall panels parallel to the braced wall line shall contribute towards the required length of bracing of that braced wall line. Braced wall panels along an angled wall meeting the minimum length requirements of Tables R602.10.5 and R602.10.5.2 shall be permitted to contribute its projected length to the braced wall line as shown in Figure R602.10.1.4. Any braced wall panel on an angled wall at the end of a braced wall line shall contribute its projected length for only one of the braced wall lines at the projected corner. In no case shall the required length of bracing along a braced wall line after adjustments be less than 48 inches (1219 mm) total.

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON WIND SPEED

EXPOSURE CATEGORY B 30 FT MEAN ROOF HEIGHT 10 FT EAVE TO RIDGE HEIGHT 10 FT WALL HEIGHT 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE [a]			
Basic Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing (feet)**	**Method LIB [b]**	**Method GB [c] (Double Sided)**	**Methods DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB [d]**	**Methods CS-WSP, CS-G, CS-PF**
≤ 85 (mph)		10	3.5	3.5	2.0	1.5
		20	6.0	6.0	3.5	3.0
		30	8.5	8.5	5.0	4.5
		40	11.5	11.5	6.5	5.5
		50	14.0	14.0	8.0	7.0
		60	16.5	16.5	9.5	8.0
		10	6.5	6.5	3.5	3.0
		20	11.5	11.5	6.5	5.5
		30	16.5	16.5	9.5	8.0
		40	21.5	21.5	12.5	10.5
		50	26.5	26.5	15.0	13.0
		60	31.5	31.5	18.0	15.5
		10	NP	9.0	5.5	4.5
		20	NP	17.0	10.0	8.5
		30	NP	24.5	14.0	12.0
		40	NP	32.0	18.0	15.5
		50	NP	39.0	22.5	19.0
		60	NP	46.5	26.5	22.5
≤ 90 (mph)		10	3.5	3.5	2.0	2.0
		20	7.0	7.0	4.0	3.5
		30	9.5	9.5	5.5	5.0
		40	12.5	12.5	7.5	6.0
		50	15.5	15.5	9.0	7.5
		60	18.5	18.5	10.5	9.0
		10	7.0	7.0	4.0	3.5
		20	13.0	13.0	7.5	6.5
		30	18.5	18.5	10.5	9.0
		40	24.0	24.0	14.0	12.0
		50	29.5	29.5	17.0	14.5
		60	35.0	35.0	20.0	17.0
		10	NP	10.5	6.0	5.0
		20	NP	19.0	11.0	9.5
		30	NP	27.5	15.5	13.5
		40	NP	35.5	20.5	17.5
		50	NP	44.0	25.0	21.5
		60	NP	52.0	30.0	25.5
≤ 100 (mph)		10	4.5	4.5	2.5	2.5
		20	8.5	8.5	5.0	4.0
		30	12.0	12.0	7.0	6.0
		40	15.5	15.5	9.0	7.5
		50	19.0	19.0	11.0	9.5
		60	22.5	22.5	13.0	11.0
		10	8.5	8.5	5.0	4.5
		20	16.0	16.0	9.0	8.0
		30	23.0	23.0	13.0	11.0

EXPOSURE CATEGORY B 30 FT MEAN ROOF HEIGHT 10 FT EAVE TO RIDGE HEIGHT 10 FT WALL HEIGHT 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE [a]			
Basic Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing (feet)**	**Method LIB [b]**	**Method GB [c] (Double Sided)**	**Methods DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB [d]**	**Methods CS-WSP, CS-G, CS-PF**
		40	29.5	29.5	17.0	14.5
		50	36.5	36.5	21.0	18.0
		60	43.5	43.5	25.0	21.0
		10	NP	12.5	7.5	6.0
		20	NP	23.5	13.5	11.5
		30	NP	34.0	19.5	16.5
		40	NP	44.0	25.0	21.5
		50	NP	54.0	31.0	26.5
		60	NP	64.0	36.5	31.0
≤ 110 (mph)		10	5.5	5.5	3.0	3.0
		20	10.0	10.0	6.0	5.0
		30	14.5	14.5	8.5	7.0
		40	18.5	18.5	11.0	9.0
		50	23.0	23.0	13.0	11.5
		60	27.5	27.5	15.5	13.5
		10	10.5	10.5	6.0	5.0
		20	19.0	19.0	11.0	9.5
		30	27.5	27.5	16.0	13.5
		40	36.0	36.0	20.5	17.5
		50	44.0	44.0	25.5	21.5
		60	52.5	52.5	30.0	25.5
		10	NP	15.5	9.0	7.5
		20	NP	28.5	16.5	14.0
		30	NP	41.0	23.5	20.0
		40	NP	53.0	30.5	26.0
		50	NP	65.5	37.5	32.0
		60	NP	77.5	44.5	37.5

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

a. Linear interpolation shall be permitted.

b. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches (203 mm).

c. The length of bracing for Method GB is based on a double sided application. Where GB is used in a one sided application (or in combination of single sided and double sided application), the single sided GB shall only contribute half as much as the double sided GB towards the minimum required length of bracing in this table.

d. Method CS-SFB does not apply where the wind speed is greater than 100 mph.

TABLE R602.10.3(2)
WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON	STORY/ SUPPORTING	CONDITION	ADJUSTMENT FACTOR [a,b] (multiply length from Table R602.10.3(1) by this factor)	APPLICABLE METHODS
Exposure category	One story structure	B	1.00	All methods
		C	1.20	
		D	1.50	
	Two-story structure	B	1.00	
		C	1.30	
		D	1.60	
	Three-story structure	B	1.00	
		C	1.40	
		D	1.70	
Roof eave-to-ridge height	Roof only	≤5 ft	0.70	
		10 ft	1.00	
		15 ft	1.30	
		20 ft	1.60	
	Roof + 1 floor	≤5 ft	0.85	
		10 ft	1.00	
		15 ft	1.15	
		20 ft	1.30	
	Roof + 2 floors	≤5 ft	0.90	
		10 ft	1.00	
		15 ft	1.10	
		20 ft	Not permitted	
Wall height adjustment	Any story	8 ft	0.90	
		9 ft	0.95	
		10 ft	1.00	
		11 ft	1.05	
		12 ft	1.10	
Number of braced wall lines (per plan direction)	Any story	3	1.30	
		4	1.45	
		≥5	1.60	
Additional 800 lb hold-down device	Top story only	Fastened to the end studs of each braced wall panel and to the foundation or framing below	0.80	DWB, WSP, SFB, PBS, PCP, HPS
Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.40	DWB, WSP, SFB,PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
Gypsum board fastening	Any story	4 in. o.c.at panel edges, including top and bottom plates, and all horizontal joints blocked	0.7	GB

For SI: 1 foot = 305 mm, 1 lb = 4.48 N.

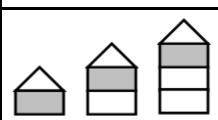
a. Linear Interpolation shall be permitted.
b. The total adjustment factor is the product of all applicable adjustment factors.

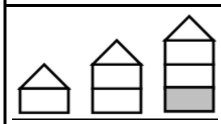
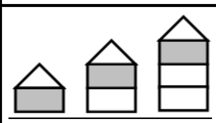
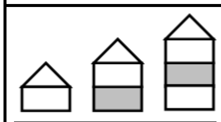
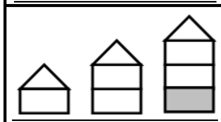
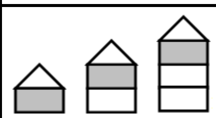
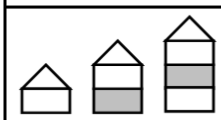
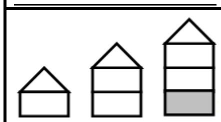
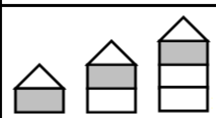
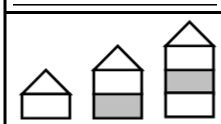
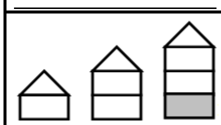
TABLE R602.10.3(3)
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

- SOIL CLASS D [b]
- WALL HEIGHT = 10 FT
- 10 PSF FLOOR DEAD LOAD
- 15 PSF ROOF/CEILING DEAD LOAD

BRACED WALL LINE SPACING ≤ 25 FT

MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE [a]

Seismic Design Category	Story Location	Braced Wall Line Length (ft)	Method LIB [c]	Method GB (Double Sided) [d]	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB [e]	Method WSP	Methods CS-WSP, CS-G,
C (townhouses only)		10	2.5	2.5	2.5	1.6	1.4
		20	5.0	5.0	5.0	3.2	2.7
		30	7.5	7.5	7.5	4.8	4.1
		40	10.0	10.0	10.0	6.4	5.4
		50	12.5	12.5	12.5	8.0	6.8
		10	NP	4.5	4.5	3.0	2.6

• SOIL CLASS D [b] • WALL HEIGHT = 10 FT • 10 PSF FLOOR DEAD LOAD • 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING ≤ 25 FT			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE [a]				
Seismic Design Category	**Story Location**	**Braced Wall Line Length (ft)**	**Method LIB [c]**	**Method GB (Double Sided) [d]**	**Methods DWB, SFB, PBS, PCP, HPS, CS-SFB [e]**	**Method WSP**	**Methods CS-WSP, CS-G,**
		20	NP	9.0	9.0	6.0	5.1
		30	NP	13.5	13.5	9.0	7.7
		40	NP	18.0	18.0	12.0	10.2
		50	NP	22.5	22.5	15.0	12.8
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
D_0		10	NP	2.8	2.8	1.8	1.6
		20	NP	5.5	5.5	3.6	3.1
		30	NP	8.3	8.3	5.4	4.6
		40	NP	11.0	11.0	7.2	6.1
		50	NP	13.8	13.8	9.0	7.7
		10	NP	5.3	5.3	3.8	3.2
		20	NP	10.5	10.5	7.5	6.4
		30	NP	15.8	15.8	11.3	9.6
		40	NP	21.0	21.0	15.0	12.8
		50	NP	26.3	26.3	18.8	16.0
		10	NP	7.3	7.3	5.3	4.5
		20	NP	14.5	14.5	10.5	9.0
		30	NP	21.8	21.8	15.8	13.4
		40	NP	29.0	29.0	21.0	17.9
		50	NP	36.3	36.3	26.3	22.3
D_1		10	NP	3.0	3.0	2.0	1.7
		20	NP	6.0	6.0	4.0	3.4
		30	NP	9.0	9.0	6.0	5.1
		40	NP	12.0	12.0	8.0	6.8
		50	NP	15.0	15.0	10.0	8.5
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
		10	NP	8.5	8.5	6.0	5.1
		20	NP	17.0	17.0	12.0	10.2
		30	NP	25.5	25.5	18.0	15.3
		40	NP	34.0	34.0	24.0	20.4
		50	NP	42.5	42.5	30.0	25.5
D2		10	NP	4.0	4.0	2.5	2.1
		20	NP	8.0	8.0	5.0	4.3
		30	NP	12.0	12.0	7.5	6.4
		40	NP	16.0	16.0	10.0	8.5
		50	NP	20.0	20.0	12.5	10.6
		10	NP	7.5	7.5	5.5	4.7
		20	NP	15.0	15.0	11.0	9.4
		30	NP	22.5	22.5	16.5	14.0
		40	NP	30.0	30.0	22.0	18.7
		50	NP	37.5	37.5	27.5	23.4
		10	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP

For SI: 1 foot 305 mm

a. Linear interpolation shall be permitted.
b. Wall bracing lengths are based on a soil site class "D." Interpolation of bracing length between the S_{ds} values associated with the Seismic Design Categories shall be permitted when a site-specific S_{ds} value is determined in accordance with Section 1613.5 of the International Building Code.
c. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches (203 mm).
d. The length of bracing for Method GB is based on a double sided application. Where GB is used in a one sided application (or in combination of single sided and double sided application), the single sided GB shall only contribute half as much as the double sided GB towards the minimum required length of bracing in this table.
e. Method CS-SFB applies in SDC C only.

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

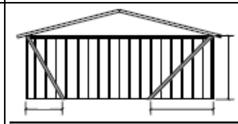
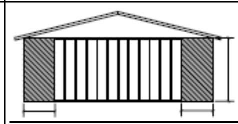
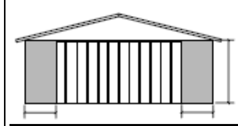
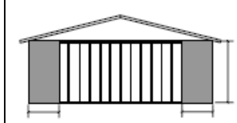
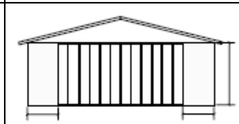
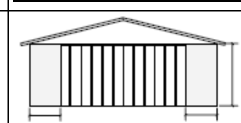
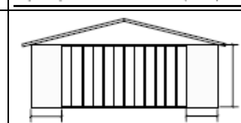
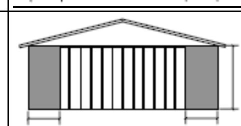
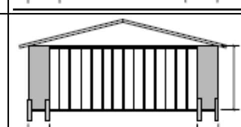
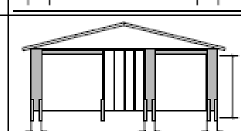
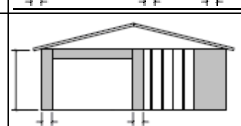
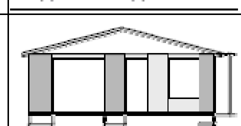
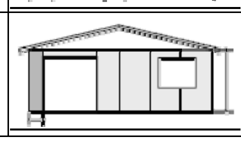
ADJUSTMENT BASED ON:	STORY/ SUPPORTING	CONDITION	ADJUSTMENT FACTOR [a,b] (Multiply length from Table R602.10.3(1) by this factor)	APPLICABLE METHODS
Story height (Section 301.3)	Any story	≤10 ft	1.0	All methods
		>10 ft ≤ 12 ft	1.2	
Braced wall line spacing, townhouses in SDC C	Any story	≤35 ft	1.0	
		>35 ft ≤ 50 ft	1.43	
Braced wall line spacing, in SDC D_0, D_1, D_2 [c]	Any story	<25 ft ≤30 ft	1.2	
		>30 ft ≤ 35 ft	1.4	
Wall dead load	Any story	> 8 ft < 15 ft	1.0	
		<8 psf	0.85	
Roof/ceiling dead load for wall supporting	Roof only or roof plus one or two stories	<15 psf	1.0	
	Roof only	>15 psf ≤ 25 psf	1.2	
	Roof plus one or two stories	>15 psf ≤ 25 psf	1.1	
Walls with stone or masonry veneer	Any story	See Section R703.7		
Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB

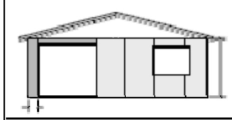
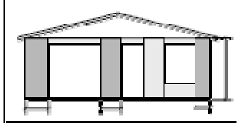
For SI: 1 psf = 47,8 N/m^2.

a. Linear interpolation shall be permitted.
b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.
c. The length-to-width ratio for the floor/roof *diaphragm* shall not exceed 3:1. The top plate lap splice nailing shall be a minimum of 12-16d nails on each side of the splice.

R602.10.4 Construction methods for braced wall panels. Intermittent and continuously sheathed braced wall panels shall be constructed in accordance with this section and the methods listed in Table R602.10.4.

TABLE R602.10.4
BRACING METHODS

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA [a]	
				Fasteners	Spacing
Intermittent Bracing Methods	**LIB** Let-in-bracing	1x4 wood or approved metal straps at 45° to 60° angles for maximum 16" stud spacing		Wood: 2-8d common nails or 3-8d (2 ½" x 0.113") nails Metal strap: per manufacturer	Wood: per stud and top and bottom plates Metal: per manufacturer
	DWB Diagonal wood boards	¾" (1" nominal) for maximum 24" stud spacing		2-8d (2½" x 0.113") nails or 2 - 1¾" staples	Per stud
	WSP Wood structural panel (See Section R604)	$^{3}/_{8}$"		Exterior sheathing per Table R602.3(3) Interior sheathing per Table R602.3(1) or R602.3(2)	6" edges 12" field Varies by fastener
	SFB Structural fiberboard sheathing	$^{1}/_{2}$" or $^{25}/_{32}$" for maximum 16" stud spacing		1½" long x 0.12" dia. (for ½ " thick sheathing) 1$^{3}/_{4}$" long x 0.12" dia. (for $^{25}/_{32}$" thick sheathing) galvanized roofing nails or 8d common (2½"x0.131) nails	3" edges 6" field
	GB [d] Gypsum board (double sided)	$^{1}/_{2}$"		Nails or screws per Table R602.3(1) for exterior locations Nails or screws per Table R702.3.5 for interior locations	For all braced wall panel locations: 7" edges (including top and bottom plates) 7" field
	PBS Particleboard sheathing (See Section R605)	$^{3}/_{8}$" or $^{1}/_{2}$" for maximum16" stud spacing		For 3/8", 6d common (2"x0.113) nails For ½", 8d common (2½"x0.131) nails	3" edges 6" field
	PCP Portland cement plaster	See Section R703.6 for maximum 16" stud spacing		1½", 11 gage, $^{7}/_{16}$" head nails or $^{7}/_{16}$", 16 gage staples	6" o.c. on all framing members
	HPS Hardboard panel siding	$^{7}/_{16}$" for maximum 16" stud spacing		0.092" dia., 0.225" head nails with length to accommodate 1½" penetration into studs	4" edges 8" field
	ABW Alternate braced wall	$^{3}/_{8}$"		See Section R602.10.6.1	See Section R602.10.6.1
	PFH Portal frame with hold-downs	$^{3}/_{8}$		See Section R602.10.6.2	See Section R602.10.6.2
	PFG Portal frame at garage	$^{7}/_{16}$"		See Section R602.10.6.3	See Section R602.10.6.3
Continuous Sheathing Methods	**CS-WSP** Continuously sheathed wood structural panel	$^{3}/_{8}$"		Exterior sheathing per Table R602.3(3) Interior sheathing per Table R602.3(1) or R602.3(2)	6" edges 12" field Varies by fastener
	CS-G [b,c] Continuously sheathed wood structural panel adjacent to garage	$^{3}/_{8}$"		See Method CS-WSP	See Method CS-WSP

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA [a]	
			Fasteners	Spacing
openings				
CS-PF Continuously sheathed portal frame	$^{7}/_{16}$"		See Section R602.10.6.4	See Section R602.10.6.4
CS-SFB Continuously sheathed structural fiberboard	$^{1}/_{2}$" or $^{25}/_{32}$" for maximum 16" stud spacing		1½" long x 0.12" dia. (for ½ " thick sheathing) $1^{3}/_{4}$" long x 0.12" dia. (for $^{25}/_{32}$" thick sheathing) galvanized roofing nails or 8d common (2½"x0.131) nails	3" edges 6" field

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

a. Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D_0, D_1 and D_2.
b. Applies to panels next to garage door opening when supporting gable end wall or roof load only. May only be used on one wall of the garage. In Seismic Design Categories D_0, D_1, and D_2, roof covering dead load may not exceed 3 psf (0.14 kN/m^2).
c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R502.5(1). A full height clear opening shall not be permitted adjacent to a Method CS-G panel.
d. "Double sided" GB shall mean that a full length/full height panel of GB sheathing is applied to both sides of the stud wall. GB bracing panels are not required to be aligned back to back – they may be offset from each other so long as their length's comply with Table R602.10.5. Where all of the GB is on one side of the studs or where there is a combination of "double sided" GB and "single sided" GB, the single sided GB shall contribute half of its actual length towards the minimum required length (i.e. 96" of single sided GB is equivalent to 48" of double sided GB).

R602.10.4.1 Mixing methods. Mixing of bracing methods shall be permitted as follows:

1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
2. Mixing intermittent bracing methods from braced wall line to braced wall line within a story shall be permitted. Within Seismic Design Categories A, B and C or in regions where the basic wind speed is less than or equal to 100 mph, mixing of intermittent bracing and continuous sheathing methods from braced wall line to braced wall line within a story shall be permitted.
3. Mixing intermittent bracing methods along a braced wall line shall be permitted in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest value of all intermittent bracing methods used.
4. Mixing of continuous sheathing methods CS-WSP, CS-G and CS-PF along a braced wall line shall be permitted.
5. In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing of intermittent bracing methods along the interior portion of a braced wall line with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same braced wall line shall be permitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3). The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the braced wall line.

R602.10.4.2 Continuous sheathing methods. Continuous sheathing methods require structural panel sheathing to be used on all sheathable surfaces on one side of a braced wall line including areas above and below openings and gable end walls and shall meet the requirements of Section R602.10.7.

R602.10.4.3 Braced wall panel interior finish material. Braced wall panels shall have gypsum wall board installed on the side of the wall opposite the bracing material. Gypsum wall board shall be not less than ½ inch (12.7 mm) in thickness and be fastened with nails or screws in accordance with Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum wall board. Spacing of fasteners at panel edges for gypsum wall board opposite Method LIB bracing shall not exceed 8 inches (203 mm). Interior finish material shall not be glued in Seismic Design Categories D_0, D_1 and D_2.

Exceptions:

1. Interior finish material is not required opposite wall panels that are braced in accordance with Method GB, ABW, PFH, PFG and CS-PF, unless otherwise required by Section R302.6.
2. An approved interior finish material with an in-plane shear resistance equivalent to gypsum board shall be permitted to be substituted, unless otherwise required by Section R302.6.
3. Except for Method LIB, gypsum wall board is permitted to be omitted provided the required length of bracing in Tables R602.10.3(1) and R602.10.3(3) is multiplied by the appropriate adjustment factor in Tables R602.10.3(2) and R602.10.3(4) respectively, unless otherwise required by Section R302.6.

R602.10.5 Minimum length of a braced wall panel. The minimum length of a braced wall panel shall comply with Table R602.10.5. For Methods CS-WSP and CS-SFB, the minimum panel length shall be based on the adjacent clear opening height in accordance with Table R602.10.5 and Figure R602.10.5. When a panel has an opening on either side of differing heights, the taller opening height shall be used to determine the panel length.

R602.10.5.1 Contributing length. For purposes of computing the required length of bracing in Table R602.10.3(1) and R602.10.3(3), the contributing length of each braced wall panel shall be as specified in Table R602.10.5.

TABLE R602.10.5
MINIMUM LENGTH OF BRACED WALL PANELS

METHOD		MINIMUM LENGTH [a] (in) Wall Height 8 ft	9 ft	10 ft	11 ft	12 ft	CONTRIBUTING LENGTH (in)
DWG, WSP, SFB, PBS, PCP, HPS, GB [d]		48	48	48	53	58	Actual [b]
LIB		55	62	69	NP		Actual [b]
ABW	SDC A, B and C, wind speed < 110 mph	28	32	34	38	42	48
	SDC D_0, D_1 and D_2, wind speed < 110 mph	32	32	34	NP	NP	
PFH	Supporting roof only	16	16	16	18 [d]	20 [d]	48
	Supporting one story and roof	24	24	24	27 [d]	29 [d]	48
PFG		24	27	30	33 [e]	36 [e]	1.5 x Actual [b]
CS-G		24	27	30	33	36	Actual [b]
CS-PF		16	18	20	22 [f]	24 [f]	Actual [b]
CS-WSP, CS-SFB	Adjacent clear opening height (in)						
	≤ 64	24	27	30	33	36	Actual [b]
	68	26	27	30	33	36	
	72	27	27	30	33	36	
	76	30	29	30	33	36	
	80	32	30	30	33	36	
	84	35	32	32	33	36	
	88	38	35	33	33	36	
	92	43	37	35	35	36	
	96	48	41	38	36	36	
	100		44	40	38	38	
	104		49	43	40	39	
	108		54	46	43	41	
	112			50	45	43	
	116			55	48	45	
	120			60	52	48	
	124				56	51	
	128				61	54	
	132				66	58	
	136					62	
	140					66	
	144					72	

For SI: 1 inch = 25.4 mm
NP = Not permitted

a. Linear interpolation shall be permitted.
b. Use the actual length when it is greater than or equal to the minimum length.
c. As specified in Table R602.10.4, Method GB is intended to be double sided. Where all of the GB is on one side of the studs or where there is a combination of "double sided" GB and "single sided" GB, the single sided GB shall contribute half of its actual length towards the minimum required length (i.e. 96" of single sided GB is equivalent to 48" of double sided GB).
d. Maximum header height for PFH is 10' per Figure R602.10.6.2, but wall height may be increased to 12' with pony wall.
e. Maximum opening height for PFG is 10' per Figure R602.10.6.3, but wall height may be increased to 12' with pony wall.
f. Maximum opening height for CS-PF is 10' per Figure R602.10.6.4, but wall height may be increased to 12' with pony wall

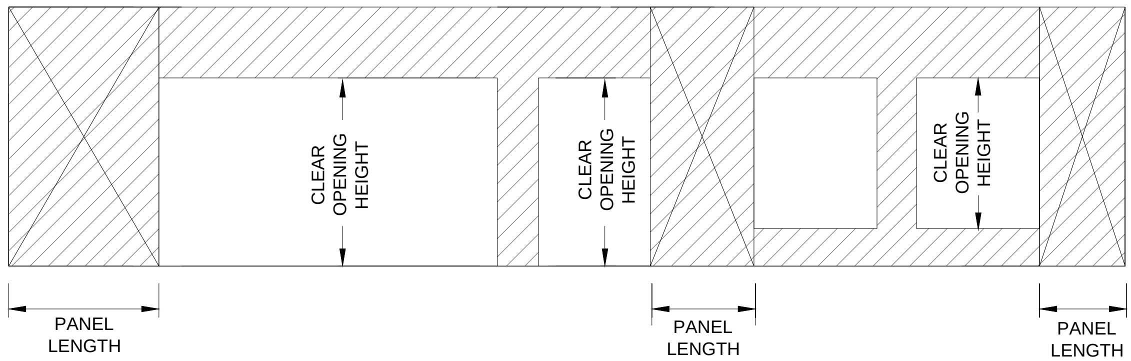


FIGURE R602.10.5
BRACED WALL PANELS WITH CONTINUOUS SHEATHING

R602.10.5.2 Partial credit. For Methods DWB, WSP, SFB, PBS, PCP and HPS in Seismic Design Categories A, B and C, panels between 36 inches and 48 inches in length shall be considered a braced wall panel and shall be permitted to partially contribute towards the required length of bracing in Table R602.10.3(1) and R602.10.3(3), and the contributing length shall be determined from Table R602.10.5.2.

TABLE R602.10.5.2
PARTIAL CREDIT FOR BRACED WALL PANELS LESS THAN 48 INCHES IN ACTUAL LENGTH

Actual Length of Braced Wall Panel (in)	Contributing Length of Braced Wall Panel (in) [a]	
	8 ft Wall Height	9 ft Wall Height
48	48	48
42	36	36
36	27	N/A

For SI: 1 inch = 25.4mm

a. Linear interpolation shall be permitted.

R602.10.6 Construction of Methods ABW, PFH, PFG and CS-PF. Methods ABW, PFH, PFG and CS-PF shall be constructed as specified in Sections R602.10.6.1 through R602.10.6.4.

R602.10.6.1 Method ABW: Alternate braced wall panels. Method ABW braced wall panels shall be constructed in accordance with Figure R602.10.6.1. The hold-down force shall be in accordance with Table R602.10.6.1.

TABLE R602.10.6.1
MINIMUM HOLD-DOWN FORCES FOR METHOD ABW BRACED WALL PANELS

SEISMIC DESIGN CATEGORY AND WIND SPEED	SUPPORTING/STORY	HOLD DOWN FORCE (lb)				
		Height of Braced Wall Panel				
		8 ft	9 ft	10 ft	11 ft	12 ft
SDC A, B and C Wind speed < 110 mph	One story	1800	1800	1800	2000	2200
	First of two story	3000	3000	3000	3300	3600
SDC D_o, D_1 and D_2 Wind speed < 110 mph	One story	1800	1800	1800	NP [a]	NP [a]
	First of two story	3000	3000	3000	NP [a]	NP [a]

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N
NP = Not Permitted.

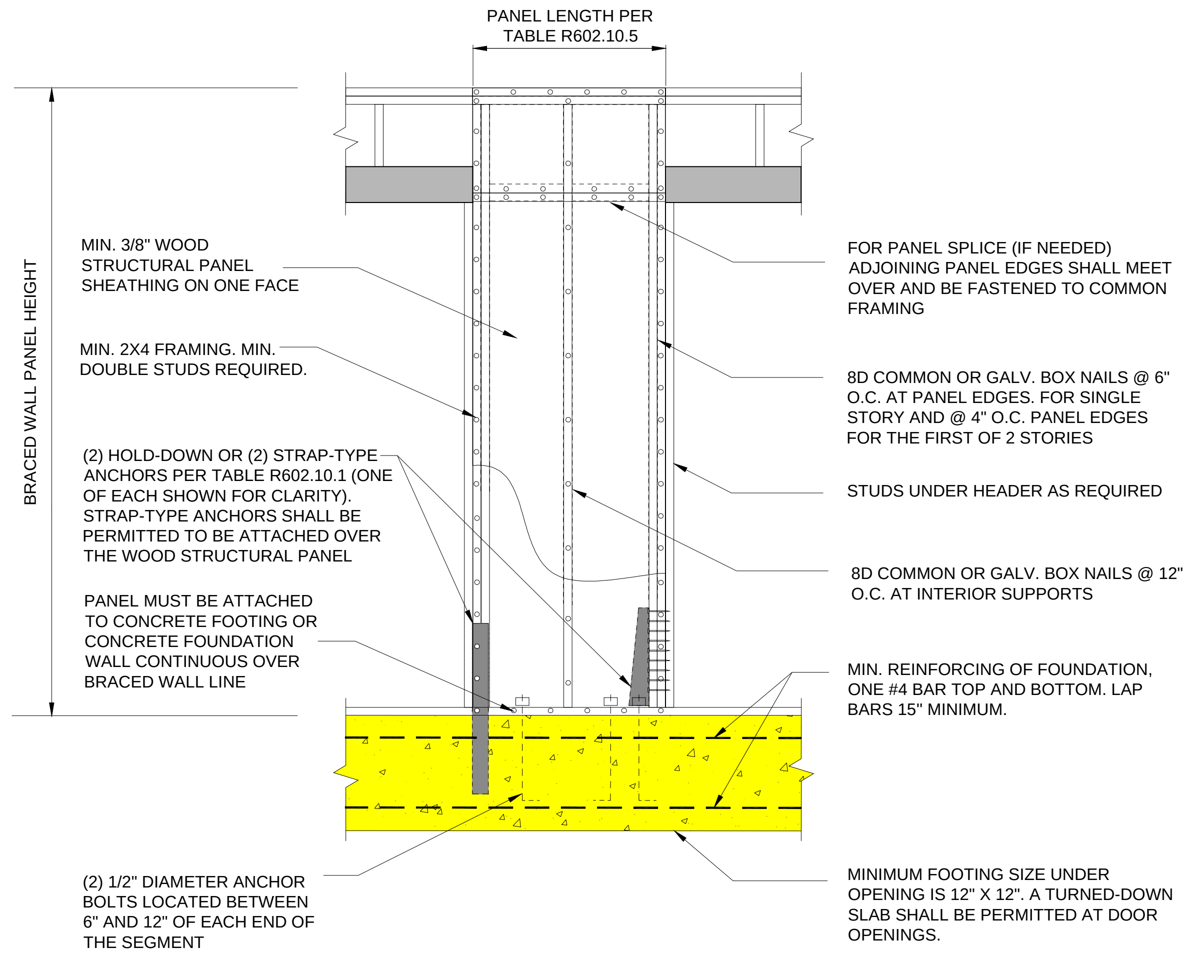
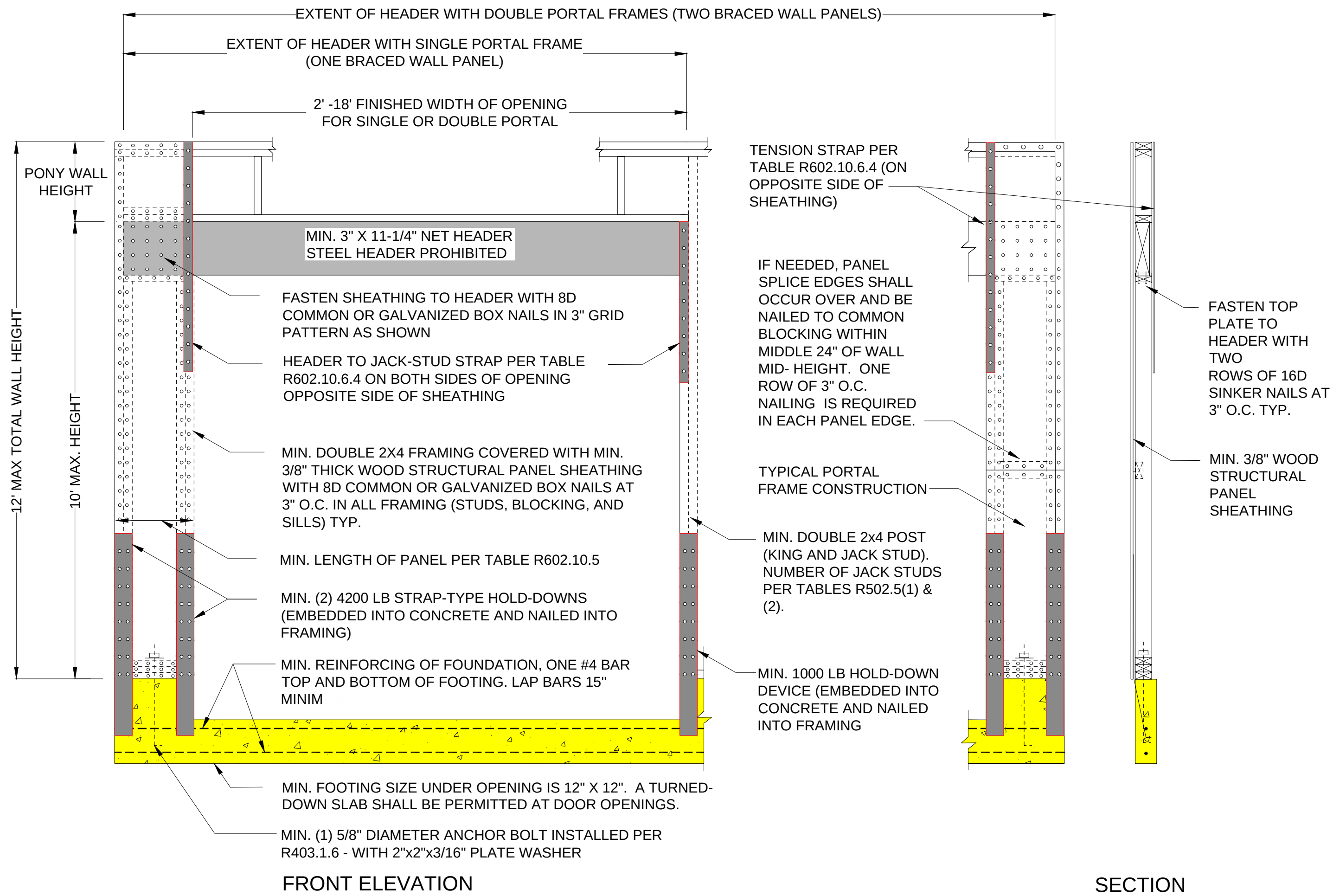


FIGURE R602.10.6.1
METHOD ABW: ALTERNATE BRACED WALL PANEL

R602.10.6.2 Method PFH: Portal frame with hold-downs. Method PFH braced wall panels shall be constructed in accordance with Figure R602.10.6.2.



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

FIGURE R602.10.6.2
METHOD PFH: PORTAL FRAME WITH HOLD-DOWNS

R602.10.6.3 Method PFG: Portal frame at garage door openings in Seismic Design Categories A, B and C. Where supporting a roof or one story and a roof, a Method PFG braced wall panel constructed in accordance with Figure R602.10.6.3 is permitted on either side of garage door openings.

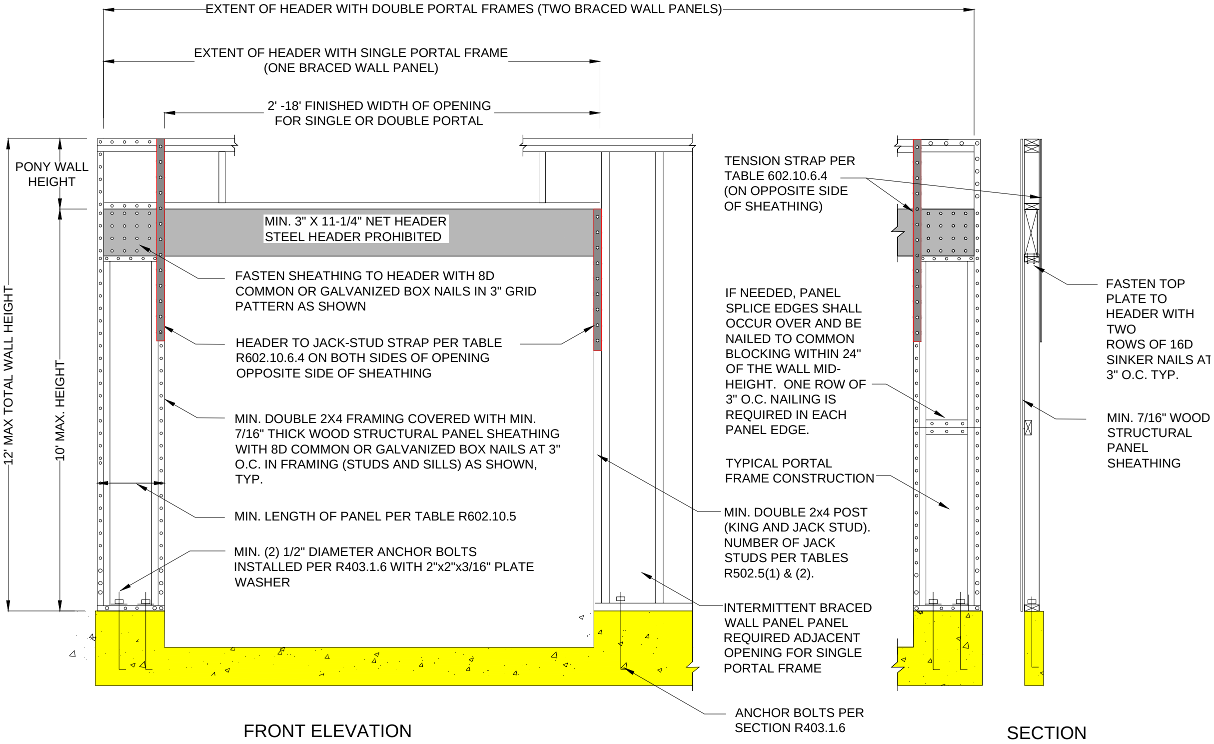


FIGURE R602.10.6.3
METHOD PFG: PORTAL FRAME AT GARAGE DOOR OPENINGS
IN SEISMIC DESIGN CATEGORIES A, B AND C

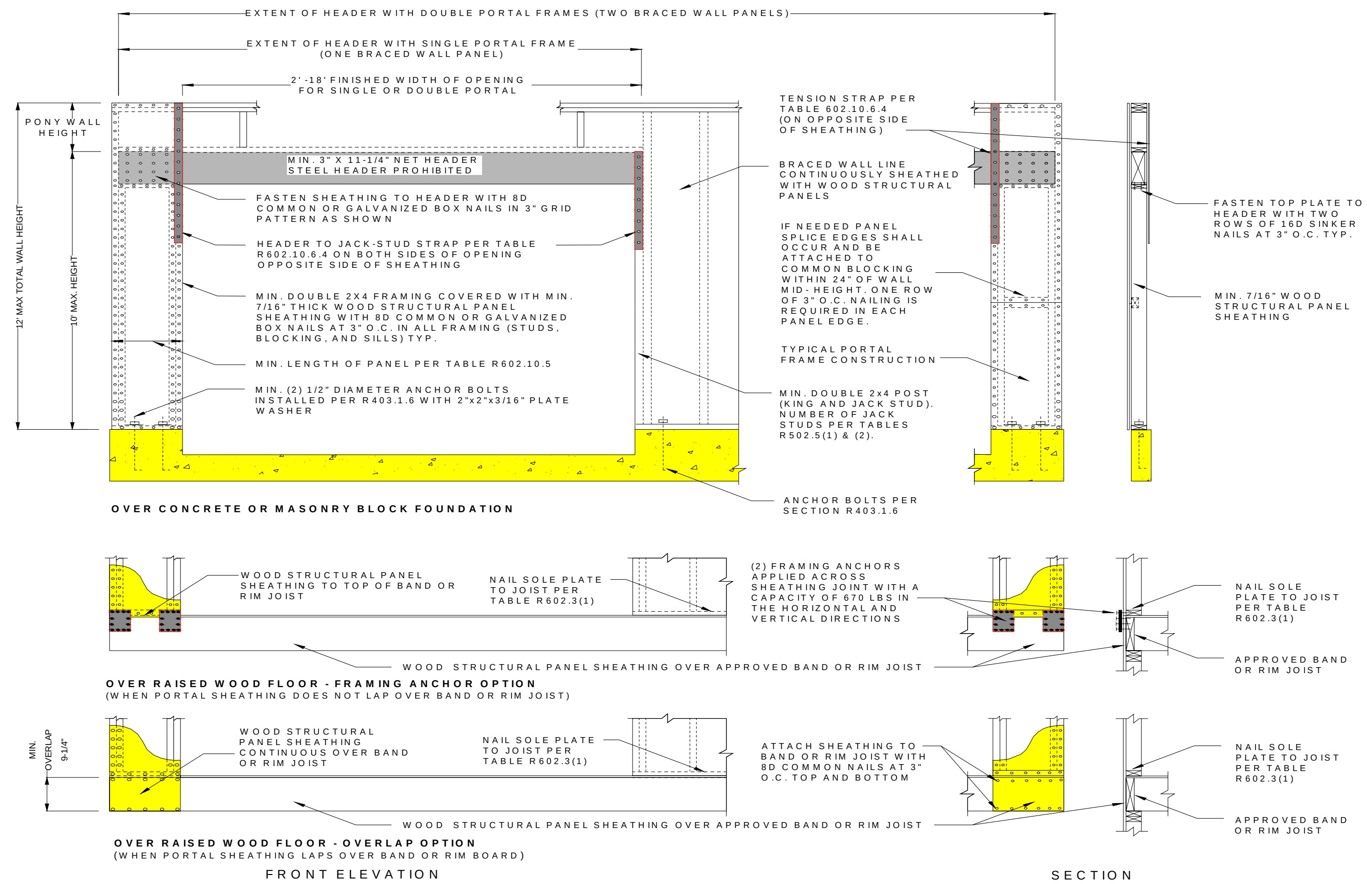
R602.10.6.4 Method CS-PF: Continuously sheathed portal frame. Continuously sheathed portal frame braced wall panels shall be constructed in accordance with Figure R602.10.6.4 and Table R602.10.6.4. The number of continuously sheathed portal frame panels in a single braced wall line shall not exceed four.

TABLE R602.10.6.4
TENSION STRAP CAPACITY REQUIRED FOR RESISTING WIND PRESSURES
PERPENDICULAR TO METHOD PFH, PFG AND CS-PF BRACED WALL PANELS

MINIMUM WALL STUD FRAMING NOMINAL SIZE AND GRADE	MAXIMUM PONY WALL HEIGHT (ft)	MAXIMUM TOTAL WALL HEIGHT (ft)	MAXIMUM OPENING WIDTH (ft)	TENSION STRAP CAPACITY REQUIRED (lb)[a, b]					
				Basic Wind Speed (mph)					
				85	90	100	85	90	100
				Exposure B			Exposure C		
2x4 No. 2 Grade	0	10	18	1000	1000	1000	1000	1000	1000
	1	10	9	1000	1000	1000	1000	1000	1275
			16	1000	1000	1750	1800	2325	3500
			18	1000	1200	2100	2175	2725	DR
	2	10	9	1000	1000	1025	1075	1550	2500
			16	1525	2025	3125	3200	3900	DR
			18	1875	2400	3575	3700	DR	DR
	2	12	9	1000	1200	2075	2125	2750	4000
			16	2600	3200	DR	DR	DR	DR
			18	3175	3850	DR	DR	DR	DR
	4	12	9	1775	2350	3500	3550	DR	DR
			16	4175	DR	DR	DR	DR	DR
2x6 Stud Grade	2	12	9	1000	1000	1325	1375	1750	2550
			16	1650	2050	2925	3000	3550	DR
			18	2025	2450	3425	3500	4100	DR
	4	12	9	1125	1500	2225	2275	2775	3800
			16	2650	3150	DR	DR	DR	DR
			18	3125	3675	DR	DR	DR	DR

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N
a. DR = design required

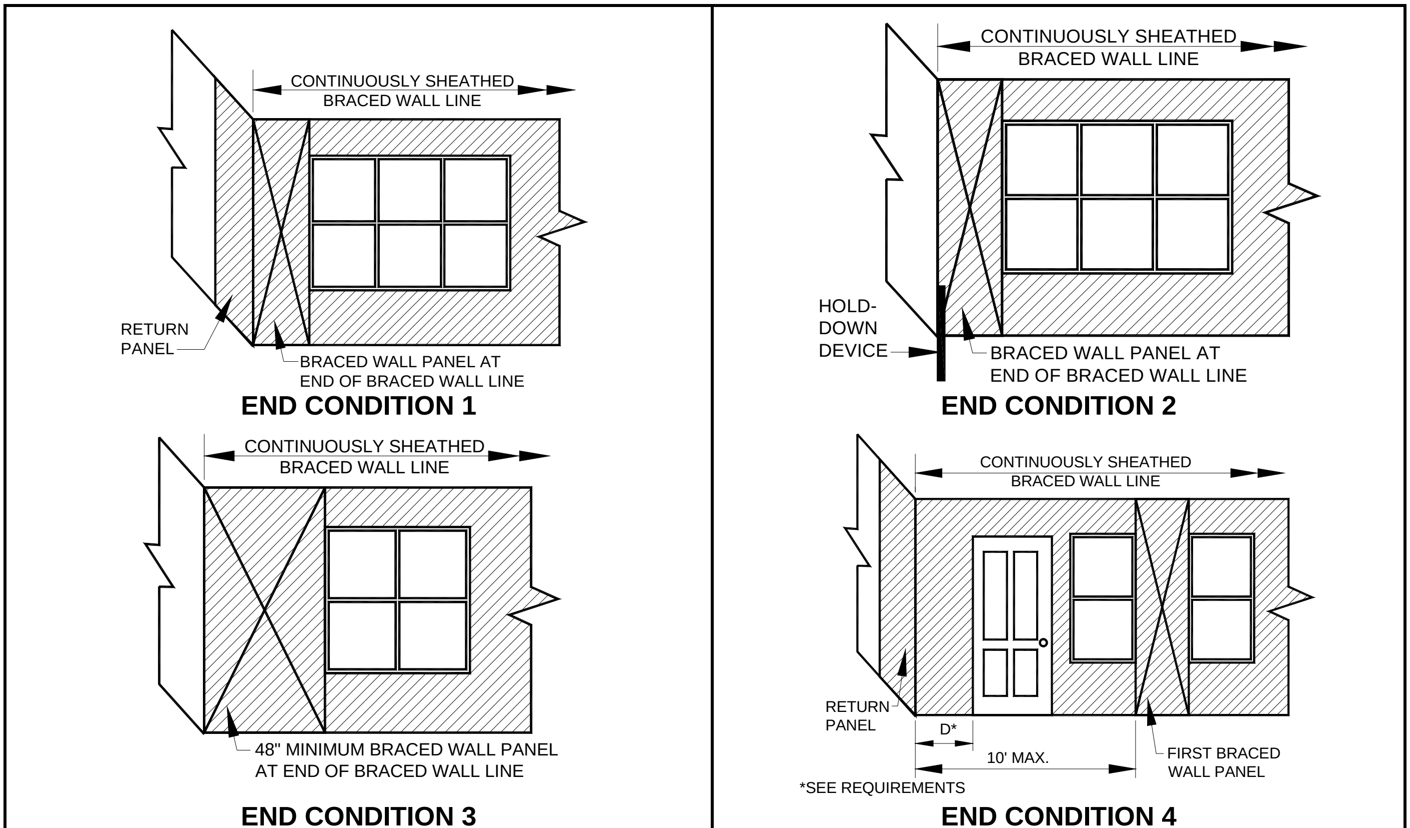
b. Strap shall be installed in accordance with manufacturer's recommendations.

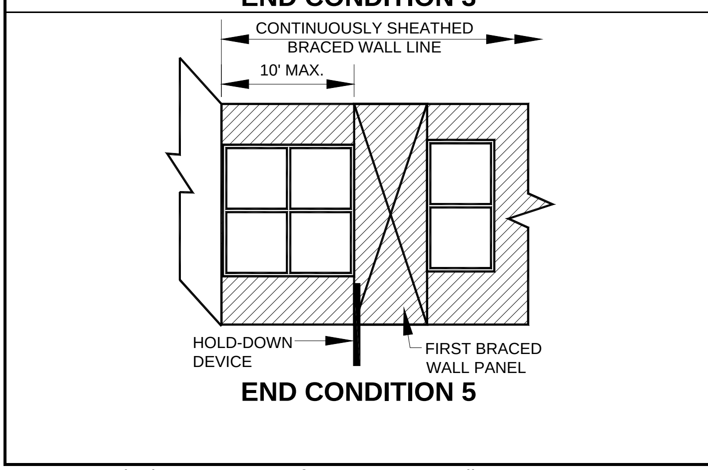


For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N

FIGURE R602.10.6.4
METHOD CS-PF: CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

R602.10.7 Ends of braced wall lines with continuous sheathing. Each end of a braced wall line with continuous sheathing shall have one of the conditions shown in Figure R602.10.7.





REQUIREMENTS

Return panel: 24" for braced wall lines sheathed with wood structural panels
32" for braced wall lines sheathed with structural fiberboard

Distance D: 24" for braced wall lines sheathed with wood structural panels
32" for braced wall lines sheathed with structural fiberboard

Hold-down device: 800 lbs capacity fastened to the edge of the braced wall panel closest to the corner and to the foundation or floor framing below

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N

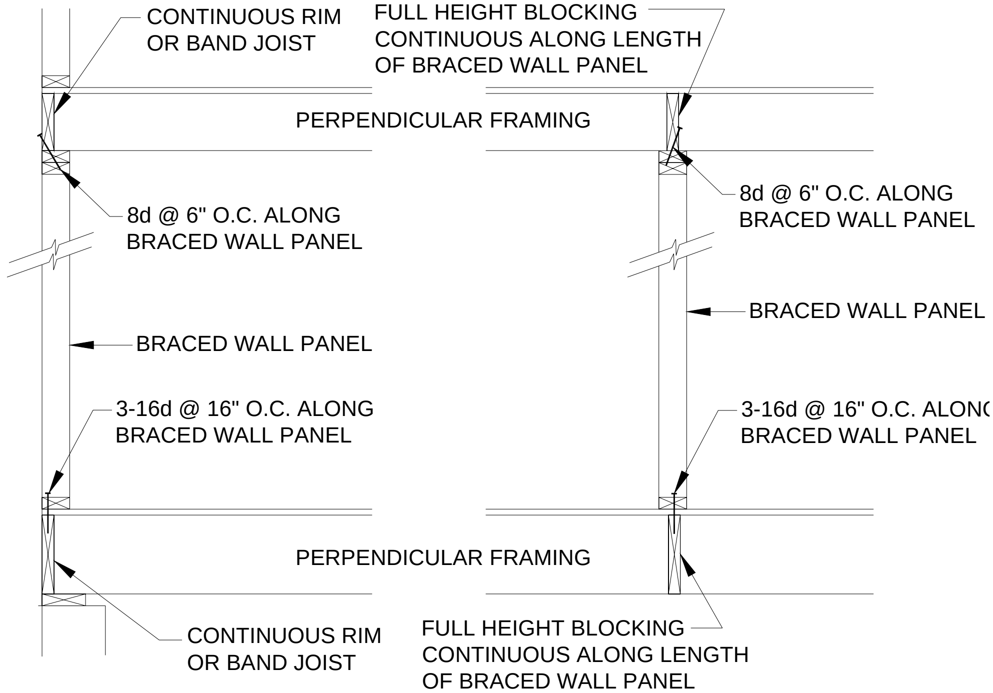
FIGURE R602.10.7
END CONDITIONS FOR BRACED WALL LINES WITH CONTINUOUS SHEATHING

R602.10.8 Braced wall panel connections. Braced wall panels shall be connected to floor framing or foundations as follows:

1. Where joists are perpendicular to a braced wall panel above or below, a rim joist, band joist or blocking shall be provided along the entire length of the braced wall panel in accordance with Figure R602.10.8(1). Fastening of top and bottom wall plates to framing, rim joist, band joist and/or blocking shall be in accordance with Table R602.3(1).
2. Where joists are parallel to a braced wall panel above or below, a rim joist, end joist or other parallel framing member shall be provided directly above and below the braced wall panel in accordance with Figure R602.10.8(2). Where a parallel framing member cannot be located directly above and below the panel, full-depth blocking at 16 inch (406 mm) spacing shall be provided between the parallel framing members to each

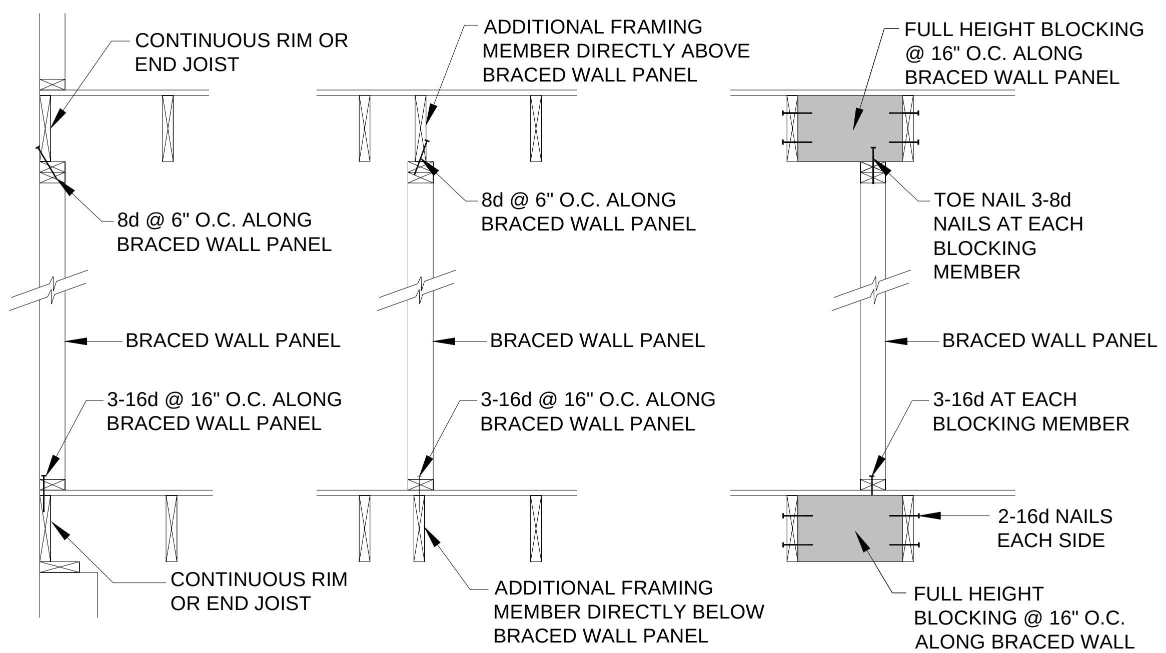
<u>side of the braced wall panel in accordance with Figure R602.10.8(2). Fastening of blocking and wall plates shall be in accordance with Table R602.3(1) and Figure R602.10.8(2).</u>

3. <u>Connections of braced wall panels to concrete or masonry shall be in accordance with Section R403.1.6.</u>



<u>For SI: 1 inch = 25.4 mm</u>

<u>FIGURE R602.10.8(1)</u>
<u>BRACED WALL PANEL CONNECTION WHEN PERPENDICULAR TO FLOOR/CEILING FRAMING</u>



<u>For SI: 1 inch = 25.4 mm</u>

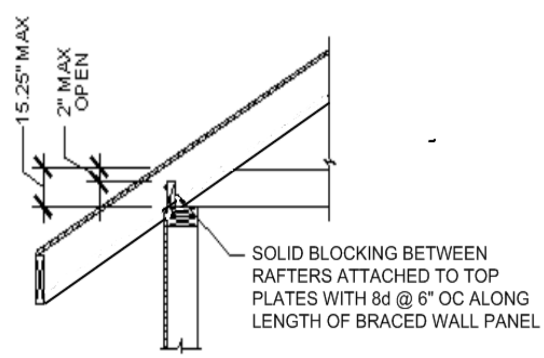
<u>FIGURE R602.10.8(2)</u>
<u>BRACED WALL PANEL CONNECTION WHEN</u>

PARALLEL TO FLOOR/CEILING FRAMING

R602.10.8.1 Braced wall panel connections for Seismic Design Categories D_0, D_1 and D_2. Braced wall panels shall be fastened to required foundations in accordance with Section R602.11.1, and top plate lap splices shall be face-nailed with at least eight 16d nails on each side of the splice.

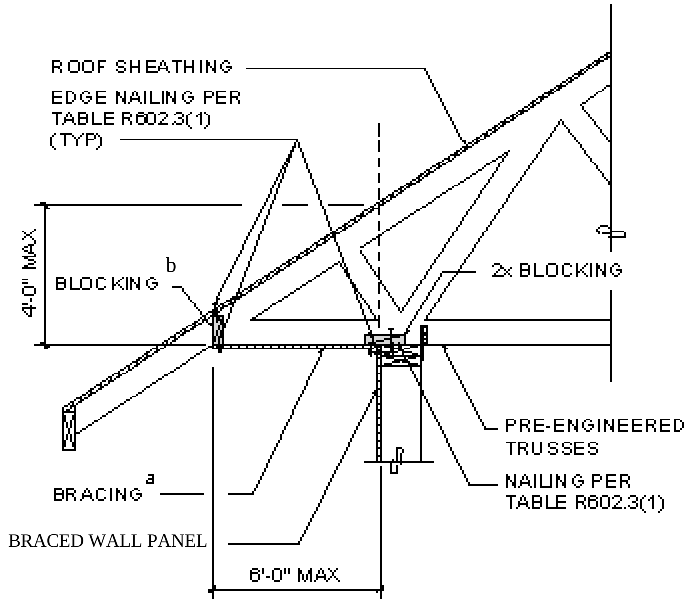
R602.10.8.2 Connections to roof framing. Exterior braced wall panels shall be connected to roof framing as follows.

1. Parallel rafters or roof trusses shall be attached to the top plates of braced wall panels in accordance with Table R602.3(1).
2. For Seismic Design Categories A, B and C and wind speeds less than 100 mph (45 m/s):
   2.1. Where the distance from the top of the rafters or roof trusses and perpendicular top plates is 9.25 inches (235 mm) or less, the rafters or roof trusses shall be connected to the top plates of braced wall panels in accordance with Table R602.3(1) and blocking need not be installed.
   2.2. Where the distance from the top of the rafters and perpendicular top plates is between 9.25 inches (235 mm) and 15.25 inches (387 mm) the rafters shall be connected to the top plates of braced wall panels with blocking in accordance with Figure R602.10.8.2(1) and attached in accordance with Table R602.3(1).
   2.3. Where the distance from the top of the roof trusses and perpendicular top plates is between 9.25 inches (235 mm) and 15.25 inches (387 mm) the roof trusses shall be connected to the top plates of braced wall panels with blocking in accordance with Table R602.3(1).
3. For Seismic Design Categories D_0, D_1 and D_2 or wind speeds of 100 mph (45 m/s) or greater, where the distance between the top of rafters or roof trusses and perpendicular top plates is 15.25 inches (387 mm) or less, rafters or roof trusses shall be connected to the top plates of braced wall panels with blocking in accordance with Figure R602.10.8.2(1) and attached in accordance with Table R602.3(1).
4. For all Seismic Design Categories and wind speeds, where the distance between the top of rafters or roof trusses and perpendicular top plates exceeds 15.25 inches (387 mm), perpendicular rafters or roof trusses shall be connected to the top plates of braced wall panels in accordance with one of the following methods
   4.1. In accordance with Figure R602.10.8.2(2),
   4.2. In accordance with Figure R602.10.8.2(3),
   4.3. With full height engineered blocking panels designed for values listed in American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM). Both the roof and floor sheathing shall be attached to the blocking panels in accordance with Table R602.3(1).
   4.4. Designed in accordance with accepted engineering methods.
5. Lateral support for the rafters and ceiling joists shall be provided in accordance with Section R802.8.
6. Lateral support for trusses shall be provided in accordance with Section R802.10.3.



For SI: 1 inch = 25.4 mm

FIGURE R602.10.8.2(1)
BRACED WALL PANEL CONNECTION TO PERPENDICULAR RAFTERS

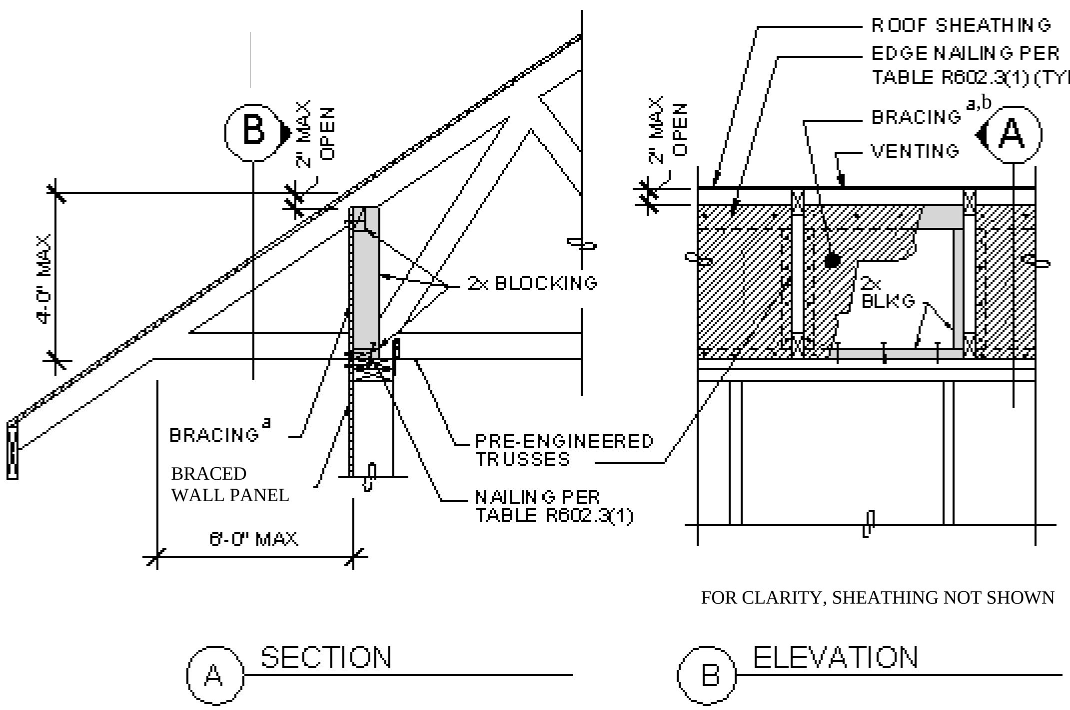


For SI: 1 inch = 25.4 mm

a. Methods of bracing shall be as described in Section R602.10.2 method DWB, WSP, SFB, GB, PBS, PCP OR HPS

b. Provide ventilation (not shown) per Section R806.

FIGURE R602.10.8.2(2)
BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES



For SI: 1 inch = 25.4 mm

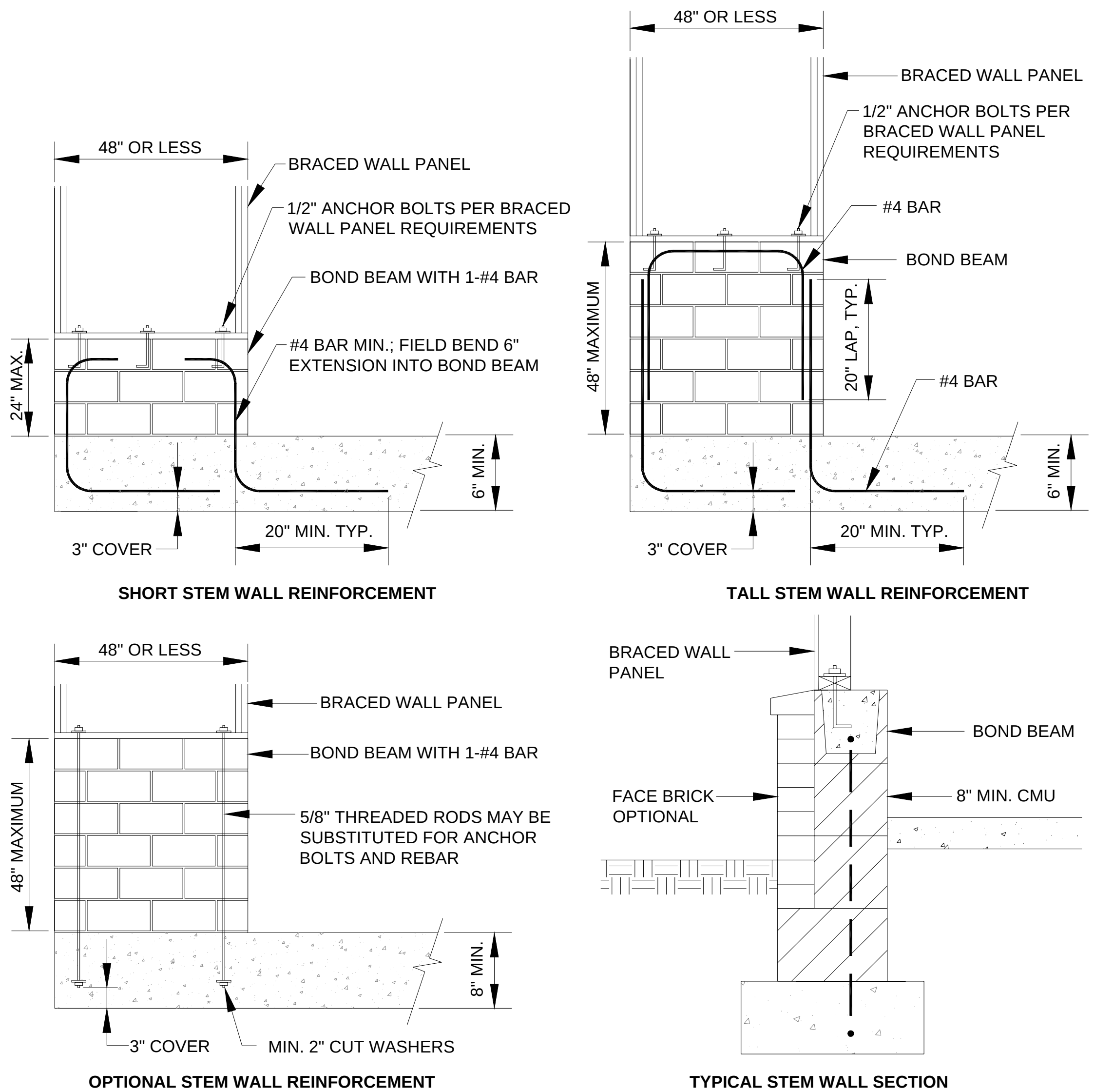
a. Methods of bracing shall be as described in Section R602.10.2 method DWB, WSP, SFB, GB, PBS, PCP OR HPS

b. Provide ventilation (not shown) per Section R608.

FIGURE R602.10.8.2(3)
BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

R602.10.9 Braced wall panel support. Braced wall panel support shall be provided as follows:

1. Cantilevered floor joists complying with Section R502.3.3 shall be permitted to support braced wall panels.
2. Elevated post or pier foundations supporting braced wall panels shall be designed in accordance with accepted engineering practice.
3. Masonry stem walls with a length of 48 inches (1220 mm) or less supporting braced wall panels shall be reinforced in accordance with Figure R602.10.9. Masonry stem walls with a length greater than 48 inches (1220 mm) supporting braced wall panels shall be constructed in accordance with Section R403.1 Methods ABW and PFH shall not be permitted to attach to masonry stem walls.
4. Concrete stem walls with a length of 48” or less, greater than 12 inches tall and less than 6 inches thick shall have reinforcement sized and located in accordance with Figure R602.10.9.



NOTE: GROUT BOND BEAMS AND ALL CELLS WHICH CONTAIN REBAR, THREADED RODS AND ANCHOR BOLTS.

For SI: 1 in=305 mm

FIGURE R602.10.9

MASONRY STEM WALLS SUPPORTING BRACED WALL PANELS

R602.10.9.1 Braced wall panel support for Seismic Design Category D_2. In one-story buildings located in Seismic Design Category D_2, braced wall panels shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). In two story buildings located in Seismic Design Category D_2, all braced wall panels shall be supported on continuous foundations.

Exception: Two-story buildings shall be permitted to have interior braced wall panels supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:

1. The height of cripple walls does not exceed 4 feet (1219 mm).
2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

R602.10.10 Panel joints. All vertical joints of panel sheathing shall occur over, and be fastened to common studs. Horizontal joints in braced wall panels shall occur over, and be fastened to common blocking of a minimum 1-1/2 inch (38 mm) thickness.

Exceptions:

1. Blocking at horizontal joints shall not be required in wall segments that are not counted as braced wall panels.
2. Where the length of bracing provided is at least twice the required length of bracing from Tables R602.10.3(1) and R602.10.3(3) blocking at horizontal joints shall not be required in braced wall panels constructed using Methods WSP, SFB, GB, PBS or HPS.
3. When Method GB panels are installed horizontally, blocking of horizontal joints is not required.

R602.10.11 Cripple wall bracing. In Seismic Design Categories other than D_2, cripple walls shall be braced with a length and type of bracing as required for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3) with the following modifications for cripple wall bracing:

1. The length of bracing as determined from Tables R602.10.3(1) and R602.10.3(3) shall be multiplied by a factor of 1.15, and
2. The wall panel spacing shall be decreased to 18 feet (5486 mm) instead of 25 feet (7620 mm).

R602.10.11.1 Cripple wall bracing in Seismic Design Categories D_0, D_1 and D_2. In addition to the requirements of Section R602.10.11, where braced wall lines at interior walls occur without a continuous foundation below, the length of parallel exterior cripple wall bracing shall be one and one-half times the length required by Table R602.10.3(3). Where cripple walls braced using Method WSP cannot provide this additional length, the capacity of the sheathing shall be increased by reducing the spacing of fasteners along the perimeter of each piece of sheathing to 4 inches (102 mm) on center.

In Seismic Design Category D_2, cripple walls shall be braced in accordance with Tables R602.10.3(3) and R602.10.3(4).

R602.10.11.2 Redesignation of cripple walls. In any Seismic Design Category, cripple walls shall be permitted to be redesignated as the first story walls for purposes of determining wall bracing requirements. If the cripple walls are redesignated, the stories above the redesignated story shall be counted as the second and third stories respectively.

Reason: As the wall bracing section evolved, it has become more universal and flexible, but, as a result, it has grown in size and complexity. After the Ad Hoc committee's "engineering" work was complete and integrated into the 2009 IRC, we heard back from end users that this section of the code was extremely challenging. The committee therefore wanted to focus on making the 2012 IRC easier to read, easier to understand and easier to use.

The *BIG BANG*: To accommodate over 30 separate editorial and technical "simplification" proposals, the Ad Hoc Committee agreed to delete Section R602.10 in its entirety, and replace it with one single change - rather than try to strikeout and insert individual tables, code sections and figures. The decision to integrate all the individual code changes into a single change was due in part to the complexity and interconnectivity of the pieces, and the necessity to "visualize" the final product in its totality. **Everything in this single change had unanimous support among committee members and was deemed to be non-controversial in nature**.

There are several other changes being proposed by committee members that are being submitted independent of this integrated change because of their scope and nature. Some have the unanimous backing of the committee, but may generate discussion from the floor, and others are being offered separately by individual members of the committee because of their content.

Non-technical changes:

Many of the code changes are reorganizational in nature from the 2009 IRC; we moved similar ideas and concepts together to read more smoothly, we merged or deleted unnecessary or duplicated pieces, and made editorial clarifications and improvements.

Technical changes:

The significant technical changes incorporated into this new section are listed below.

Table R602.3(1):

A new row was added to the table that incorporates the nailing requirements of 2009 IRC Figure R602.10.4.4(1) thus eliminating the large and complex figure. All other requirements of the eliminated figure are already covered elsewhere in the IRC. A new requirement for fastening the rim board to sill plate was added to complete the load path from braced wall panels to the foundation.

Section R602.10.1.1:

- o A new figure was added to replace several less effective figures: it clarifies offsets, BWL spacing, and explains how to handle the situation when an intersecting braced wall line is not present to define the length of BWL – it now explains that the end of the building will determine its length.

Section R602.10.2.2 and R602.10.2.3:

- o For consistency, the distance from the end of a BWL to the first BWP was unified at 10 feet for all SDCs and wind speeds.
- o The required summation of end distances was eliminated (2009 IRC Section R602.10.1.4); in its place, braced wall lines up to 16 feet in length may have only one braced wall panel.
- o BWP spacing was changed from 25' o.c.to a 20' edge-to-edge spacing to make it easier to measure.
- o Another new figure was introduced to better demonstrate how BWPs may be located along the walls of the house.

Section R602.10.3:

- o The contribution from BWP on an angled wall was clarified.

Tables R602.10.3(1) and (3):

- o Method GB was redefined as a <u>one sided, 4' application only</u>, because of the problem with interpreting what "double sided GB" meant. To compensate, the required length of bracing for a braced wall line with Method GB was doubled in these two tables.
- o Method CS-SFB was integrated into the tables as well.

Section R602.10.5:

- o Section R602.10.5 was deleted and the provisions for the use of Continuous Sheathing- Structural Fiberboard Sheathing were placed in the appropriate sections
- o

Section R602.10.4.1, Item 5:

- o The option to mix intermittent and continuous methods on a single braced wall line was provided. When a braced wall line begins on the exterior of the building and continues through the interior, the designer can brace the interior portions with intermittent methods and utilize the advantages of continuous sheathing on the exterior portions.

Figure R602.10.6.2:

- o The option for a pony wall atop a PFH portal frame was added so that all portal frames (including PFG and CS-PF) allow the pony wall extension above the header.

Figure R602.10.7:

- o A new end condition was added. Condition 3 allows no return panels or hold-downs if a 4 foot braced wall panel is located at the end of the braced wall line.

The uplift load path section, previously R602.10.1.2.1, was clarified, strengthened and moved to become Section R602.3.5.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LSTIBUREK-RB-1-R602.7

<u>Public Hearing Results</u>

Committee Action: Approved as Modified

Modify the proposal as follows:

R602.3.5 Braced wall panel uplift load path. Braced wall panels located at exterior walls that support roof rafters or trusses (including stories below top story) shall have the framing members connected in accordance with one of the following:

1. Fastening in accordance with Table R602.3(1) where:
   1.1 The basic wind speed does not exceed 90 mph (40 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, or
   1.2 The net uplift value at the top of a wall does not exceed 100 plf (146 N/mm). The net uplift value shall be determined in accordance with Section R802.11 and shall be permitted to be reduced by ~~40~~ <u>60</u> plf (~~57~~ <u>86</u> N/mm) for each full wall above ~~and 40 plf (57 N/mm) for each floor platform above~~.
2. Where the net uplift value at the top of a wall exceeds 100 plf (146 N/mm), installing approved uplift framing connectors to provide a continuous load path from the top of the wall to the foundation or to a point where the uplift force is 100 plf (146 N/mm) or less. The net uplift value shall be as determined in Item 1.2 above.
3. Wall sheathing and fasteners designed in accordance with accepted engineering practice to resist combined uplift and shear forces.

TABLE R802.11
REQUIRED STRENGTH OF TRUSS OR RAFTER CONNECTIONS
TO RESIST WIND UPLIFT FORCES[a, b, c, e, f]
(Pounds per connection)
(No change to table values)

a. through e. *(No change)*
f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 600-pound rated connector is used on the roof framing, a 500-pound rated connector is permitted at the next floor level down).

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON:	**STORY/ SUPPORTING**	**CONDITION**	**ADJUSTMENT FACTOR [a,b] (Multiply length from Table R602.10.3(1) by this factor)**	**APPLICABLE METHODS**
Story height (Section 301.3)	Any story	≤10 ft	1.0	All methods
		>10 ft ≤ 12 ft	1.2	
Braced wall line spacing, townhouses in SDC C	Any story	≤35 ft	1.0	
		>35 ft ≤ 50 ft	1.43	
Braced wall line spacing, in SDC D_0, D_1, D_2[c]	Any story	≥25 ft ≤30 ft	1.2	
		>30 ft ≤ 35 ft	1.4	
Wall dead load	Any story	> 8 ft < 15 ft	1.0	
		<8 psf	0.85	
Roof/ceiling dead load for wall supporting	Roof only or roof plus one or two stories	<15 psf	1.0	
	Roof only	>15 psf ≤ 25 psf	1.2	
	Roof plus one or two stories	>15 psf ≤ 25 psf	1.1	
Walls with stone or masonry veneer	Any story	See Section R703.7		
Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB

R602.10.11 Cripple wall bracing. In Seismic Design Categories other than D_2, cripple walls shall be braced with a length and type of bracing as required for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3) with the following modifications for cripple wall bracing:

1. The length of bracing as determined from Tables R602.10.3(1) and R602.10.3(3) shall be multiplied by a factor of 1.15, and
2. The wall panel spacing shall be decreased to 18 feet (5486 mm) instead of ~~25~~ 20 feet (~~7620~~ mm).

(Portion of proposal not shown remains unchanged)

Committee Reason: The committee feels this is a much needed improvement and adds considerable clarification to the wall bracing provisions while reducing the number of pages from 25 to 23. The modifications corrects for the proper wall load in R602.3.5, item 1.1.2, adds a deleted footnote to Table R802.11, corrects an inequality sign (<25 ft should be >25 ft) in Table R602.10.3(4) and corrects the 25 ft to 20 ft in Section R602.10.11 to comport with Section R602.10.2.2.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Charles S. Bajnai, VBCOA and Chesterfield County, VA, representing ICC Ad-Hoc Committee on Wall Bracing, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R602.10 Wall bracing. Buildings shall be braced in accordance with this section. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1.

R602.10.1 Braced wall lines. For the purpose of determining the amount and location of bracing required in each story level of a building, braced wall lines shall be designated as straight lines ~~on~~ in the building plan placed in accordance with this section.

R602.10.1.1 Length of a braced wall line. The length of a braced wall line shall be the distance between its ends. The end of a braced wall line shall be the intersection with a perpendicular braced wall line, ~~or~~ an angled braced wall line as permitted in Section R602.10.1.4 or an exterior wall~~.~~ ~~In the absence of an intersecting braced wall line, the end shall be the farthest exterior wall of the building~~ as shown in Figure R602.10.1.1.

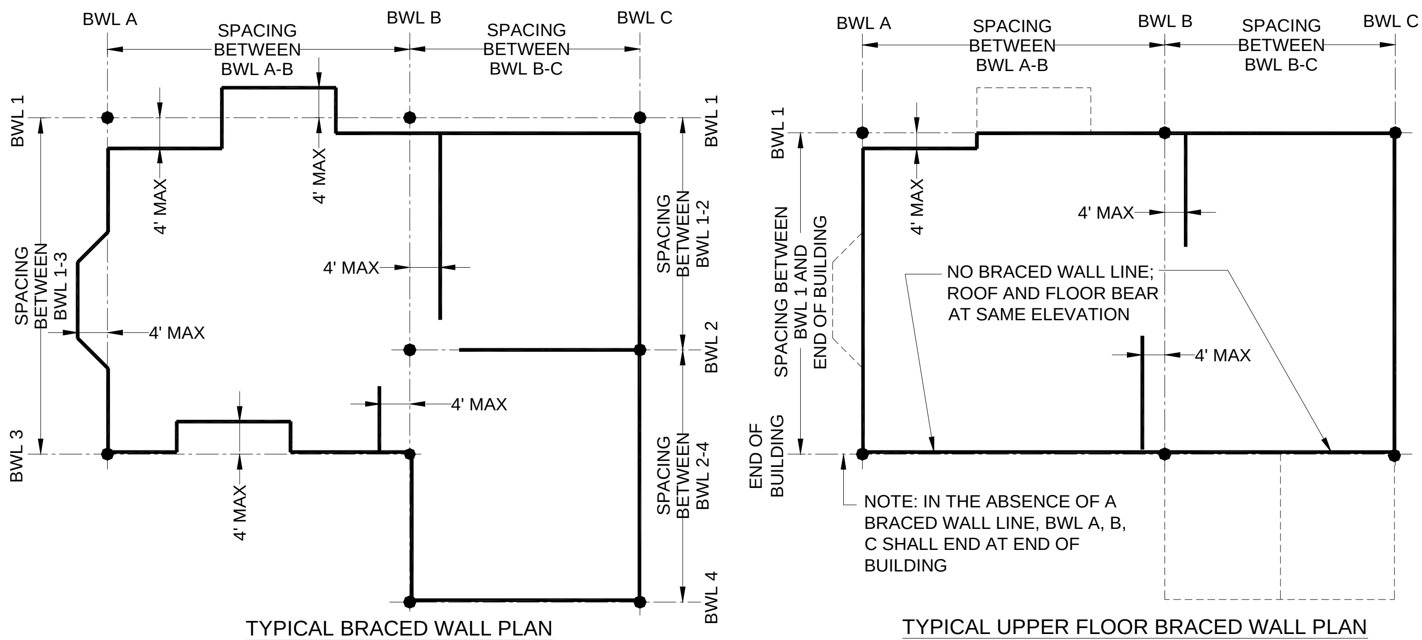


FIGURE R602.10.1.1
BRACED WALL LINES

R602.10.1.2 Offsets along a braced wall line. All exterior walls parallel to a braced wall line shall be permitted to offset up to 4 feet (1219 mm) from the designated braced wall line location as shown Figure R602.10.1.1. Interior walls used as bracing shall be permitted to offset up to 4 feet (1219 mm) from a braced wall line through the interior of the building as shown in Figure R602.10.1.1.

R602.10.1.3 Spacing of braced wall lines. There shall be a minimum of two braced wall lines in both the longitudinal and transverse direction as shown in Figure R602.10.1.1. Intermediate braced wall lines through the interior of the building shall be permitted. The spacing between parallel braced wall lines shall be in accordance with Table R602.10.1.3.

TABLE R602.10.1.3
BRACED WALL LINE SPACING

APPLICATION	CONDITION	BUILDING TYPE	BRACED WALL LINE SPACING CRITERIA	
			Maximum Spacing	Exception to Maximum Spacing
Wind bracing	85 mph to <110 mph	Detached, townhouse	60 feet	None
Seismic bracing	SDC A - C	Detached	Use wind bracing	
	SDC A – B	Townhouse	Use wind bracing	
	SDC C	Townhouse	35 feet	Up to 50 feet ~~with adjustment of required length of bracing per~~ when length of required bracing per Table R602.10.3(3) is adjusted in accordance with Table R602.10.3(4)
	SDC D_0, D_1, D_2	Detached, townhouses, one- and two-story only	25 feet	Up to 35 feet to allow for a single room not to exceed 900 sq ft. Spacing of all other braced wall lines shall not exceed 25 feet.
	SDC D_0, D_1, D_2	Detached, townhouse	25 feet	Up to 35 feet when length of required bracing per Table R602.10.3(3) is adjusted in accordance with Table R602.10.3(4).

For SI: 1 foot = 304.8 mm

R602.10.1.4 Angled walls. Any portion of a wall along a braced wall line shall be permitted to angle out of plane for a maximum diagonal length of 8 feet (2438 mm). Where the angled wall occurs at a corner, the length of the braced wall line shall be measured from the projected corner as shown in Figure R602.10.1.4. Where the diagonal length is greater than 8 feet (2438 mm), it shall be considered a separate braced wall line and shall be braced in accordance with Section R602.10.1.

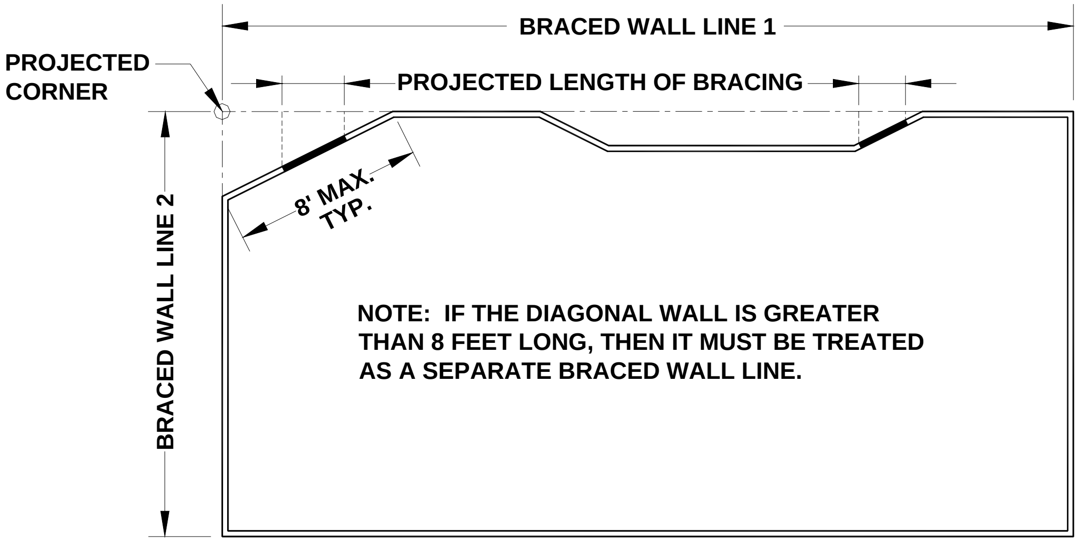


FIGURE R602.10.1.4
ANGLED WALLS

R602.10.2 Braced wall panels. Braced wall panels shall be full-height sections of wall that shall <u>have no vertical or horizontal offsets</u> ~~be continuous in the same plane~~. Braced wall panels shall be constructed and placed along a braced wall line in accordance with this section and the bracing methods specified in Section R602.10.4.

R602.10.2.1 Braced wall panel uplift load path. The bracing lengths in Table R602.10.3(1) apply only when uplift loads are resisted per Section R602.3.5.

R602.10.2.2 Locations of braced wall panels. A braced wall panel shall begin within 10 feet (3810 mm) from each end of a braced wall line as determined in Section R602.10.1.1. The distance between adjacent edges of ~~two~~ braced wall panels <u>along a braced wall line</u> shall be no greater than 20 feet (6096 mm) as shown in Figure R602.10.2.2.

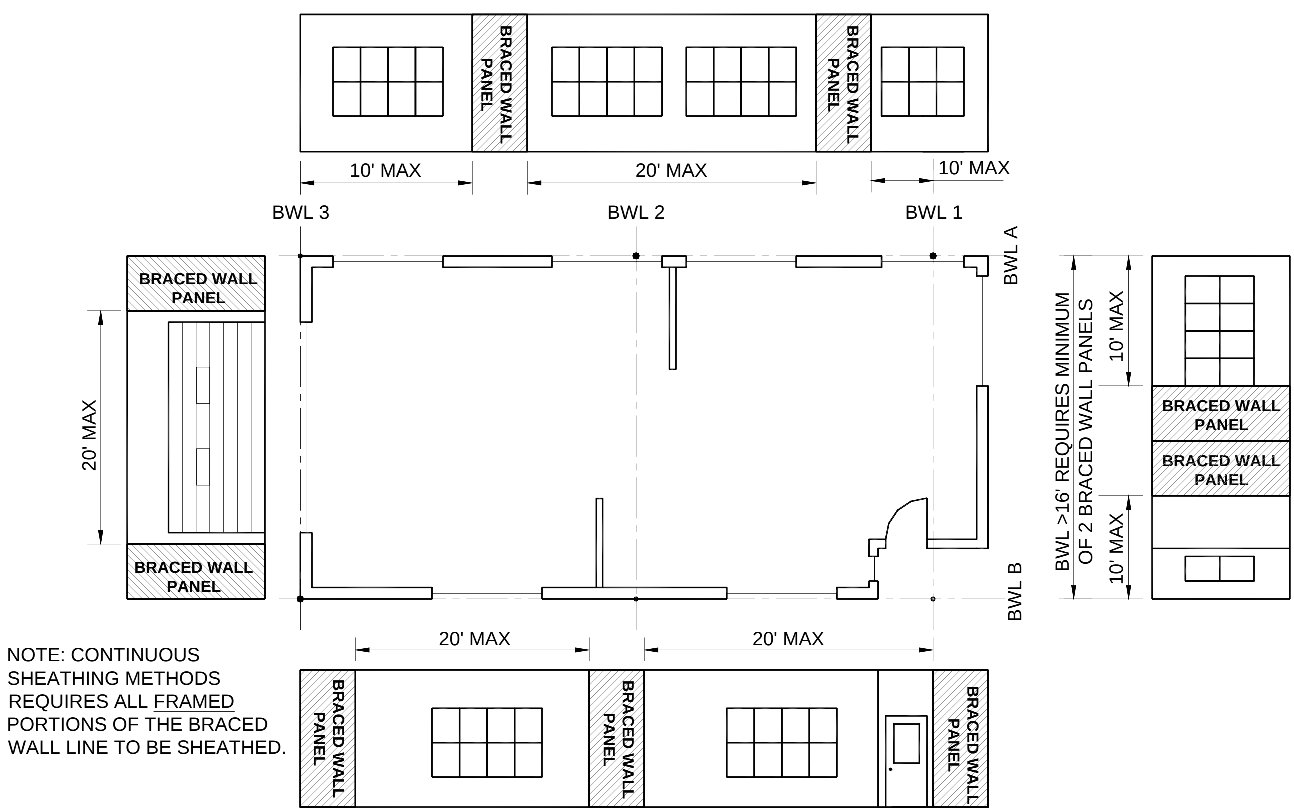


FIGURE R602.10.2.2
LOCATION OF BRACED WALL PANELS

R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D_0, D_1 and D_2. Braced wall panels shall be located at each end of a braced wall line.

Exception: Braced wall panels constructed of Methods WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a braced wall line provided each end complies with one of the following.

1. A minimum 24 in. wide (610 mm) panel for Methods WSP, CS-WSP, CS-G, CS-PF and 32 in. (813 mm) wide panel for Method CS-SFB is applied to each side of the building corner as shown in Condition 4 of Figure R602.10.7.
2. The end of each braced wall panel closest to the end of the braced wall line shall have an 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below as shown in Condition 5 of Figure R602.10.7.

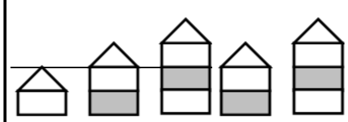
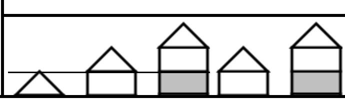
R602.10.2.3 Minimum number of braced wall panels. Braced wall lines with a length of 16 feet (4877 mm) or less shall have a minimum of ~~one~~ two braced wall panels of any length or one braced wall panel equal to 48 inches (1219 mm) or more. Braced wall lines greater than 16 feet (4877 mm) shall have a minimum of two braced wall panels.

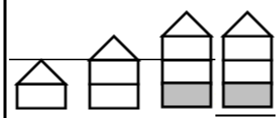
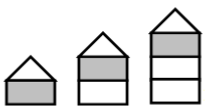
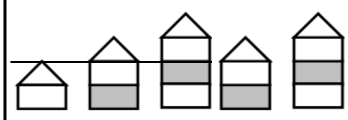
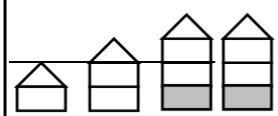
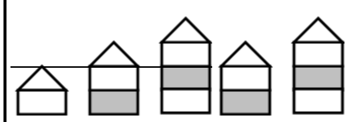
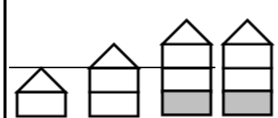
R602.10.3 Required length of bracing. The required length of bracing along each braced wall line shall be determined as follows.

1. All buildings in Seismic Design Categories A and B shall use Table R602.10.3(1) and the applicable adjustment factors in Table R602.10.3(2).
2. Detached buildings in Seismic Design Category C shall use Table R602.10.3(1) and the applicable adjustment factors in Table R602.10.3(2).
3. Townhouses in Seismic Design Category C shall use the greater value determined from Table R602.10.3(1) or R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4) respectively.
4. All buildings in Seismic Design Categories D_0, D_1 and D_2 shall use the greater value determined from Table R602.10.3(1) or R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4) respectively.

Only braced wall panels parallel to the braced wall line shall contribute towards the required length of bracing of that braced wall line. Braced wall panels along an angled wall meeting the minimum length requirements of Tables R602.10.5 and R602.10.5.2 shall be permitted to contribute its projected length towards the minimum required length of bracing for ~~to~~ the braced wall line as shown in Figure R602.10.1.4. Any braced wall panel on an angled wall at the end of a braced wall line shall contribute its projected length for only one of the braced wall lines at the projected corner. ~~In no case shall the required length of bracing along a braced wall line after adjustments be less than 48 inches (1219 mm) total.~~

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON WIND SPEED

EXPOSURE CATEGORY B 30 FT MEAN ROOF HEIGHT 10 FT EAVE TO RIDGE HEIGHT 10 FT WALL HEIGHT 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE [a]			
Basic Wind Speed (mph)	Story Location	Braced Wall Line Spacing (feet)	Method LIB [b]	Method GB [~~c~~] ~~(Double Sided)~~	Methods DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB [c~~d~~]	Methods CS-WSP, CS-G, CS-PF
≤ 85 ~~(mph)~~		10	3.5	3.5	2.0	1.5
		20	6.0	6.0	3.5	3.0
		30	8.5	8.5	5.0	4.5
		40	11.5	11.5	6.5	5.5
		50	14.0	14.0	8.0	7.0
		60	16.5	16.5	9.5	8.0
		10	6.5	6.5	3.5	3.0
		20	11.5	11.5	6.5	5.5
		30	16.5	16.5	9.5	8.0
		40	21.5	21.5	12.5	10.5
		50	26.5	26.5	15.0	13.0
		60	31.5	31.5	18.0	15.5
		10	NP	9.0	5.5	4.5
		20	NP	17.0	10.0	8.5
		30	NP	24.5	14.0	12.0
		40	NP	32.0	18.0	15.5
		50	NP	39.0	22.5	19.0
		60	NP	46.5	26.5	22.5
≤ 90 ~~(mph)~~		10	3.5	3.5	2.0	2.0
		20	7.0	7.0	4.0	3.5
		30	9.5	9.5	5.5	5.0
		40	12.5	12.5	7.5	6.0
		50	15.5	15.5	9.0	7.5
		60	18.5	18.5	10.5	9.0
		10	7.0	7.0	4.0	3.5
		20	13.0	13.0	7.5	6.5
		30	18.5	18.5	10.5	9.0

EXPOSURE CATEGORY B 30 FT MEAN ROOF HEIGHT 10 FT EAVE TO RIDGE HEIGHT 10 FT WALL HEIGHT 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE [a]			
Basic Wind Speed (mph)	**Story Location**	**Braced Wall Line Spacing (feet)**	**Method LIB [b]**	**Method GB ~~[c]~~ ~~(Double Sided)~~**	**Methods DWB, WSP, SFB, PBS, PCP, HPS, CS-SFB [c~~d~~]**	**Methods CS-WSP, CS-G, CS-PF**
		40	24.0	24.0	14.0	12.0
		50	29.5	29.5	17.0	14.5
		60	35.0	35.0	20.0	17.0
		10	NP	10.5	6.0	5.0
		20	NP	19.0	11.0	9.5
		30	NP	27.5	15.5	13.5
		40	NP	35.5	20.5	17.5
		50	NP	44.0	25.0	21.5
		60	NP	52.0	30.0	25.5
≤ 100 ~~(mph)~~		10	4.5	4.5	2.5	2.5
		20	8.5	8.5	5.0	4.0
		30	12.0	12.0	7.0	6.0
		40	15.5	15.5	9.0	7.5
		50	19.0	19.0	11.0	9.5
		60	22.5	22.5	13.0	11.0
		10	8.5	8.5	5.0	4.5
		20	16.0	16.0	9.0	8.0
		30	23.0	23.0	13.0	11.0
		40	29.5	29.5	17.0	14.5
		50	36.5	36.5	21.0	18.0
		60	43.5	43.5	25.0	21.0
		10	NP	12.5	7.5	6.0
		20	NP	23.5	13.5	11.5
		30	NP	34.0	19.5	16.5
		40	NP	44.0	25.0	21.5
		50	NP	54.0	31.0	26.5
		60	NP	64.0	36.5	31.0
< 110 [c] ~~(mph)~~		10	5.5	5.5	3.0	3.0
		20	10.0	10.0	6.0	5.0
		30	14.5	14.5	8.5	7.0
		40	18.5	18.5	11.0	9.0
		50	23.0	23.0	13.0	11.5
		60	27.5	27.5	15.5	13.5
		10	10.5	10.5	6.0	5.0
		20	19.0	19.0	11.0	9.5
		30	27.5	27.5	16.0	13.5
		40	36.0	36.0	20.5	17.5
		50	44.0	44.0	25.5	21.5
		60	52.5	52.5	30.0	25.5
		10	NP	15.5	9.0	7.5
		20	NP	28.5	16.5	14.0
		30	NP	41.0	23.5	20.0
		40	NP	53.0	30.5	26.0
		50	NP	65.5	37.5	32.0
		60	NP	77.5	44.5	37.5

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

a. Linear interpolation shall be permitted.

b. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches (203 mm).

~~c. The length of bracing for Method GB is based on a double sided application. Where GB is used in a one sided application (or in combination of single sided and double sided application), the single sided GB shall only contribute half as much as the double sided GB towards the minimum required length of bracing in this table.~~

c~~d~~. Method CS-SFB does not apply where the wind speed is greater than 100 mph.

Table R602.10.3(2)
WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON	STORY/ SUPPORTING	CONDITION	ADJUSTMENT FACTOR[a,b] (multiply length from Table R602.10.3(1) by this factor)	APPLICABLE METHODS
Exposure category	One story structure	B	1.00	All methods
		C	1.20	
		D	1.50	
	Two-story structure	B	1.00	
		C	1.30	
		D	1.60	
	Three-story structure	B	1.00	
		C	1.40	
		D	1.70	
Roof eave-to-ridge height	Roof only	≤5 ft	0.70	
		10 ft	1.00	
		15 ft	1.30	
		20 ft	1.60	
	Roof + 1 floor	≤5 ft	0.85	
		10 ft	1.00	
		15 ft	1.15	
		20 ft	1.30	
	Roof + 2 floors	≤5 ft	0.90	
		10 ft	1.00	
		15 ft	1.10	
		20 ft	Not permitted	
Wall height adjustment	Any story	8 ft	0.90	
		9 ft	0.95	
		10 ft	1.00	
		11 ft	1.05	
		12 ft	1.10	
Number of braced wall lines (per plan direction)[c]	Any story	2	1.00	
		3	1.30	
		4	1.45	
		≥5	1.60	
Additional 800 lb hold-down device	Top story only	Fastened to the end studs of each braced wall panel and to the foundation or framing below	0.80	DWB, WSP, SFB, PBS, PCP, HPS
Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.40	DWB, WSP, SFB,PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
Gypsum board fastening	Any story	4 in. o.c. at panel edges, including top and bottom plates, and all horizontal joints blocked	0.7	GB

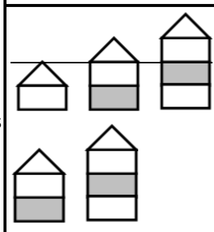
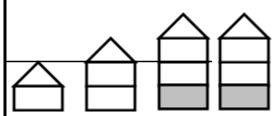
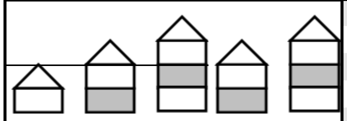
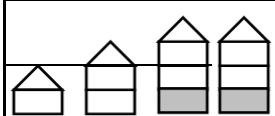
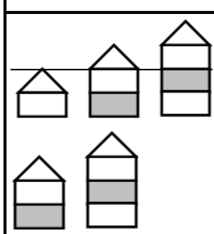
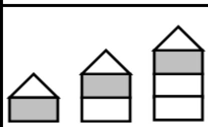
For SI: 1 foot = 305 mm, 1 lb = 4.48 N.

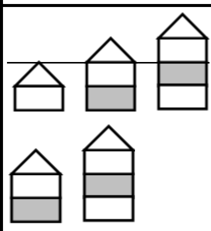
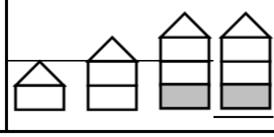
a. Linear Interpolation shall be permitted.

b. The total adjustment factor is the product of all applicable adjustment factors.

c. The adjustment factor is permitted to be 1.0 when determining bracing amounts for intermediate braced wall lines provided the bracing mounts on adjacent braced wall lines are based on a spacing and number that neglects the intermediate braced wall line.

TABLE R602.10.3(3)
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

• SOIL CLASS D [b] • WALL HEIGHT = 10 FT • 10 PSF FLOOR DEAD LOAD • 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING ≤ 25 FT			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE [a]				
Seismic Design Category	**Story Location**	**Braced Wall Line Length (ft)**	**Method LIB [c]**	**Method GB ~~(Double Sided) [d]~~**	**Methods DWB, SFB, PBS, PCP, HPS, CS-SFB [de]**	**Method WSP**	**Methods CS-WSP, CS-G**
C (townhouses only)		10	2.5	2.5	2.5	1.6	1.4
		20	5.0	5.0	5.0	3.2	2.7
		30	7.5	7.5	7.5	4.8	4.1
		40	10.0	10.0	10.0	6.4	5.4
		50	12.5	12.5	12.5	8.0	6.8
		10	NP	4.5	4.5	3.0	2.6
		20	NP	9.0	9.0	6.0	5.1
		30	NP	13.5	13.5	9.0	7.7
		40	NP	18.0	18.0	12.0	10.2
		50	NP	22.5	22.5	15.0	12.8
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
D_0		10	NP	2.8	2.8	1.8	1.6
		20	NP	5.5	5.5	3.6	3.1
		30	NP	8.3	8.3	5.4	4.6
		40	NP	11.0	11.0	7.2	6.1
		50	NP	13.8	13.8	9.0	7.7
		10	NP	5.3	5.3	3.8	3.2
		20	NP	10.5	10.5	7.5	6.4
		30	NP	15.8	15.8	11.3	9.6
		40	NP	21.0	21.0	15.0	12.8
		50	NP	26.3	26.3	18.8	16.0
		10	NP	7.3	7.3	5.3	4.5
		20	NP	14.5	14.5	10.5	9.0
		30	NP	21.8	21.8	15.8	13.4
		40	NP	29.0	29.0	21.0	17.9
		50	NP	36.3	36.3	26.3	22.3
D_1		10	NP	3.0	3.0	2.0	1.7
		20	NP	6.0	6.0	4.0	3.4
		30	NP	9.0	9.0	6.0	5.1
		40	NP	12.0	12.0	8.0	6.8
		50	NP	15.0	15.0	10.0	8.5
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
		10	NP	8.5	8.5	6.0	5.1
		20	NP	17.0	17.0	12.0	10.2
		30	NP	25.5	25.5	18.0	15.3
		40	NP	34.0	34.0	24.0	20.4
		50	NP	42.5	42.5	30.0	25.5
D_2		10	NP	4.0	4.0	2.5	2.1
		20	NP	8.0	8.0	5.0	4.3
		30	NP	12.0	12.0	7.5	6.4
		40	NP	16.0	16.0	10.0	8.5
		50	NP	20.0	20.0	12.5	10.6

• SOIL CLASS D [b] • WALL HEIGHT = 10 FT • 10 PSF FLOOR DEAD LOAD • 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING ≤ 25 FT			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE [a]				
Seismic Design Category	**Story Location**	**Braced Wall Line Length (ft)**	**Method LIB [c]**	**Method GB ~~(Double Sided) [d]~~**	**Methods DWB, SFB, PBS, PCP, HPS, CS-SFB [d~~e~~]**	**Method WSP**	**Methods CS-WSP, CS-G**
		10	NP	7.5	7.5	5.5	4.7
		20	NP	15.0	15.0	11.0	9.4
		30	NP	22.5	22.5	16.5	14.0
		40	NP	30.0	30.0	22.0	18.7
		50	NP	37.5	37.5	27.5	23.4
		10	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP

For SI: 1 foot 305 mm

a. Linear interpolation shall be permitted.

b. Wall bracing lengths are based on a soil site class "D." Interpolation of bracing length between the S_{ds} values associated with the Seismic Design Categories shall be permitted when a site-specific S_{ds} value is determined in accordance with Section 1613.5 of the International Building Code.

c. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches (203 mm).

~~d. The length of bracing for Method GB is based on a double sided application. Where GB is used in a one sided application (or in combination of single sided and double sided application), the single sided GB shall only contribute half as much as the double sided GB towards the minimum required length of bracing in this table.~~

d~~e~~. Method CS-SFB applies in SDC C only.

TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON:	**STORY/SUPPORTING**	**CONDITION**	**ADJUSTMENT FACTOR [a,b] (Multiply length from Table R602.10.3(1) by this factor)**	**APPLICABLE METHODS**
Story height (Section 301.3)	Any story	≤10 ft	1.0	All methods
		>10 ft ≤ 12 ft	1.2	
Braced wall line spacing, townhouses in SDC C	Any story	≤35 ft	1.0	
		>35 ft ≤ 50 ft	1.43	
Braced wall line spacing, in SDC D_0, D_1, D_2 [c]	Any story	> 25 ft ≤30 ft	1.2	
		>30 ft ≤ 35 ft	1.4	
Wall dead load	Any story	> 8 ft < 15 ft	1.0	
		<8 psf	0.85	
Roof/ceiling dead load for wall supporting	Roof only or roof plus one or two stories	~~<~~ ≤15 psf	1.0	
	~~Roof only~~	~~>15 psf ≤ 25 psf~~	~~1.2~~	
	Roof plus one or two stories	>15 psf ≤ 25 psf	1.1	
	Roof only	>15 psf ≤ 25 psf	1.2	
Walls with stone or masonry veneer	Any story	See Section R703.7		
Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB

For SI: 1 psf = 47,8 N/m^2.

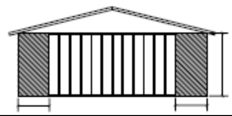
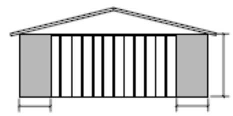
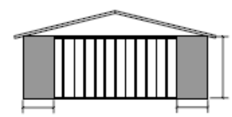
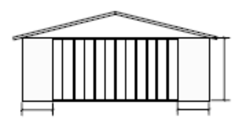
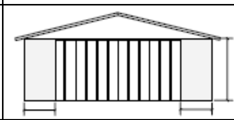
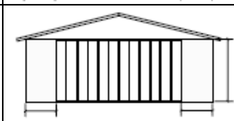
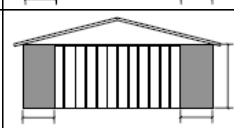
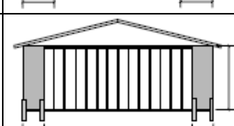
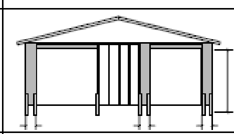
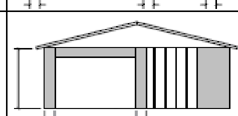
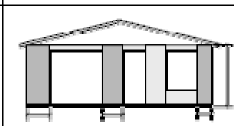
a. Linear interpolation shall be permitted.

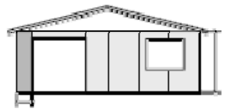
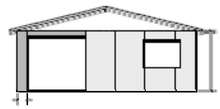
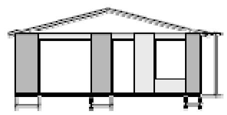
b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.

c. The length-to-width ratio for the floor/roof diaphragm shall not exceed 3:1. The top plate lap splice nailing shall be a minimum of 12-16d nails on each side of the splice.

R602.10.4 Construction methods for braced wall panels. Intermittent and continuously sheathed braced wall panels shall be constructed in accordance with this section and the methods listed in Table R602.10.4.

TABLE R602.10.4
BRACING METHODS

	METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA [a] Fasteners	CONNECTION CRITERIA [a] Spacing
Intermittent Bracing Methods	**LIB** Let-in-bracing	1x4 wood or approved metal straps at 45° to 60° angles for maximum 16” stud spacing		Wood: 2-8d common nails or 3-8d (2 ½” long x 0.113” dia.) nails Metal strap: per manufacturer	Wood: per stud and top and bottom plates Metal: per manufacturer
Intermittent Bracing Methods	**DWB** Diagonal wood boards	¾” (1” nominal) for maximum 24” stud spacing		2-8d (2½" long x 0.113" dia.) nails or 2 - 1¾" long staples	Per stud
Intermittent Bracing Methods	**WSP** Wood structural panel (See Section R604)	$^{3}/_{8}$"		Exterior sheathing per Table R602.3(3) Interior sheathing per Table R602.3(1) or R602.3(2)	6" edges 12" field Varies by fastener
Intermittent Bracing Methods	**SFB** Structural fiberboard sheathing	$^{1}/_{2}$" or $^{25}/_{32}$" for maximum 16" stud spacing		1½" long x 0.12" dia. (for ½ “ thick sheathing) 1$^{3}/_{4}$” long x 0.12” dia. (for $^{25}/_{32}$” thick sheathing) galvanized roofing nails or 8d common (2½" long x0.131" dia.) nails	3" edges 6" field
Intermittent Bracing Methods	**GB** [d] Gypsum board ~~(double sided)~~	$^{1}/_{2}$"		Nails or screws per Table R602.3(1) for exterior locations Nails or screws per Table R702.3.5 for interior locations	For all braced wall panel locations: 7" edges (including top and bottom plates) 7" field
Intermittent Bracing Methods	**PBS** Particleboard sheathing (See Section R605)	$^{3}/_{8}$" or $^{1}/_{2}$" for maximum16" stud spacing		For 3/8”, 6d common (2” long x0.113" dia.) nails For ½”, 8d common (2½" long x0.131" dia.) nails	3" edges 6" field
Intermittent Bracing Methods	**PCP** Portland cement plaster	See Section R703.6 for maximum 16” stud spacing		1½" long, 11 gage, $^{7}/_{16}$" dia. head nails or $^{7}/_{\cancel{16}8}$" long, 16 gage staples	6" o.c. on all framing members
Intermittent Bracing Methods	**HPS** Hardboard panel siding	$^{7}/_{16}$" for maximum 16” stud spacing		0.092" dia., 0.225" dia. head nails with length to accommodate 1½" penetration into studs	4" edges 8" field
Intermittent Bracing Methods	**ABW** Alternate braced wall	$^{3}/_{8}$"		See Section R602.10.6.1	See Section R602.10.6.1
Intermittent Bracing Methods	**PFH** Portal frame with hold-downs	$^{3}/_{8}$		See Section R602.10.6.2	See Section R602.10.6.2
Intermittent Bracing Methods	**PFG** Portal frame at garage	$^{7}/_{16}$"		See Section R602.10.6.3	See Section R602.10.6.3
Continuous Sheathing	**CS-WSP** Continuously sheathed wood structural panel	$^{3}/_{8}$"		Exterior sheathing per Table R602.3(3) Interior sheathing per Table R602.3(1) or R602.3(2)	6" edges 12" field Varies by fastener

	CS-G [b,c] Continuously sheathed wood structural panel adjacent to garage openings	$^{3}/_{8}$"		See Method CS-WSP	See Method CS-WSP
	CS-PF Continuously sheathed portal frame	$^{7}/_{16}$"		See Section R602.10.6.4	See Section R602.10.6.4
	CS-SFB [d] Continuously sheathed structural fiberboard	$^{1}/_{2}$" or $^{25}/_{32}$" for maximum 16" stud spacing		1½" long x 0.12" dia. (for ½ " thick sheathing) $1^{3}/_{4}$" long x 0.12" dia. (for $^{25}/_{32}$" thick sheathing) galvanized roofing nails or 8d common (2½" long x0.131" dia.) nails	3" edges 6" field

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

a. Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D_0, D_1 and D_2.

b. Applies to panels next to garage door opening when supporting gable end wall or roof load only. May only be used on one wall of the garage. In Seismic Design Categories D_0, D_1, and D_2, roof covering dead load may not exceed 3 psf (0.14 kN/m^2).

c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R502.5(1). A full height clear opening shall not be permitted adjacent to a Method CS-G panel.

~~d. "Double sided" GB shall mean that a full length/full height panel of GB sheathing is applied to both sides of the stud wall. GB bracing panels are not required to be aligned back to back – they may be offset from each other so long as their length's comply with Table R602.10.5. Where all of the GB is on one side of the studs or where there is a combination of "double sided" GB and "single sided" GB, the single sided GB shall contribute half of its actual length towards the minimum required length (i.e. 96" of single sided GB is equivalent to 48" of double sided GB).~~

d. Method CS-SFB does not apply in Seismic Design Categories D_0, D_1 and D_2 and in areas where the wind speed exceeds 100 mph.

R602.10.4.1 Mixing methods. Mixing of bracing methods shall be permitted as follows:

1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
2. Mixing intermittent bracing methods from braced wall line to braced wall line within a story shall be permitted. Within Seismic Design Categories A, B and C or in regions where the basic wind speed is less than or equal to 100 mph, mixing of intermittent bracing and continuous sheathing methods from braced wall line to braced wall line within a story shall be permitted.
3. Mixing intermittent bracing methods along a braced wall line shall be permitted in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest value of all intermittent bracing methods used.
4. Mixing of continuous sheathing methods CS-WSP, CS-G and CS-PF along a braced wall line shall be permitted.
5. In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing of intermittent bracing methods along the interior portion of a braced wall line with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same braced wall line shall be permitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3) as adjusted by Tables R602.10.3(2) and R602.10.3(4), respectively. The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the braced wall line.

R602.10.4.2 Continuous sheathing methods. Continuous sheathing methods require structural panel sheathing to be used on all sheathable surfaces on one side of a braced wall line including areas above and below openings and gable end walls and shall meet the requirements of Section R602.10.7.

R602.10.4.3 Braced wall panel interior finish material. Braced wall panels shall have gypsum wall board installed on the side of the wall opposite the bracing material. Gypsum wall board shall be not less than ½ inch (12.7 mm) in thickness and be fastened with nails or screws in accordance with Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum wall board. Spacing of fasteners at panel edges for gypsum wall board opposite Method LIB bracing shall not exceed 8 inches (203 mm). Interior finish material shall not be glued in Seismic Design Categories D_0, D_1 and D_2.

Exceptions:

1. Interior finish material is not required opposite wall panels that are braced in accordance with Method GB, ABW, PFH, PFG and CS-PF, unless otherwise required by Section R302.6.
2. An approved interior finish material with an in-plane shear resistance equivalent to gypsum board shall be permitted to be substituted, unless otherwise required by Section R302.6.
3. Except for Method LIB, gypsum wall board is permitted to be omitted provided the required length of bracing in Tables R602.10.3(1) and R602.10.3(3) is multiplied by the appropriate adjustment factor in Tables R602.10.3(2) and R602.10.3(4) respectively, unless otherwise required by Section R302.6.

R602.10.5 Minimum length of a braced wall panel. The minimum length of a braced wall panel shall comply with Table R602.10.5. For Methods CS-WSP and CS-SFB, the minimum panel length shall be based on the adjacent clear opening height in accordance with Table R602.10.5 and Figure R602.10.5. When a panel has an opening on either side of differing heights, the taller opening height shall be used to determine the panel length.

R602.10.5.1 Contributing length. For purposes of computing the required length of bracing in Table R602.10.3(1) and R602.10.3(3), the contributing length of each braced wall panel shall be as specified in Table R602.10.5.

TABLE R602.10.5
MINIMUM LENGTH OF BRACED WALL PANELS

METHOD (See Table R602.10.4)		**MINIMUM LENGTH [a] (in)**					**CONTRIBUTING LENGTH (in)**
		Wall Height					
		8 ft	**9 ft**	**10 ft**	**11 ft**	**12 ft**	
DWG, WSP, SFB, PBS, PCP, HPS~~, GB [d]~~		48	48	48	53	58	Actual [b]
GB		48	48	48	53	58	Double sided = Actual Single sided = 0.5 x Actual
LIB		55	62	69	NP	NP	Actual [b]
ABW	SDC A, B and C, wind speed < 110 mph	28	32	34	38	42	48
ABW	SDC D_0, D_1 and D_2, wind speed < 110 mph	32	32	34	NP	NP	48
PFH	Supporting roof only	16	16	16	18 [~~d~~c]	20 [~~d~~c]	48
PFH	Supporting one story and roof	24	24	24	27 [~~d~~c]	29 [~~d~~c]	48
PFG		24	27	30	33 [~~e~~d]	36 [~~e~~d]	1.5 x Actual [b]
CS-G		24	27	30	33	36	Actual [b]
CS-PF		16	18	20	22 [~~f~~e]	24 [~~f~~e]	Actual [b]
CS-WSP, CS-SFB	Adjacent clear opening height (in)						
	≤ 64	24	27	30	33	36	Actual [b]
	68	26	27	30	33	36	
	72	27	27	30	33	36	
	76	30	29	30	33	36	
	80	32	30	30	33	36	
	84	35	32	32	33	36	
	88	38	35	33	33	36	
	92	43	37	35	35	36	
	96	48	41	38	36	36	
	100		44	40	38	38	
	104		49	43	40	39	
	108		54	46	43	41	
	112			50	45	43	
	116			55	48	45	
	120			60	52	48	
	124				56	51	
	128				61	54	
	132				66	58	
	136					62	
	140					66	
	144					72	

For SI: 1 inch = 25.4 mm
NP = Not permitted

a. Linear interpolation shall be permitted.
b. Use the actual length when it is greater than or equal to the minimum length.
~~c. As specified in Table R602.10.4, Method GB is intended to be double sided. Where all of the GB is on one side of the studs or where there is a combination of "double sided" GB and "single sided" GB, the single sided GB shall contribute half of its actual length towards the minimum required length (i.e. 96" of single sided GB is equivalent to 48" of double sided GB).~~
~~d~~c. Maximum header height for PFH is 10' per Figure R602.10.6.2, but wall height may be increased to 12' with pony wall.
~~e~~d. Maximum opening height for PFG is 10' per Figure R602.10.6.3, but wall height may be increased to 12' with pony wall.
~~f~~e. Maximum opening height for CS-PF is 10' per Figure R602.10.6.4, but wall height may be increased to 12' with pony wall

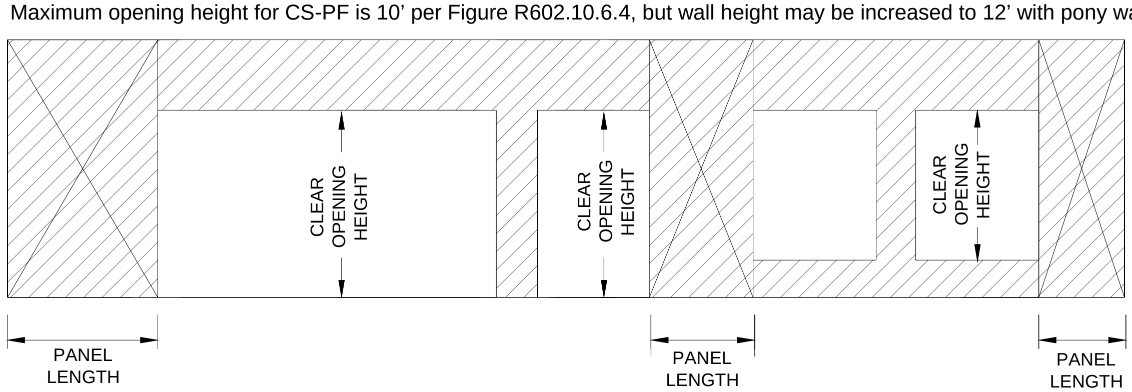


FIGURE R602.10.5
BRACED WALL PANELS WITH CONTINUOUS SHEATHING

R602.10.5.2 Partial credit. For Methods DWB, WSP, SFB, PBS, PCP and HPS in Seismic Design Categories A, B and C, panels between 36 inches and 48 inches in length shall be considered a braced wall panel and shall be permitted to partially contribute towards the required length of bracing in Table R602.10.3(1) and R602.10.3(3), and the contributing length shall be determined from Table R602.10.5.2.

TABLE R602.10.5.2
PARTIAL CREDIT FOR BRACED WALL PANELS LESS THAN 48 INCHES IN ACTUAL LENGTH

Actual Length of Braced Wall Panel (in)	**Contributing Length of Braced Wall Panel (in)** [a]	
	8 ft Wall Height	9 ft Wall Height
48	48	48
42	36	36
36	27	N/A

For SI: 1 inch = 25.4mm
a Linear interpolation shall be permitted.

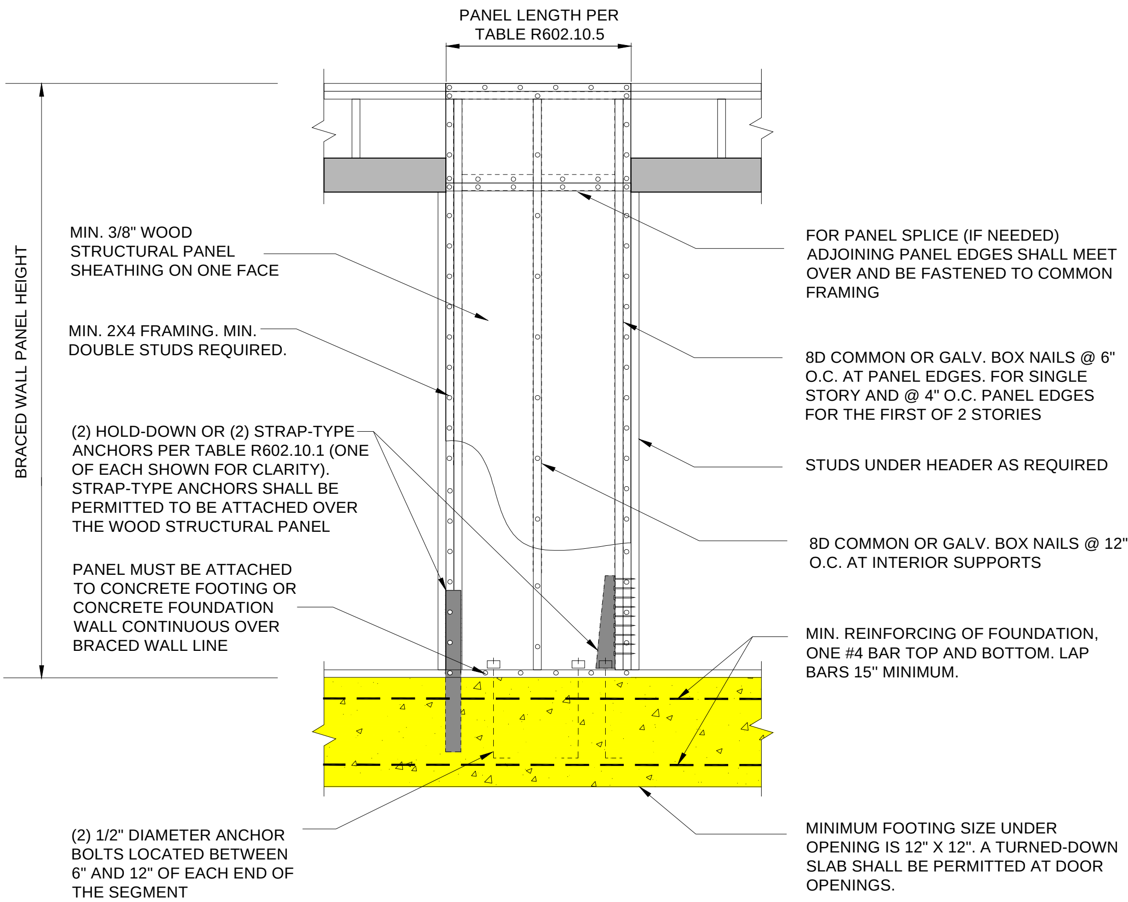
R602.10.6 Construction of Methods ABW, PFH, PFG and CS-PF. Methods ABW, PFH, PFG and CS-PF shall be constructed as specified in Sections R602.10.6.1 through R602.10.6.4.

R602.10.6.1 Method ABW: Alternate braced wall panels. Method ABW braced wall panels shall be constructed in accordance with Figure R602.10.6.1. The hold-down force shall be in accordance with Table R602.10.6.1.

TABLE R602.10.6.1
MINIMUM HOLD-DOWN FORCES FOR METHOD ABW BRACED WALL PANELS

SEISMIC DESIGN CATEGORY AND WIND SPEED	**SUPPORTING/STORY**	**HOLD DOWN FORCE (lb)**				
		Height of Braced Wall Panel				
		8 ft	**9 ft**	**10 ft**	**11 ft**	**12 ft**
SDC A, B and C Wind speed < 110 mph	One story	1800	1800	1800	2000	2200
	First of two story	3000	3000	3000	3300	3600
SDC D_o, D_1 and D_2 Wind speed < 110 mph	One story	1800	1800	1800	NP [a]	NP [a]
	First of two story	3000	3000	3000	NP [a]	NP [a]

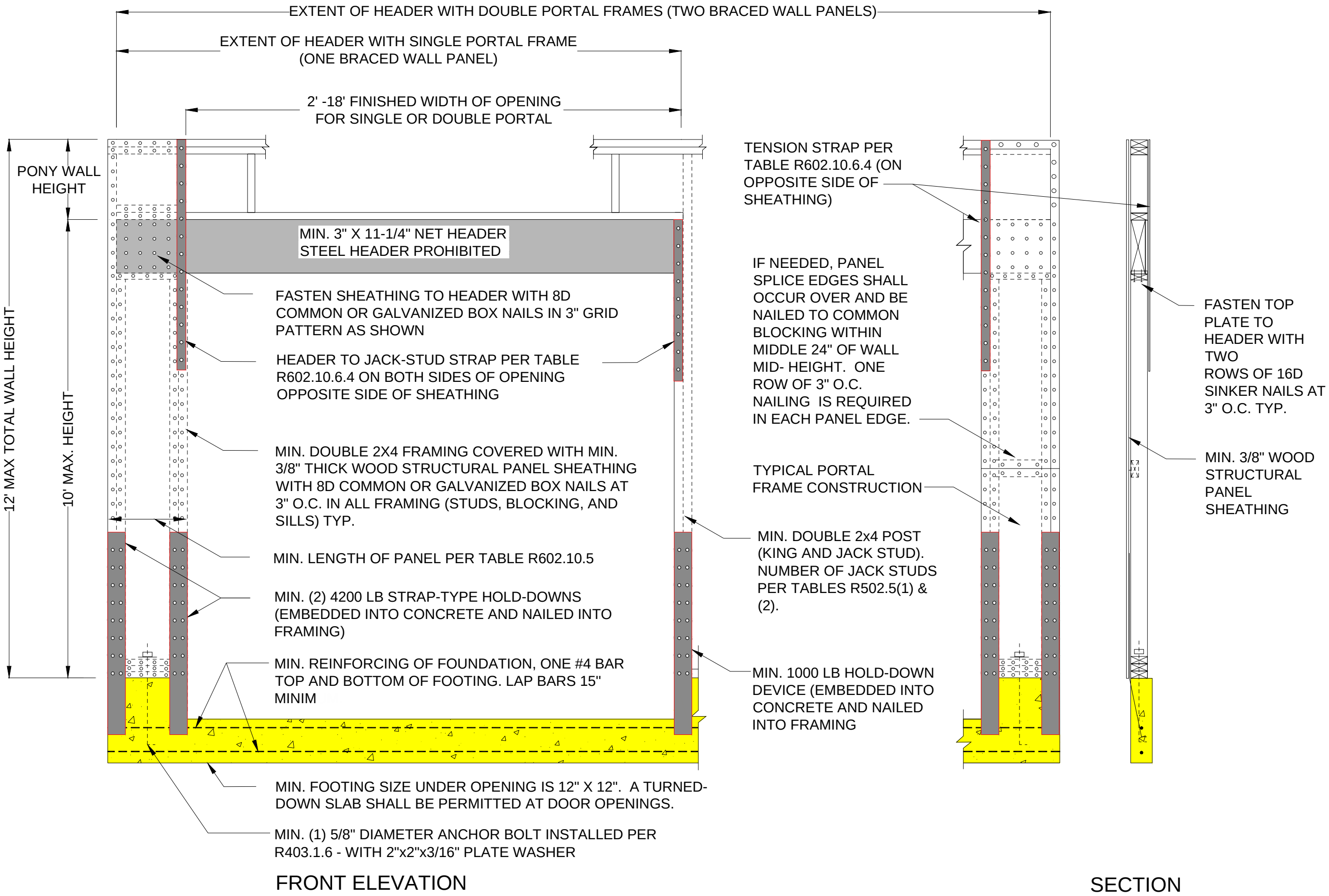
For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N
a. NP = Not Permitted.



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

FIGURE R602.10.6.1
METHOD ABW: ALTERNATE BRACED WALL PANEL

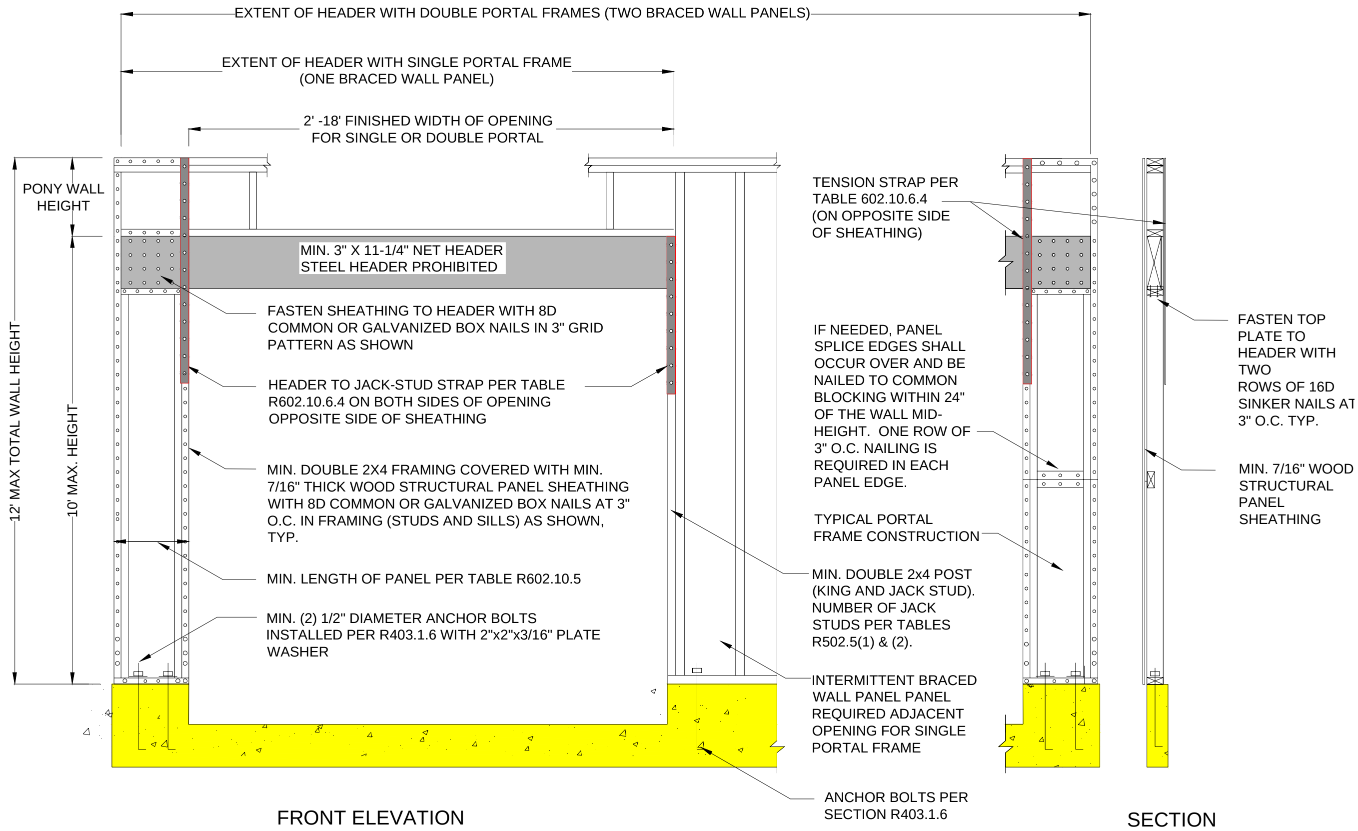
R602.10.6.2 Method PFH: Portal frame with hold-downs. Method PFH braced wall panels shall be constructed in accordance with Figure R602.10.6.2.



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

FIGURE R602.10.6.2
METHOD PFH: PORTAL FRAME WITH HOLD-DOWNS

R602.10.6.3 Method PFG: Portal frame at garage door openings in Seismic Design Categories A, B and C. Where supporting a roof or one story and a roof, a Method PFG braced wall panel constructed in accordance with Figure R602.10.6.3 ~~is~~ shall be permitted on either side of garage door openings.



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

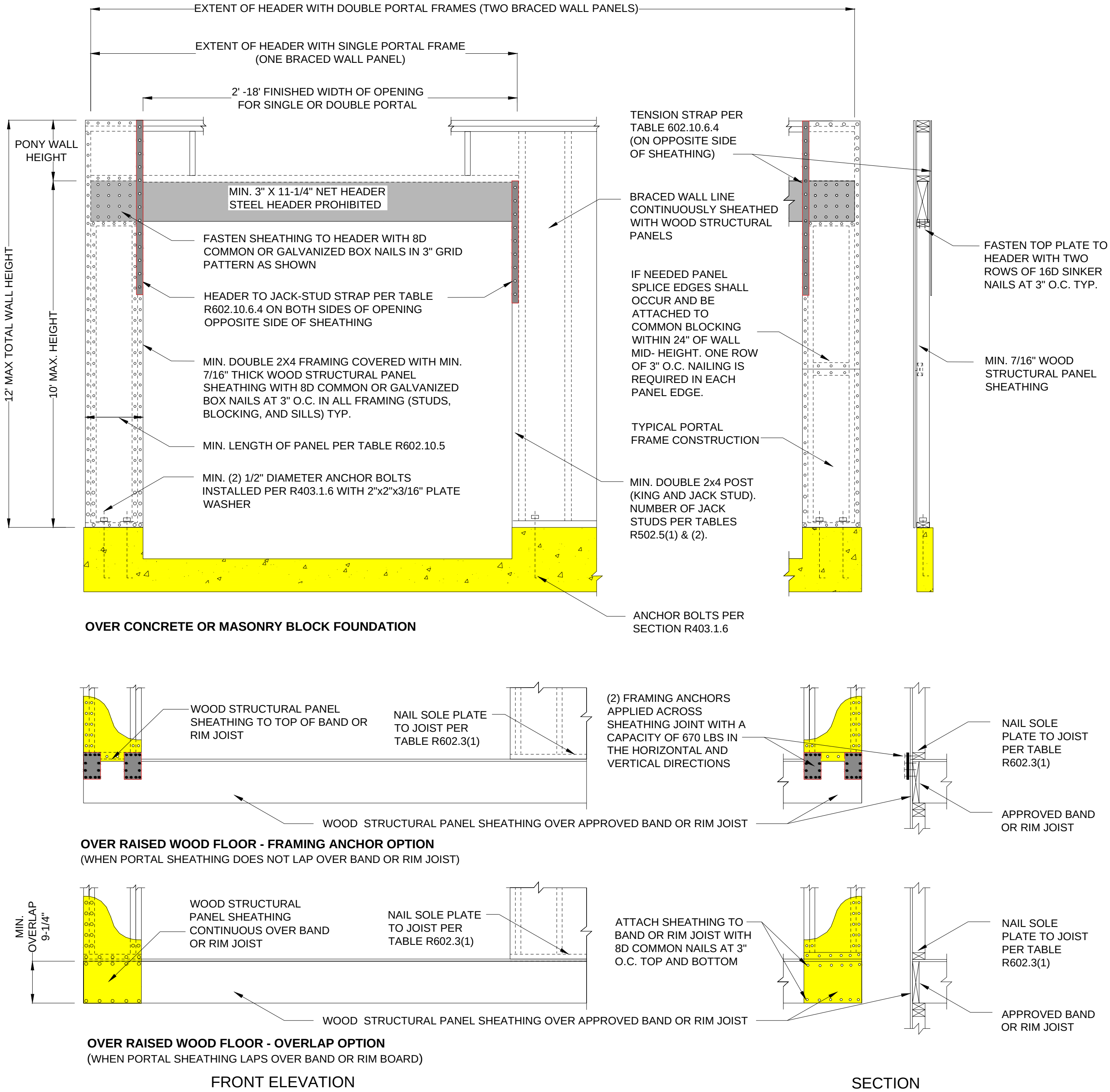
FIGURE R602.10.6.3
METHOD PFG: PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C

R602.10.6.4 Method CS-PF: Continuously sheathed portal frame. Continuously sheathed portal frame braced wall panels shall be constructed in accordance with Figure R602.10.6.4 and Table R602.10.6.4. The number of continuously sheathed portal frame panels in a single braced wall line shall not exceed four.

TABLE R602.10.6.4
TENSION STRAP CAPACITY REQUIRED FOR RESISTING WIND PRESSURES PERPENDICULAR TO METHOD PFH, PFG AND CS-PF BRACED WALL PANELS

MINIMUM WALL STUD FRAMING NOMINAL SIZE AND GRADE	MAXIMUM PONY WALL HEIGHT (ft)	MAXIMUM TOTAL WALL HEIGHT (ft)	MAXIMUM OPENING WIDTH (ft)	TENSION STRAP CAPACITY REQUIRED (lb)[a, b]					
				Basic Wind Speed (mph)					
				85	90	100	85	90	100
				Exposure B			Exposure C		
2x4 No. 2 Grade	0	10	18	1000	1000	1000	1000	1000	1000
	1	10	9	1000	1000	1000	1000	1000	1275
			16	1000	1000	1750	1800	2325	3500
			18	1000	1200	2100	2175	2725	DR
	2	10	9	1000	1000	1025	1075	1550	2500
			16	1525	2025	3125	3200	3900	DR
			18	1875	2400	3575	3700	DR	DR
	2	12	9	1000	1200	2075	2125	2750	4000
			16	2600	3200	DR	DR	DR	DR
			18	3175	3850	DR	DR	DR	DR
	4	12	9	1775	2350	3500	3550	DR	DR
			16	4175	DR	DR	DR	DR	DR
2x6 Stud Grade	2	12	9	1000	1000	1325	1375	1750	2550
			16	1650	2050	2925	3000	3550	DR
			18	2025	2450	3425	3500	4100	DR
	4	12	9	1125	1500	2225	2275	2775	3800
			16	2650	3150	DR	DR	DR	DR
			18	3125	3675	DR	DR	DR	DR

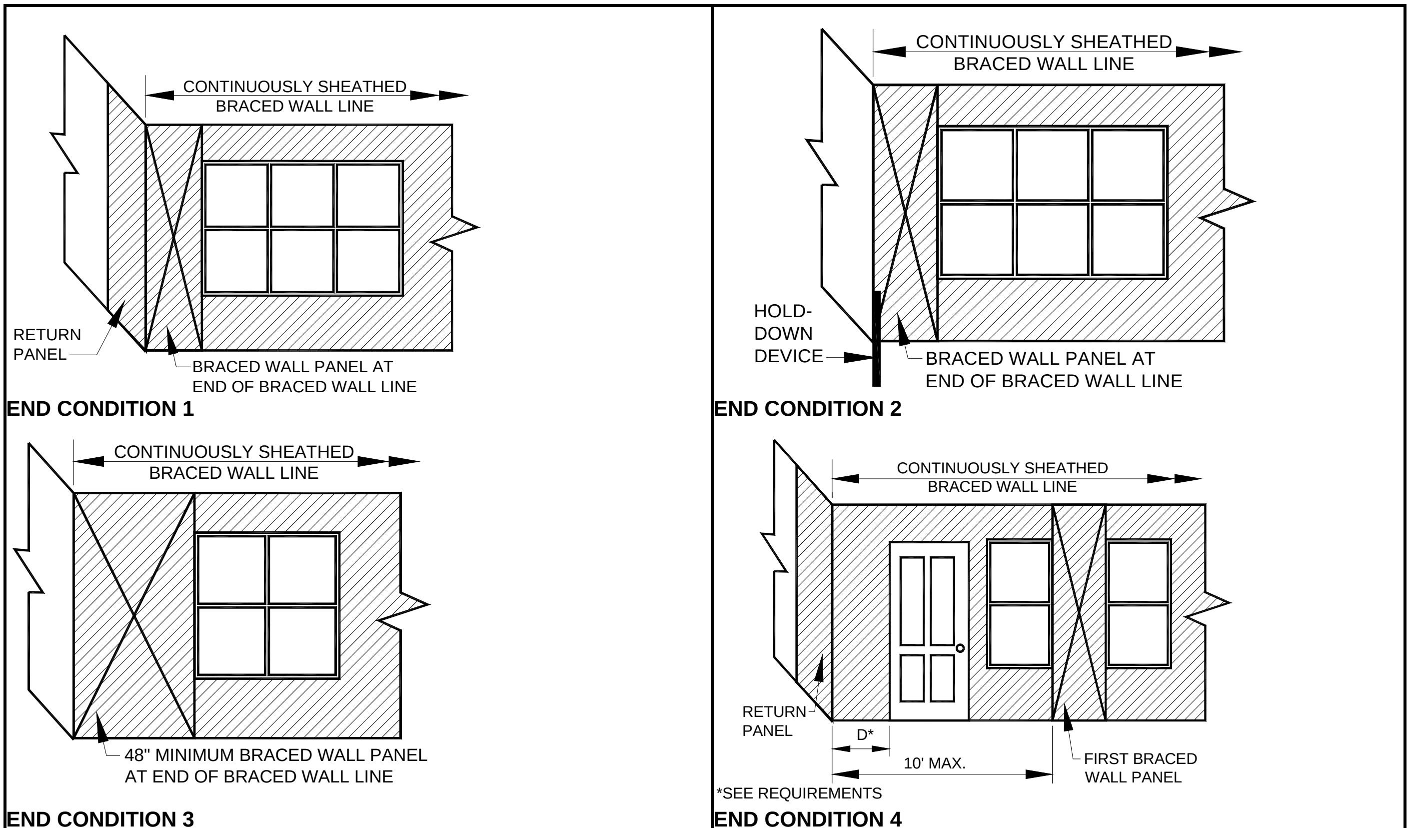
For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N
a. DR = design required
b. Strap shall be installed in accordance with manufacturer's recommendations.

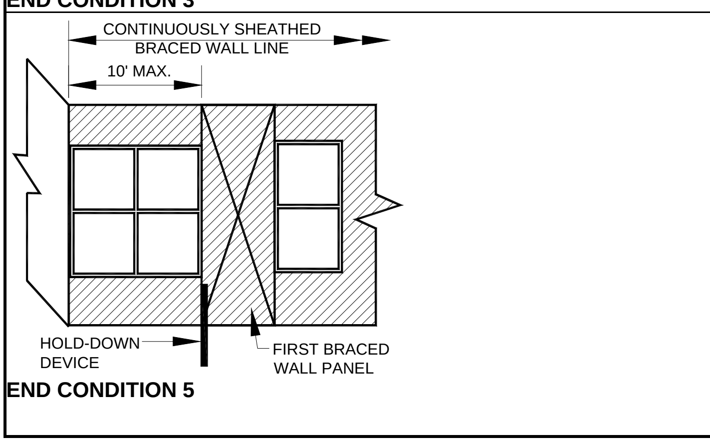


For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N

FIGURE R602.10.6.4
METHOD CS-PF: CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

R602.10.7 Ends of braced wall lines with continuous sheathing. Each end of a braced wall line with continuous sheathing shall have one of the conditions shown in Figure R602.10.7.





REQUIREMENTS

Return panel: 24" for braced wall lines sheathed with wood structural panels
32" for braced wall lines sheathed with structural fiberboard

Distance D: 24" for braced wall lines sheathed with wood structural panels
32" for braced wall lines sheathed with structural fiberboard

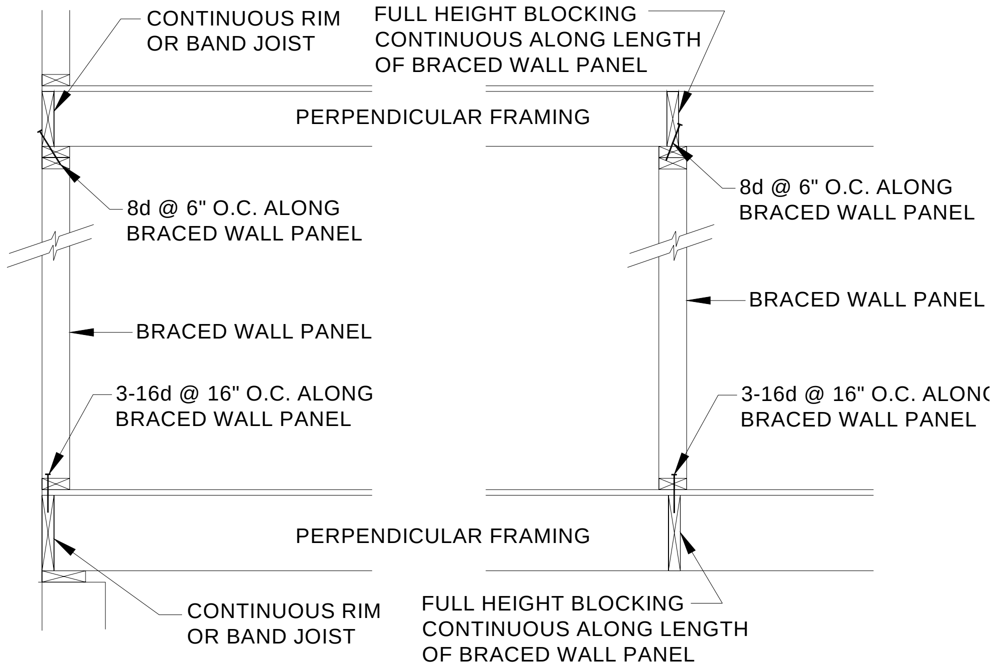
Hold-down device: 800 lbs capacity fastened to the edge of the braced wall panel closest to the corner and to the foundation or floor framing below

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N

FIGURE R602.10.7
END CONDITIONS FOR BRACED WALL LINES WITH CONTINUOUS SHEATHING

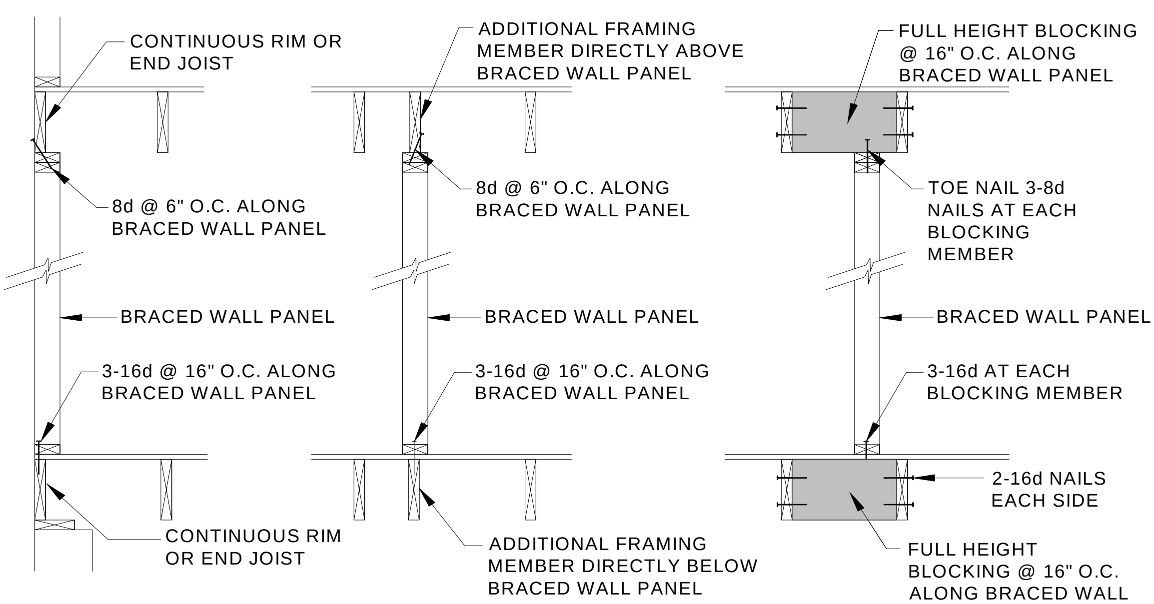
R602.10.8 Braced wall panel connections. Braced wall panels shall be connected to floor framing or foundations as follows:

1. Where joists are perpendicular to a braced wall panel above or below, a rim joist, band joist or blocking shall be provided along the entire length of the braced wall panel in accordance with Figure R602.10.8(1). Fastening of top and bottom wall plates to framing, rim joist, band joist and/or blocking shall be in accordance with Table R602.3(1).
2. Where joists are parallel to a braced wall panel above or below, a rim joist, end joist or other parallel framing member shall be provided directly above and below the braced wall panel in accordance with Figure R602.10.8(2). Where a parallel framing member cannot be located directly above and below the panel, full-depth blocking at 16 inch (406 mm) spacing shall be provided between the parallel framing members to each side of the braced wall panel in accordance with Figure R602.10.8(2). Fastening of blocking and wall plates shall be in accordance with Table R602.3(1) and Figure R602.10.8(2).
3. Connections of braced wall panels to concrete or masonry shall be in accordance with Section R403.1.6.



For SI: 1 inch = 25.4 mm

FIGURE R602.10.8(1)
BRACED WALL PANEL CONNECTION WHEN
PERPENDICULAR TO FLOOR/CEILING FRAMING



For SI: 1 inch = 25.4 mm

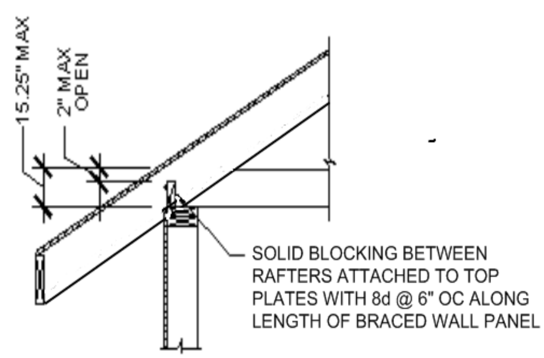
FIGURE R602.10.8(2)
BRACED WALL PANEL CONNECTION WHEN

PARALLEL TO FLOOR/CEILING FRAMING

R602.10.8.1 Braced wall panel connections for Seismic Design Categories D_0, D_1 and D_2. Braced wall panels shall be fastened to required foundations in accordance with Section R602.11.1, and top plate lap splices shall be face-nailed with at least eight 16d nails on each side of the splice.

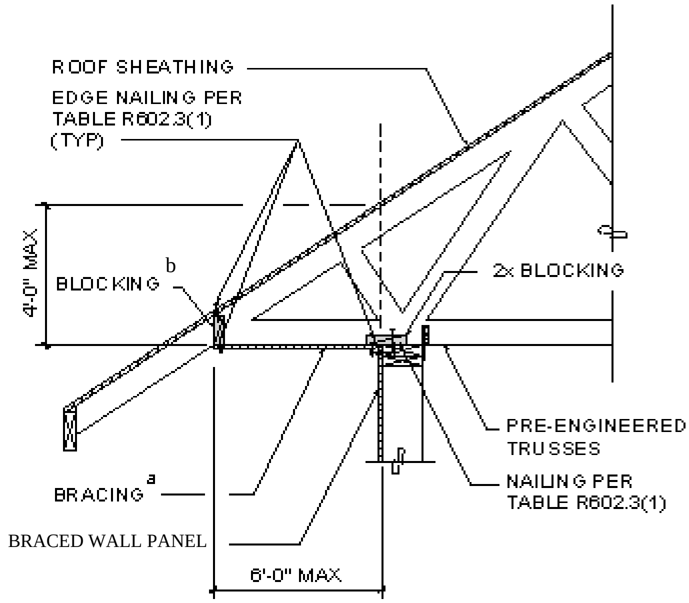
R602.10.8.2 Connections to roof framing. Exterior braced wall panels shall be connected to roof framing as follows.

1. Parallel rafters or roof trusses shall be attached to the top plates of braced wall panels in accordance with Table R602.3(1).
2. For Seismic Design Categories A, B and C and wind speeds less than 100 mph (45 m/s):
   2.1 Where the distance from the top of the rafters or roof trusses and perpendicular top plates is 9.25 inches (235 mm) or less, the rafters or roof trusses shall be connected to the top plates of braced wall panels in accordance with Table R602.3(1) and blocking need not be installed.
   2.2 Where the distance from the top of the rafters and perpendicular top plates is between 9.25 inches (235 mm) and 15.25 inches (387 mm) the rafters shall be connected to the top plates of braced wall panels with blocking in accordance with Figure R602.10.8.2(1) and attached in accordance with Table R602.3(1).
   2.3 Where the distance from the top of the roof trusses and perpendicular top plates is between 9.25 inches (235 mm) and 15.25 inches (387 mm) the roof trusses shall be connected to the top plates of braced wall panels with blocking in accordance with Table R602.3(1).
3. For Seismic Design Categories D_0, D_1 and D_2 or wind speeds of 100 mph (45 m/s) or greater, where the distance between the top of rafters or roof trusses and perpendicular top plates is 15.25 inches (387 mm) or less, rafters or roof trusses shall be connected to the top plates of braced wall panels with blocking in accordance with Figure R602.10.8.2(1) and attached in accordance with Table R602.3(1).
4. For all Seismic Design Categories and wind speeds, where the distance between the top of rafters or roof trusses and perpendicular top plates exceeds 15.25 inches (387 mm), perpendicular rafters or roof trusses shall be connected to the top plates of braced wall panels in accordance with one of the following methods
   4.1. In accordance with Figure R602.10.8.2(2),
   4.2. In accordance with Figure R602.10.8.2(3),
   4.3. With full height engineered blocking panels designed for values listed in American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM). Both the roof and floor sheathing shall be attached to the blocking panels in accordance with Table R602.3(1).
   4.4. Designed in accordance with accepted engineering methods.
5. Lateral support for the rafters and ceiling joists shall be provided in accordance with Section R802.8. 6. Lateral support for trusses shall be provided in accordance with Section R802.10.3.



For SI: 1 inch = 25.4 mm

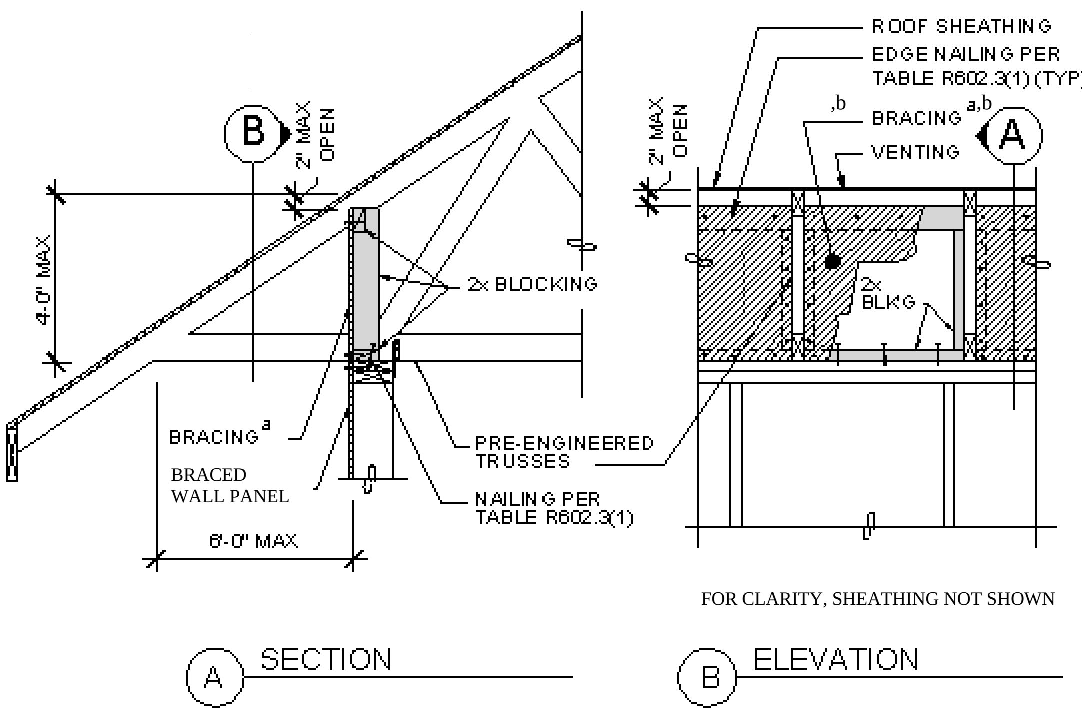
FIGURE R602.10.8.2(1)
BRACED WALL PANEL CONNECTION TO PERPENDICULAR RAFTERS



For SI: 1 inch = 25.4 mm

a. Methods of bracing shall be as described in Section R602.10.2 method DWB, WSP, SFB, GB, PBS, PCP OR HPS
b. Provide ventilation (not shown) per Section R806.

FIGURE R602.10.8.2(2)
BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES



For SI: 1 inch = 25.4 mm

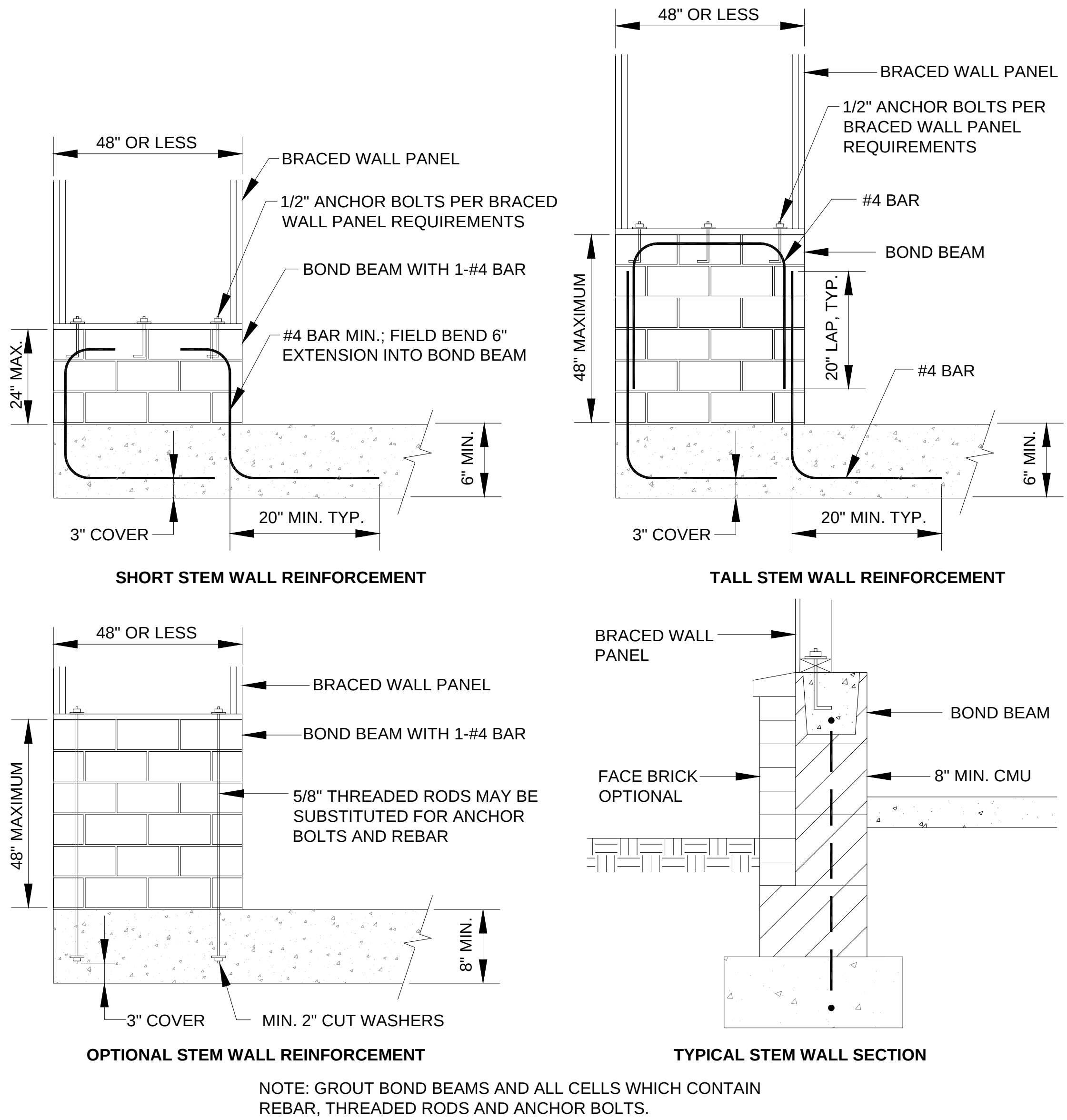
a. Methods of bracing shall be as described in Section R602.10.2 method DWB, WSP, SFB, GB, PBS, PCP OR HPS
b. Provide ventilation (not shown) per Section R806.

FIGURE R602.10.8.2(3)
BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

R602.10.9 Braced wall panel support. Braced wall panel support shall be provided as follows:

1. Cantilevered floor joists complying with Section R502.3.3 shall be permitted to support braced wall panels.
2. Elevated post or pier foundations supporting braced wall panels shall be designed in accordance with accepted engineering practice.

3. Masonry stem walls with a length of 48 inches (1220 mm) or less supporting braced wall panels shall be reinforced in accordance with Figure R602.10.9. Masonry stem walls with a length greater than 48 inches (1220 mm) supporting braced wall panels shall be constructed in accordance with Section R403.1 Methods ABW and PFH shall not be permitted to attach to masonry stem walls.
4. Concrete stem walls with a length of 48" or less, greater than 12 inches tall and less than 6 inches thick shall have reinforcement sized and located in accordance with Figure R602.10.9.



For SI: 1 in=305 mm

FIGURE R602.10.9
MASONRY STEM WALLS SUPPORTING BRACED WALL PANELS

R602.10.9.1 Braced wall panel support for Seismic Design Category D_2. In one-story buildings located in Seismic Design Category D_2, braced wall panels shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). In two story buildings located in Seismic Design Category $D_{2,}$ all braced wall panels shall be supported on continuous foundations.

Exception: Two-story buildings shall be permitted to have interior braced wall panels supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:

1. The height of cripple walls does not exceed 4 feet (1219 mm).
2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

R602.10.10 Panel joints. All vertical joints of panel sheathing shall occur over, and be fastened to common studs. Horizontal joints in braced wall panels shall occur over, and be fastened to common blocking of a minimum 1-1/2 inch (38 mm) thickness.

Exceptions:

1. Blocking at horizontal joints shall not be required in wall segments that are not counted as braced wall panels.
2. Where the length of bracing provided is at least twice the required length of bracing from Tables R602.10.3(1) and R602.10.3(3) blocking at horizontal joints shall not be required in braced wall panels constructed using Methods WSP, SFB, GB, PBS or HPS.
3. When Method GB panels are installed horizontally, blocking of horizontal joints is not required.

R602.10.11 Cripple wall bracing. In Seismic Design Categories other than D_2, cripple walls shall be braced with a length and type of bracing as required for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3) with the following modifications for cripple wall bracing:

1. The length of bracing as determined from Tables R602.10.3(1) and R602.10.3(3) shall be multiplied by a factor of 1.15, and
2. ~~The wall panel spacing shall be decreased to 18 feet (5486 mm) instead of 20 feet (7620 mm)~~ The distance between adjacent edges of braced wall panels shall be reduced from 20 feet (6096 mm) to 14 feet (4267 mm).

R602.10.11.1 Cripple wall bracing in Seismic Design Categories D_0, D_1 and D_2. In addition to the requirements of Section R602.10.11, where braced wall lines at interior walls occur without a continuous foundation below, the length of parallel exterior cripple wall bracing shall be one and one-half times the length required by Table R602.10.3(3). Where cripple walls braced using Method WSP cannot provide this additional length, the capacity of the sheathing shall be increased by reducing the spacing of fasteners along the perimeter of each piece of sheathing to 4 inches (102 mm) on center.

In Seismic Design Category D_2, cripple walls shall be braced in accordance with Tables R602.10.3(3) and R602.10.3(4).

R602.10.11.2 Redesignation of cripple walls. In any Seismic Design Category, cripple walls shall be permitted to be redesignated as the first story walls for purposes of determining wall bracing requirements. If the cripple walls are redesignated, the stories above the redesignated story shall be counted as the second and third stories respectively.

Commenter's Reason: The proposed amendments sharpen and clarify the intent of the original RB105 by moving provisions to more accessible sections and strengthening language to avoid misinterpretations. Other housekeeping included replacing story location figures, moving a requirement in footnotes to a more prominently location providing, clarifying nail/staple lengths and diameters and correcting typographical errors.

Public Comment 2:

Randall Shackelford, Simpson Strong-Tie Company requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R602.10.1.2 Offsets along a braced wall line. All exterior walls parallel to a braced wall line shall be ~~permitted to~~ offset ~~up to~~ not more than 4 feet (1219 mm) from the designated braced wall line location as shown Figure R602.10.1.1. Interior walls used as bracing shall be ~~permitted to~~ offset ~~up to~~ not more than 4 feet (1219 mm) from a braced wall line through the interior of the building as shown in Figure R602.10.1.1.

R602.10.1.3 Spacing of braced wall lines. ~~There shall be a minimum of two braced wall lines in both the longitudinal and transverse direction as shown in Figure R602.10.1.1.~~ ~~Intermediate braced wall lines through the interior of the building shall be permitted.~~ The spacing between parallel braced wall lines shall be in accordance with Table R602.10.1.3. Intermediate braced wall lines through the interior of the building shall be permitted.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This Public Comment clarifies that all exterior walls must be part of, or within 4 feet of, a braced wall line. This is to carry on the traditional wall bracing requirement that all exterior walls must be braced. The language is cleaned up to remove "permitted" language in favor of mandatory language.

When the first section is clarified to require all exterior walls to be part of a braced wall line, the first sentence of R602.10.1.3 is unnecessary, so it is deleted.

The text regarding braced wall lines at building interior is relocated to the last part of the paragraph because the primary purpose of this paragraph is to provide spacing requirements, so that should come first.

Public Comment 3:

Randall Shackelford, Simpson Strong-Tie Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R602.10 Wall bracing. Buildings shall be braced in accordance with this section. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1.

R602.10.1 Braced wall lines. For the purpose of determining the amount and location of bracing required in each story level of a building, braced wall lines shall be designated as straight lines ~~on~~ in the building plan placed in accordance with this section. All exterior walls of a building shall be part of a braced wall line.

R602.10.1.1 Length of a braced wall line. The length of a braced wall line shall be the distance between its ends. The end of a braced wall line shall be the intersection with a perpendicular braced wall line, ~~or~~ an angled braced wall line as permitted in Section R602.10.1.4 or an exterior wall. ~~In the absence of an intersecting braced wall line, the end shall be the farthest exterior wall of the building~~ as shown in Figure R602.10.1.1. The end of the braced wall line shall be chosen so that the maximum length results.

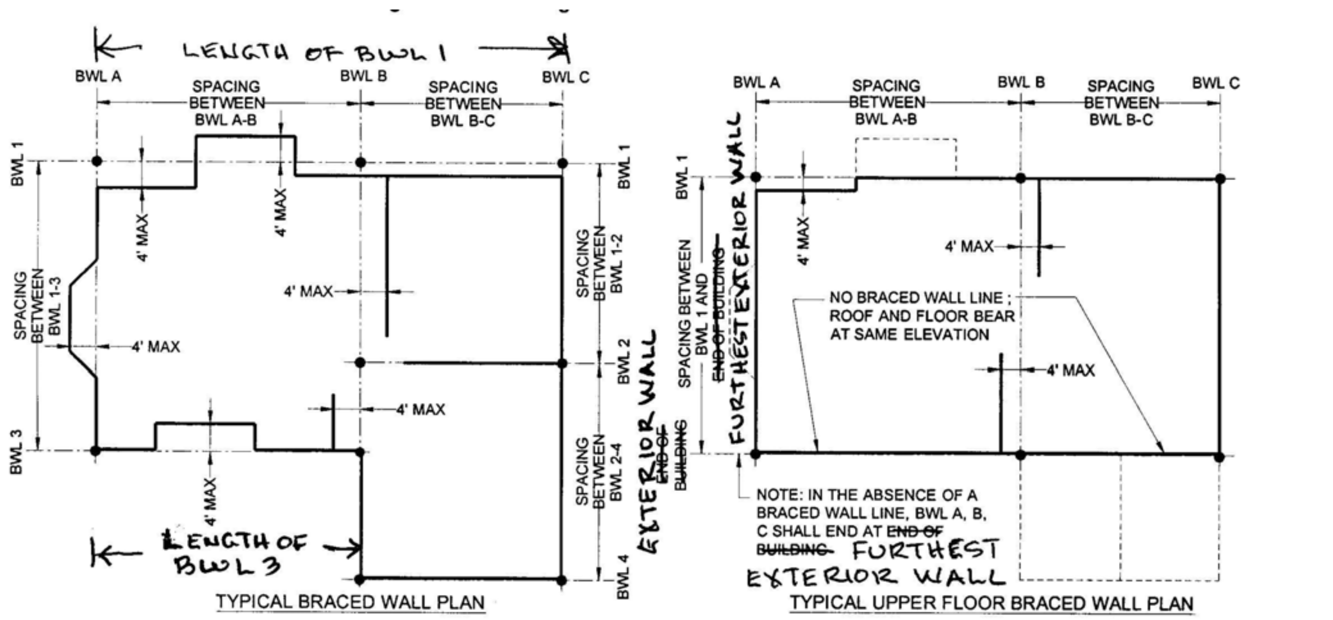


FIGURE R602.10.1.1
BRACED WALL LINES

R602.10.1.2 Offsets along a braced wall line. All exterior walls parallel to a braced wall line shall be permitted to offset up to 4 feet (1219 mm) from the designated braced wall line location as shown Figure R602.10.1.1. Interior walls used as bracing shall be permitted to offset up to 4 feet (1219 mm) from a braced wall line through the interior of the building as shown in Figure R602.10.1.1. <u>Walls that are offset in accordance with this section are permitted to count as a single braced wall line.</u>

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This Public Comment achieves 4 things.

1. It maintains the requirements from past wall bracing provisions that all exterior walls shall be braces. Somehow in the drafting of the new provisions, this explicit requirement has been lost. While it may be argued that R602.10.1.2 implies that exterior walls have to have a braced wall line within 4 feet, it does not come out and say that directly. This will clarify the wall bracing provisions.
2. It clarifies that the length of the braced wall line has to be chosen so that the maximum length results. The amount of seismic bracing is still based on the length of the braced wall line, so the length of the braced wall line has to be chosen correctly. This wording ensures that the user will not choose the length of an exterior braced wall line as the intersection with in interior braced wall line when the line actually continues to the end of the wall.
3. Figure R602.10.1.1 is clarified in several ways. First, this figure supposedly goes with Section R602.10.1.1, which describes the length of braced wall lines, but the figure does not say anything about the length of braced wall lines. Two dimensions are added to illustrate choosing the length of braced wall lines. Second, the wording "End of building" is changed to "Exterior Wall" and "Furthest Exterior Wall" to be consistent with the wording in the Section.
4. Language is added to the offset section to clarify that walls that meet the offset requirement are permitted to count as one wall. Otherwise, the user could count two walls with an offset of less than 8 feet as two single walls, when the intent is to count them as one wall.

Public Comment 4:

Maureen Traxler, City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

<u>TABLE R602.10.3(4)</u>
<u>SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING</u>

ADJUSTMENT BASED ON:	STORY/ SUPPORTING	CONDITION	ADJUSTMENT FACTOR a,b (Multiply length from Table R602.10.3(1) by this factor)	APPLICABLE METHODS
Story height (Section 301.3)	Any story	≤ 10 ft	1.0	All methods
		>10 ft <u>and</u> ≤ 12 ft	1.2	
Braced wall line spacing, townhouses in SDC C	Any story	≤ 35 ft	1	
		>35 ft <u>and</u> ≤ 50 ft	1.43	

Braced wall line spacing, in SDC D0, D1, D2[c]	Any story	>25 ft and ≤ 30 ft	1.2	
		>30 ft and ≤ 35 ft	1.4	
Wall dead load	Any story	> 8 ft and < 15 ft	1	
		<8 psf	0.85	
Roof/ceiling dead load for wall supporting	Roof only or roof plus one or two stories	<15 psf	1.0	
	Roof only	>15 psf and ≤ 25 psf	1.2	
	Roof plus one or two stories	>15 psf and ≤ 25 psf	1.1	
Walls with stone or masonry veneer	Any story	See Section R703.7		
Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Editorial clarification to show lower and upper limits must both be satisfied.

Final Action: AS AM AMPC____ D

RB106-09/10

R602.9, Table R602.10.1.2(2), R602.10.9, R602.10.9.1, R602.10.9.2, R602.10.9.3, R602.11.2

Proposed Change as Submitted

Proponent: Chuck Bajnai, Chesterfield County, VA, Chairman, ICC Ad-Hoc Committee on Wall Bracing

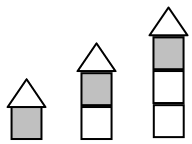
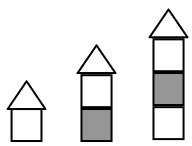
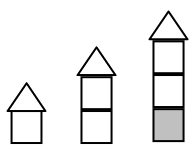
1. Revise as follows:

R602.9 Cripple walls. Foundation cripple walls shall be framed of studs not smaller than the studding above. When exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional *story*.

Cripple walls with a stud height less than 14 inches (356 mm) shall be continuously sheathed on ~~at least~~ one side with ~~a~~ wood structural panels ~~that is~~ fastened to both the top and bottom plates in accordance with Table R602.3(1), or the cripple walls shall be constructed of solid blocking.

All cripple walls shall be supported on continuous foundations.

TABLE R602.10.1.2(2)[a, b, c]
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY (AS A FUNCTION OF BRACED WALL LINE LENGTH)

SOIL CLASS D[a] WALL HEIGHT = 10 FT 10 PSF FLOOR DEAD LOAD 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING ≤ 25 FT			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE			
SEISMIC DESIGN CATEGORY (SDC)	**STORY LOCATION**	**BRACED WALL LINE LENGTH**	**METHOD LIB**	**METHODS DWB, SFB, GB, PBS, PCP, HPS**	**METHOD WSP**	**CONT. SHEATHING**
SDC D2		10	NP	4.0	2.5	2.1
		20	NP	8.0	5.0	4.3
		30	NP	12.0	7.5	6.4
		40	NP	16.0	10.0	8.5
		50	NP	20.0	12.5	10.6
		10	NP	7.5	5.5	4.7
		20	NP	15.0	11.0	9.4
		30	NP	22.5	16.5	14.0
		40	NP	30.0	22.0	18.7
		50	NP	37.5	27.5	23.4
		10	NP	NP	NP	NP
		20	NP	NP	NP	NP
		30	NP	NP	NP	NP
		40	NP	NP	NP	NP
		50	NP	NP	NP	NP

SOIL CLASS D[a] WALL HEIGHT = 10 FT 10 PSF FLOOR DEAD LOAD 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING ≤ 25 FT			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE			
SEISMIC DESIGN CATEGORY (SDC)	**STORY LOCATION**	**BRACED WALL LINE LENGTH**	**METHOD LIB**	**METHODS DWB, SFB, GB, PBS, PCP, HPS**	**METHOD WSP**	**CONT. SHEATHING**
SDC D2	Cripple wall below one- or two-story dwelling	10	NP	NP	7.5	6.4
		20	NP	NP	15.0	12.8
		30	NP	NP	22.5	19.1
		40	NP	NP	30.0	25.5
		50	NP	NP	37.5	31.9

(Portions of table not shown remain unchanged)

R602.10.9 Cripple wall bracing. ~~In Seismic Design Categories other than D2, cripple walls shall be braced with a length and type of bracing as required for the wall above in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2) with the following modifications for cripple wall bracing:~~ Cripple walls shall be constructed in accordance with Section R602.9 and braced in accordance with this section. Cripple walls shall be braced with the length and method of bracing used for the wall above in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2), except that the length of cripple wall bracing shall be multiplied by a factor of 1.15.

1. ~~The length of bracing as determined from Tables R602.10.1.2(1) and R602.10.1.2(2) shall be multiplied by a factor of 1.15, and~~
2. ~~The wall panel spacing shall be decreased to 18 feet (5486 mm) instead of 25 feet (7620 mm).~~

2. Delete and substitute as follows:

~~**R602.10.9.1 Cripple wall bracing in Seismic Design Categories D0, D1 and D2.** In addition to the requirements of Section R602.10.9, where *braced wall lines* at interior walls occur without a continuous foundation below, the length of parallel exterior cripple wall bracing shall be 11/2 times the length required by Tables R602.10.1.2(1) and R602.10.1.2(2). Where cripple walls braced using Method WSP of Section R602.10.2 cannot provide this additional length, the capacity of the sheathing shall be increased by reducing the spacing of fasteners along the perimeter of each piece of sheathing to 4 inches (102 mm) on center. In Seismic Design Category D2, cripple walls shall be braced in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2).~~

R602.10.9.1 Cripple wall bracing for Seismic Design Categories D_0, D_1 and townhouses in Seismic Design Category C. In addition to the requirements in Section R602.10.9, braced wall panels for cripple walls shall be located no more than 18 feet (5486 mm) on center along a braced wall line.

Where braced wall lines at interior walls are not supported on a continuous foundation below, the adjacent parallel cripple walls, where provided, shall be braced with Method WSP per Section R602.10.2 or Method CS-WSP per Section R602.10.4. The length of bracing required per Table R602.10.1.2(2) for the cripple walls shall be multiplied by 1.5. Where the cripple walls do not have sufficient length to provide the required bracing, the spacing of panel edge fasteners shall be reduced to 4 inches (102 mm) on center and the required bracing length adjusted by 0.7. If the required length can still not be provided, the cripple wall shall be designed in accordance with accepted engineering practice.

R602.10.9.2 Cripple wall bracing for Seismic Design Category D_2. In Seismic Design Category D_2, cripple walls shall be braced in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2).

3. Revise as follows:

R602.10.9.~~2~~3 Redesignation of cripple walls. ~~In any Seismic Design Category,~~ Where all cripple wall segments along a braced wall line do not exceed 48 inches in height, the cripple walls shall be permitted to be redesignated as ~~the~~ a first *story* wall~~s~~ for purposes of determining wall bracing requirements. Where any cripple wall segment in a braced wall line exceeds 48 inches in height, the entire cripple wall shall be counted as an additional story. If the cripple walls are redesignated, the stories above the redesignated *story* shall be counted as the second and third stories, respectively.

R602.11.2 Stepped foundations in Seismic Design Categories D_0, D_1 and D_2. In all buildings located in Seismic Design Categories D_0, D_1 or D_2, where the height of a required *braced wall line* that extends from foundation to floor above varies more than 4 feet (1219 mm), the *braced wall line* shall be constructed in accordance with the following:

1. Where the lowest floor framing rests directly on a sill bolted to a foundation not less than 8 feet (2440 mm) in length along a line of bracing, the line shall be considered as braced. The double plate of the cripple stud wall beyond the segment of footing that extends to the lowest framed floor shall be spliced by extending the upper top plate a minimum of 4 feet (1219 mm) along the foundation. Anchor bolts shall be located a maximum of 1 foot and 3 feet (305 and 914 mm) from the step in the foundation. See Figure R602.11.2.
2. Where cripple walls occur between the top of the foundation and the lowest floor framing, the bracing requirements of Sections R602.10.9, ~~and~~ R602.10.9.1 and R602.10.9.2 shall apply.
3. Where only the bottom of the foundation is stepped and the lowest floor framing rests directly on a sill bolted to the foundations, the requirements of Sections R403.1.6 and R602.11.1 shall apply.

Reason: This proposal clarifies and coordinates the basic cripple wall provisions in Section R602.9 and the cripple wall bracing provisions in Section R602.10.9.

The changes to Section R602.9 are largely editorial. The apparent intent of the provisions for cripple walls shorter than 14" is to require solid blocking or continuous sheathing. However, the current language calls for "a structural panel". Taken literally, that calls for one single sheet of plywood or OSB to be placed on the wall. The language is revised to clarify the apparent intent. Also, the continuous foundation requirement is moved to its own paragraph, as it clearly is intended to apply to all cripple walls, not just 14" and shorter ones.

The 75% minimum WSP bracing requirement for cripple walls in SDC D2 was mistakenly deleted from the reformatted seismic bracing table and is restored to Table R602.10.1.2(2). Consistent with the revisions last cycle, the percentage is converted into a foot length. The 15% reduction for continuous sheathing is also applied.

Section R602.10.9 and R609.10.9.1 are revised to divide the requirements into low-seismic (i.e. governed by wind) and high-seismic sections. The same calculation method and spreadsheet the ICC Ad-Hoc Wall Bracing Committee used to define the wind bracing table, was used to verify that the 1.15x multiplier is accurate for the wind bracing case as well as the seismic bracing case. The 18 foot braced wall panel spacing limit is applied only for high-seismic. There is no documentation of cripple wall failures in wind events, as there is for seismic events. Thus there is no technical justification to apply the additional limit for wind bracing.

The provisions regarding braced wall lines on interior walls not supported on continuous foundations are clarified. The 50% increase in bracing is applied to the adjacent cripple walls. It is noted these walls could potentially be either exterior or interior walls. Also, a complex house plan may have exterior cripple walls that are not adjacent to the unsupported wall (e.g. on an attached garage, den, or other feature) and do not inherit seismic loads from the unsupported wall. It would not then make sense to increase the bracing for those walls. Furthermore, it is clarified that the bracing for the adjacent cripple walls can be either Method WSP or Method CS-WSP. Finally, a specific factor is provided for the increased strength provided by the reduction to 4" edge nailing. Of course, for some plans, the reduction may still result in a required bracing length that exceeds the total length of the cripple wall. Obviously, an engineered solution would be required in that case,

The provision on re-designation of cripple walls is amended to require exterior cripple walls exceeding 48" in height to be considered a story. This is consistent with the calculation performed above to verify the 1.15 multiplier. The increase in bracing for taller cripple walls would begin to approach, and finally equal, the difference in bottom-floor bracing from the addition of a story. Thus, it would make sense to automatically re-designate these taller cripple walls as a story. This will also help clarify the determination of bracing for houses on sloped sites, where figuring out the bracing for the cripple walls occurring on the walls parallel to the slope has been an issue.

Finally, the section references in R602.11.2 are revised to include R602.10.9.2.

Cost Impact: The code change proposal may increase the cost of construction for houses with cripple walls exceeding 48" in height..

ICCFILENAME: BAJNAI-AHWB-RB-3-R602.9-R602.10-R602.11

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change adds needed changes and adds clarifying changes to the cripple wall bracing section and into the table for bracing requirements based on Seismic Design Categories.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Charles S. Bajnai, VBCOA and Chesterfield County, VA, representing ICC Ad-Hoc Committee on Wall Bracing, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R602.10.9.1 Cripple wall bracing for Seismic Design Categories D_0, D_1 and townhouses in Seismic Design Category C. In addition to the requirements in Section R602.10.9, the distance between adjacent edges of braced wall panels for cripple walls along a braced wall line shall be 14 feet (4267 mm) maximum ~~located no more than 18 feet (5486 mm) on center along a braced wall line~~.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The ICC Ad-Hoc Wall Bracing Committee determined that using a maximum distance between adjacent edges of braced wall panels on a braced wall line as the controlling limit for braced wall panel spacing is easier to apply and enforce than using a maximum center-to-center distance. Using the distance between adjacent edges better accommodates braced wall segments greater than 48" in length. The revised language above mirrors the language in Section R602.10.2.2 of RB105-09/10 that was approved at the Baltimore hearings.

Final Action: AS AM AMPC____ D

RB109-09/10

R602.10.6.2, Figure R602.10.6.2(2), Figure R602.10.6.2(3)

Proposed Change as Submitted

Proponent: Gary Ehrlich, National Association of Home Builders (NAHB)

1. Revise as follows:

R602.10.6.2 Connections to roof framing. ~~Exterior *braced wall panels* shall be connected to roof framing as follows.~~

~~1.~~ ~~Parallel rafters or roof trusses shall be attached to the top~~ Top plates of exterior *braced wall panels* shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of *braced wall panels* and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the *braced wall panels* shall be permitted to replace the blocking required by this section.

Blocking shall not be required over openings in continuously-sheathed *braced wall lines*. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with R806.1. .

~~2~~ 1. For SDC A, B and C and wind speeds less than 100 miles per hour (45 m/s), where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses above ~~and perpendicular top plates~~ is 91/4 inches (235 mm) or less, ~~the rafters or roof trusses shall be connected to the top plates of *braced wall lines* in accordance with Table R602.3(1) and~~ blocking between rafters or roof trusses shall ~~need~~ not be ~~installed~~ required. Where the distance from the top of the *braced wall panel* to the top of the rafters above ~~and perpendicular top plates~~ is between 91/4 inches (235 mm) and 151/4 inches (387 mm) ~~the rafters shall be connected to the top plates of *braced wall panels* with~~ blocking between rafters shall be provided above the *braced wall panel* in accordance with Figure R602.10.6.2(1) ~~and attached in accordance with Table R602.3(1)~~. Where the distance from the top of the *braced wall panel* to the top of the roof trusses ~~and perpendicular top plates~~ above is between 91/4 inches (235 mm) and 151/4 inches (387 mm) ~~the roof trusses shall be connected to the top plates of *braced wall panels* with blocking in accordance with Table R602.3(1)~~ lateral load transfer shall be provided in accordance with Section R802.10.3.

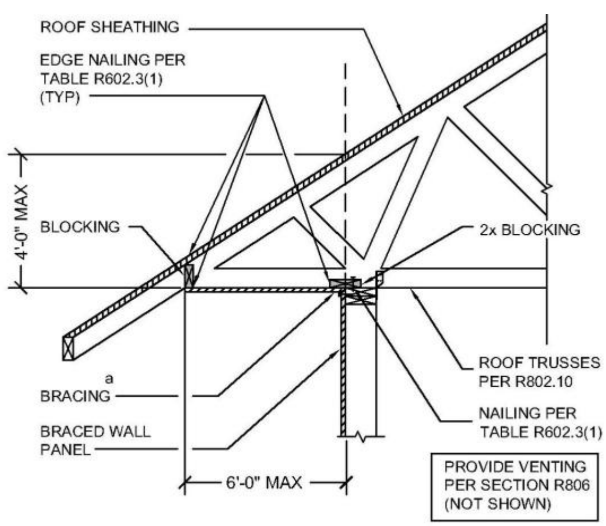
~~3~~ 2. For SDC D_0, D_1 and D_2 or wind speeds of 100 miles per hour (45 m/s) or greater, where the distance ~~between~~ from the top of the *braced wall panel* to the top of the rafters or roof trusses ~~and perpendicular top plates~~ is 151/4 inches (387 mm) or less, ~~rafters or roof trusses shall be connected to the top plates of *braced wall panels* with~~ blocking between rafters or roof trusses shall be provided above the *braced wall panel* in accordance with Figure R602.10.6.2(1) ~~and attached in accordance with Table R602.3(1)~~.

~~4~~ 3. ~~For all seismic design categories and wind speeds,~~ Where the distance ~~between~~ from the top of the *braced wall panel* to the top of the rafters or roof trusses ~~and perpendicular top plates~~ exceeds 151/4 inches (387 mm), ~~perpendicular rafters or roof trusses shall be connected to~~ the top plates of the *braced wall panels* shall be connected to perpendicular rafters or roof trusses above in accordance with one or more of the following methods:

- ~~4~~ 3.1. Soffit blocking panels constructed in accordance with Figure R602.10.6.2(2),
- ~~4~~ 3.2. Vertical blocking panels constructed in accordance with Figure R602.10.6.2(3),
- ~~4~~ 3.3. ~~With f~~Full -height engineered blocking panels designed ~~for values listed in~~ per the AF&PA WFCM ~~American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM). Both the roof and floor sheathing shall be attached to the blocking panels in accordance with Table R602.3(1)~~.
- ~~4~~ 3.4. Blocking, blocking panels, or other methods of lateral load transfer ~~Designed~~ designed in accordance with accepted engineering ~~methods~~ practice.

~~Lateral support for the rafters and ceiling joists shall be provided in accordance with Section R802.8. Lateral support for trusses shall be provided in accordance with Section R802.10.3. Ventilation shall be provided in accordance with Section R806.1.~~

Replace Figure R602.10.6.2(2) with the following:



a. Methods of bracing shall be as described in Section R602.10.1.1~~R602.10.2 method DWB, WSP, SFB, GB, PBS, PCP OR HPS~~
For SI: 1 inch = 25.4 mm.

FIGURE R602.10.6.2(2)

BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

3. Replace Figure R602.10.6.2(3) with the following:

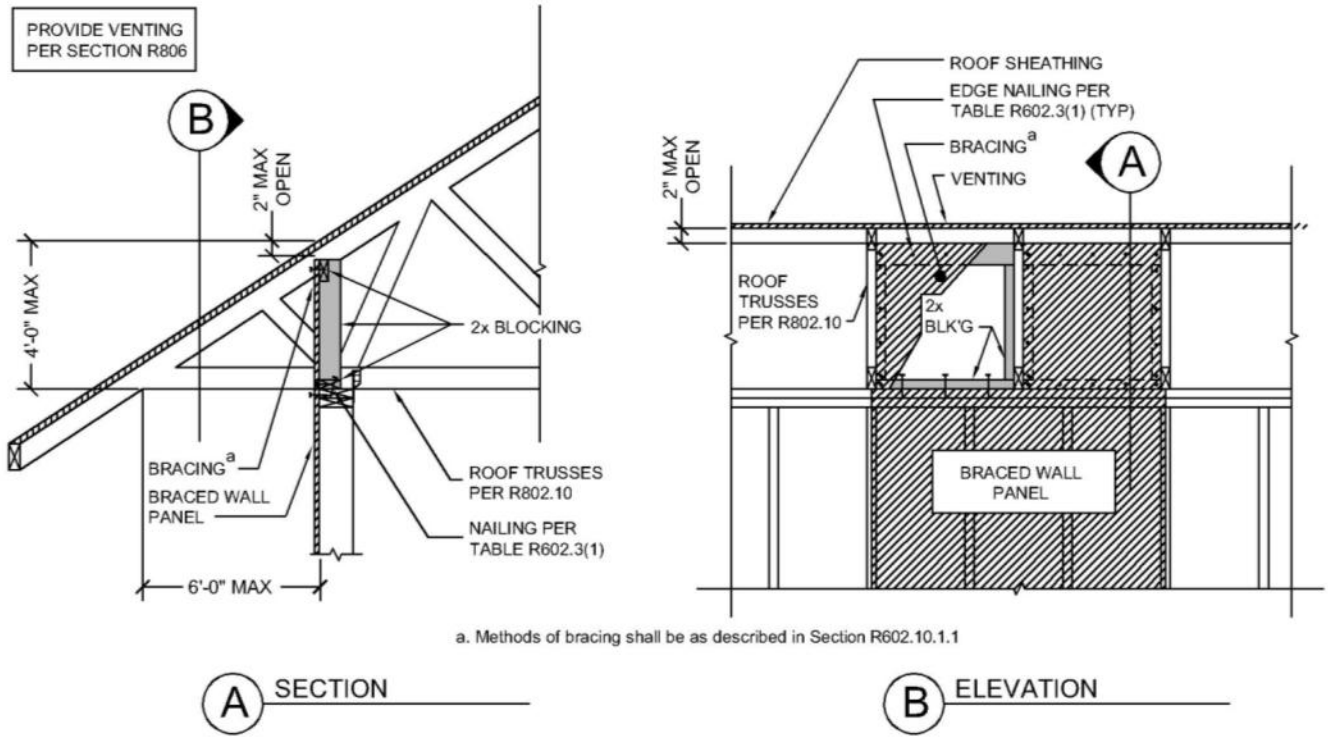


FIGURE R602.10.6.2(3)
BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

Reason: The purpose of this proposal is to amend and simplify the language for blocking between roof rafters and trusses over braced wall panels added during the 2007-2008 Code Development Cycle. The 2009 IRC language is incomprehensible and will create an enforcement nightmare. The change is primarily editorial, although minor technical changes have been introduced.

The terminology in the original code change is often unclear. Terms such as "parallel rafters or roof trusses" and "perpendicular top plates" leave it unclear as to what the framing members or top plates are parallel or perpendicular to. The statement that "blocking need not be installed" is permissive language. The text can even be taken to read that the BLOCKING is what's used to connect the rafter/truss to the top plate. To simplify the requirements, all of the references to "parallel" or "perpendicular" are removed, and the multiple references to Table R602.3(1) replaced with one comprehensive reference in the opening paragraph. Further, since this is the wall section, the blocking requirements and triggers are flipped so the braced wall panel is the point of reference, not the roof framing.

Language allowing a continuous rim board, rim joist, or truss in lieu of the blocking is added. This allows the distinction between "parallel" and "perpendicular" to be removed throughout the proposal, since providing a continuous member over the braced wall panels will be the obvious solution where roof framing direction is parallel to the panels and the framing depth is deep enough to require blocking.

Figures R602.10.6.2(2) and R602.10.6.2(3) are extensively revised. The details are clarified to indicate the blocking panel is only required at the braced wall panels, not along the entire braced wall line. The list of allowable methods is revised to point to Section R602.10.1.1, which includes all the allowable intermittent and continuous bracing methods, including the various alternate narrow wall panels and portal frames. Finally, the reference to "pre-engineered trusses" is replaced with a reference to R802.10, since roof trusses under the IRC are not required to be designed by an engineer.

NAHB asks for your support of this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EHRLICH-RB-12-R602.10.6.2

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

R602.10.6.2 Connections to roof framing. Top plates of exterior *braced wall panels* shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of *braced wall panels* and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the *braced wall panels* shall be permitted to replace the blocking required by this section. Blocking shall not be required over openings in continuously-sheathed *braced wall lines*. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with R806.1.

1. For SDC A, B and C and wind speeds less than 100 miles per hour (45 m/s), where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses above is 91/4 inches (235 mm) or less, blocking between rafters or roof trusses shall not be required. Where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses above is between 91/4 inches (235 mm) and 151/4 inches (387 mm) blocking between rafters or roof trusses shall be provided above the *braced wall panel* in accordance with Figure R602.10.6.2(1). ~~Where the distance from the top of the braced wall panel to the top of the roof trusses above is between 9 1/4 inches and 15 1/4 inches lateral load transfer shall be provided in accordance with Section R802.10.3.~~
2. For SDC D_0, D_1 and D_2 or wind speeds of 100 miles per hour (45 m/s) or greater, where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses is 151/4 inches (387 mm) or less, blocking between rafters or roof trusses shall be provided above the *braced wall panel* in accordance with Figure R602.10.6.2(1).
3. Where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses exceeds 151/4 inches (387 mm), the top plates of the *braced wall panel~~s~~* shall be connected to perpendicular rafters or roof trusses above in accordance with one or more of the following methods:
   3.1. Soffit blocking panels constructed in accordance with Figure R602.10.6.2(2),
   3.2. Vertical blocking panels constructed in accordance with Figure R602.10.6.2(3),
   3.3. Full -height engineered blocking panels designed in accordance with the AF&PA WFCM.
   3.4. Blocking, blocking panels, or other methods of lateral load transfer designed in accordance with accepted engineering practice.

(Portions of proposal not shown remain unchanged)

Committee Reason: The committee feels this change simplifies the language and addresses the requirements for rafters and trusses. The modification aligns the blocking requirements for trusses with the blocking requirement for rafters.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Steven Winkel, FAIA, P.E., and Kelly Cobeen, P.E., S.E., Building Seismic Safety Council of the National Institute of Building Sciences, representing Federal Emergency Management Agency/Building Seismic Safety Council Code Resource Support Committee (FEMA/BSSC CRSC), request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

R602.10.6.2 Connections to roof framing. Top plates of exterior braced wall panels shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of braced wall panels and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the braced wall panels shall be permitted to replace the blocking required by this section.
Blocking shall not be required over openings in continuously-sheathed braced wall lines. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with R806.1.

1. For SDC A, B and C and wind speeds less than 100 miles per hour (45 m/s), where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is 91/4 inches (235 mm) or less, blocking between rafters or roof trusses shall not be required. Where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is between 91/4 inches (235 mm) and 151/4 inches (387 mm) blocking between rafters or roof trusses shall be provided above the braced wall panel in accordance with Figure R602.10.6.2(1)
2. For SDC D0, D1 and D2 or wind speeds of 100 miles per hour (45 m/s) or greater, where the distance from the top of the braced wall panel to the top of the rafters or roof trusses is 151/4 inches (387 mm) or less, blocking between rafters or roof trusses shall be provided over the full length of the braced wall line ~~above the braced wall panel~~ in accordance with Figure R602.10.6.2(1).
3. Where the distance from the top of the braced wall panel to the top of the rafters or roof trusses exceeds 151/4 inches (387 mm), the top plates of the braced wall panels shall be connected to perpendicular rafters or roof trusses over the full length of the braced wall line ~~above~~ in accordance with one or more of the following methods:
   3.1. Soffit blocking panels constructed in accordance with Figure R602.10.6.2(2),
   3.2. Vertical blocking panels constructed in accordance with Figure R602.10.6.2(3),
   3.3. Full -height engineered blocking panels designed in accordance with the AF&PA WFCM.
   3.4. Blocking, blocking panels, or other methods of lateral load transfer designed in accordance with accepted engineering practice.

(Portion of proposal not shown remain unchanged)

Commenter's Reason: The purpose of these blocking panels is to transfer seismic and wind loads from the roof to the wall below. The addition of a 2-inch gap between the top of blocking and the roof sheathing above reduces the strength and capacity of the roof system and the connection. There is not adequate research available to demonstrate that the reduced strength and stiffness are sufficient when blocking is limited to the length of the braced wall panel. Extension of the blocking over the full wall line length replicates common existing construction that has a history of adequate performance.

Final Action: AS AM AMPC____ D

RB111-09/10
R602.10, R602.12 (New)

Proposed Change as Submitted

Proponent: Chuck Bajnai, Chesterfield County, VA, Chairman, ICC Ad-Hoc Committee on Wall Bracing

1. Revise as follows:

R602.10 Wall bracing. Buildings shall be braced in accordance with this section or, when applicable, Section R602.12. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1.

> **Exception:** Detached one- and two-family *dwellings* located in Seismic Design Category C are exempt from the seismic bracing requirements of this section. Wind speed provisions for bracing shall be applicable to detached one- and two-family *dwellings*.

2. Add new section as follows:

R602.12 Simplified wall bracing. Buildings meeting all of the conditions listed below shall be permitted to be braced in accordance with this section as an alternate to the requirements of Section R602.10.

1. A rectangle circumscribing the entire enclosed building, as shown in Figure R602.12.3, shall have no side longer than 60 feet (18 288 mm), and the ratio between the long side and short side shall be a maximum of 3:1.
2. There shall be no more than two stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.
3. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.
4. Wall height shall not be greater than 10 feet (2743 mm).
5. Interior walls shall not contribute toward bracing required in this section.
6. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.
7. All exterior walls shall have gypsum board with a minimum thickness of 1/2 inches (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.
8. The structure shall be located where the basic wind speed is less than or equal to 90 mph (40 m/s), and the Exposure Category is A or B.
9. The structure shall be located in Seismic Design Category of A, B or C for detached one- and two-family dwellings or Seismic Design Category A or B for townhouses.
10. Cripple walls shall not be permitted in two-story buildings.

When the bracing described in this section is used, the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.

R602.12.1 Sheathing materials. The following sheathing materials installed on the exterior side of exterior walls shall be used to construct a bracing unit as defined in Section R602.12.2. Mixing materials is prohibited.

1. Wood structural panels with a minimum thickness of 3/8 inch (9.5 mm) fastened in accordance with Table R602.3(3).
2. Structural fiberboard sheathing with a minimum thickness of 1/2 inch (12.7 mm) fastened in accordance with Table R602.3(1).

R602.12.2 Bracing unit. A bracing unit shall be a full-height sheathed segment of the exterior wall with no openings and a minimum length as specified below.

1. When all framed portions of all exterior walls are continuously sheathed in accordance with Section R602.12.1, Including areas between bracing units, above and below openings and on gable end walls, the minimum length of a bracing unit shall be 3 feet (914 mm).
2. When the exterior walls are braced with intermittent sheathing in accordance with Section R602.12.1 and infilled with other materials, the minimum length of a bracing unit shall be 4 feet (1219 mm).

R602.12.2.1 Multiple bracing units. Segments of wall compliant with Section R602.12.2 and longer than the minimum bracing unit length shall be considered as multiple bracing units. The number of bracing units shall be determined by dividing the wall segment length by the minimum bracing unit length. The number of bracing units provided by one or more compliant wall segments shall be added together and rounded down to the nearest whole number. Full-height sheathed segments of wall shorter than the minimum bracing unit length shall not contribute toward a bracing unit except as specified in Section R602.12.6.1.

R602.12.3 Number of bracing units. The number of bracing units required along each side of a building shall be determined by circumscribing a rectangle around the entire enclosed building for each story level as shown in Figure R602.12.3. Each side of the rectangle shall have, at a minimum, the number of bracing units per Table R602.12.3 placed on the parallel exterior walls facing the side of the rectangle. Bracing units shall then be placed using the distribution requirements specified in Section R602.12.4. Mixing intermittent and continuous sheathing shall not be permitted.

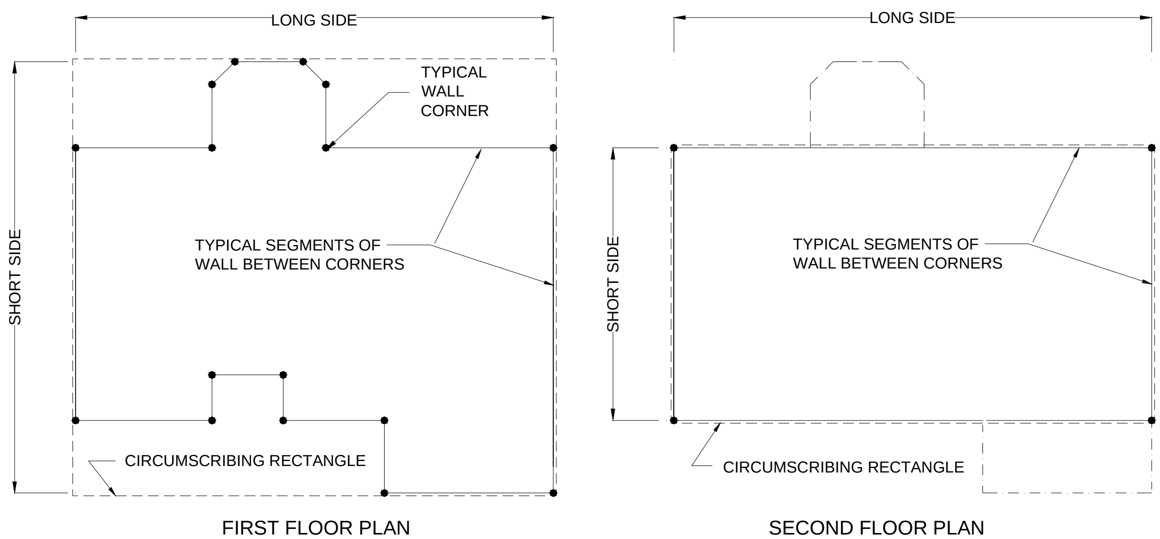


FIGURE R602.12.3
RECTANGLE CIRCUMSCRIBING AN ENCLOSED BUILDING

TABLE R602.12.3
MINIMUM NUMBER OF BRACING UNITS ON
EACH SIDE OF A CIRCUMSCRIBED RECTANGLE

STORY LEVEL		EAVE-TO RIDGE HEIGHT (FEET)	MINIMUM NUMBER OF BRACING UNITS ON EACH LONG SIDE [a,b]						MINIMUM NUMBER OF BRACING UNITS ON EACH SHORT SIDE [a,b]					
			Length of short side (ft) [c]						Length of long side (ft) [c]					
			10	20	30	40	50	60	10	20	30	40	50	60
	One-story house or second floor of a two-story	10	1	2	2	2	3	3	1	2	2	2	3	3
	First floor of a two-story house	10	2	3	3	4	5	6	2	3	3	4	5	6
	One-story house or second floor of a two-story	15	1	2	3	3	4	4	1	2	3	3	4	4
	First floor of a two-story house	15	2	3	4	5	6	7	2	3	4	5	6	7

For SI: 1 ft = 304.8 mm
a. Interpolation shall not be permitted.
b. Cripple walls or wood-framed basement walls in a walk-out condition of a one-story structure shall be designed as the first floor of a two-story house.
c. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.

R602.12.4 Distribution of bracing units. The placement of bracing units on exterior walls shall meet all of the following requirements as shown in Figure R602.12.4.

1. A bracing unit shall begin no more than 12 feet (3658 mm) from any wall corner.
2. The distance between adjacent edges of two bracing units shall be no greater than 20 feet (6096 mm).
3. Segments of wall greater than 8 feet (2438 mm) in length shall have a minimum of one bracing unit.

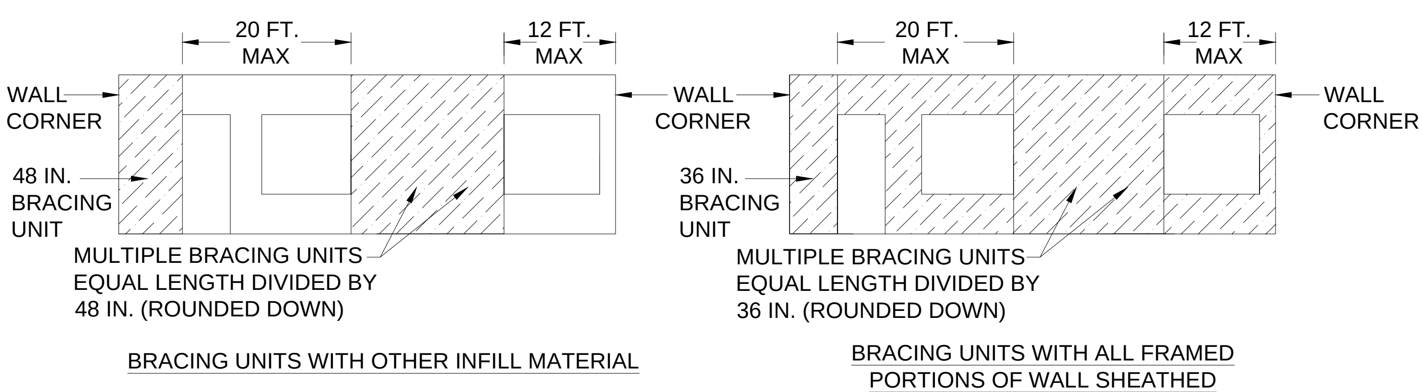


FIGURE R602.12.4
BRACING UNIT DISTRIBUTION

R602.12.5 Narrow panels. The bracing methods referenced in Section R602.10 and specified in Sections R602.12.5.1 through R602.12.5.3 shall be permitted when using simplified wall bracing.

R602.12.5.1 Method CS-G. Braced wall panels constructed as Method CS-G in accordance with Tables R602.10.4.1. and R602.10.4.2 shall be permitted for single story garages when all framed portions of all exterior walls are sheathed with wood structural panels. Each CS-G panel shall be equivalent to 0.5 of a bracing unit. Segments of wall which include a Method CS-G panel shall meet the requirements of Section R602.10.4.4.

R602.12.5.2 Method CS-PF. Braced wall panels constructed as Method CS-PF in accordance with Section R602.10.4.1.1 shall be permitted when all framed portions of all exterior walls are sheathed with wood structural panels. Each CS-PF panel shall equal 0.5 bracing units. A maximum of four CS-PF panels shall be permitted on all the segments of walls parallel to each side of the circumscribed rectangle. Segments of wall which include a Method CS-PF panel shall meet the requirements of Section R602.10.4.4.

R602.12.5.3 Methods PFH and PFG. Braced wall panels constructed as Method PFH and PFG shall be permitted when bracing units are constructed using wood structural panels. Each PFH and panel shall equal one bracing unit, and each PFG shall be equal to 0.75 bracing units.

R602.12.6 Lateral support. For bracing units located along the eaves, the vertical distance from the outside edge of the top wall plate to the roof sheathing above shall not exceed 9.25 inches (235 mm) at the location of a bracing unit unless lateral support is provided in accordance with Section R602.10.6.2.

R602.12.7 Stem walls. Masonry stem walls with a height and length of 48 inches (1219 mm) or less supporting a bracing unit or a Method CS-G, CS-PF or PFG braced wall panel shall be constructed in accordance with Figure R602.10.7. Concrete stem walls with a length of 48" or less, greater than 12 inches tall and less than 6 inches thick shall be reinforced sized and located in accordance with Figure R602.10.7

Reason: As the wall bracing section evolved, it has become more universal and flexible, but, as a result, it has grown in size and complexity. After the Ad Hoc committee's "engineering" work was complete and integrated into the 2009 IRC, we heard back from end users that this section of the code was extremely challenging. The committee therefore wanted to focus on making the 2012 IRC easier to read, easier to understand and easier to use.

The Ad Hoc committee strove to provide an easy, prescriptive procedure that would serve most users throughout the country. We defined the "majority of the country" as users in the 90 mph and SDC A and B areas.

The Committee developed a quick, prescriptive approach for those homes that fall within certain limitations. This simplified approach:

1. Eliminated all of the extra text provisions required for high seismic areas,
2. Eliminated the requirement for braced wall lines,
3. Quantified the amount of bracing using a simple table, and
4. Eliminated from the text the less-often utilized (and frequently the most verbose) bracing methods and concentrated on the most common bracing materials.

Simplified wall bracing incorporates intermittent and continuous sheathing methods (wood structural panels and structural fiberboard), but defines a braced wall panel and its minimum length as a "bracing unit." The minimum number of bracing units is determined by first drawing a rectangle around the building and then using its dimensions to select the total bracing from Table R602.12.3. Bracing units are also required to be placed per the distribution requirements in Section R602.12.4

This simplified method is intended as one easier to use option. Where homes do not qualify because they are located in higher wind or seismic zones, or are more complex in structure, or if the builder simply prefers it, the traditional "long" approach can still be used.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BAJNAI-AHWB-RB-2-R602.10-R602.12

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee feels this is a much needed simplified wall bracing method for structures in low seismic areas and as stated in the proponent's published reason..

Assembly Action: **None**

<u>*Individual Consideration Agenda*</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Charles S. Bajnai, VBCOA and Chesterfield County, VA, representing ICC Ad-Hoc Committee on Wall Bracing, requests Approval as Modified by this Public Comment.

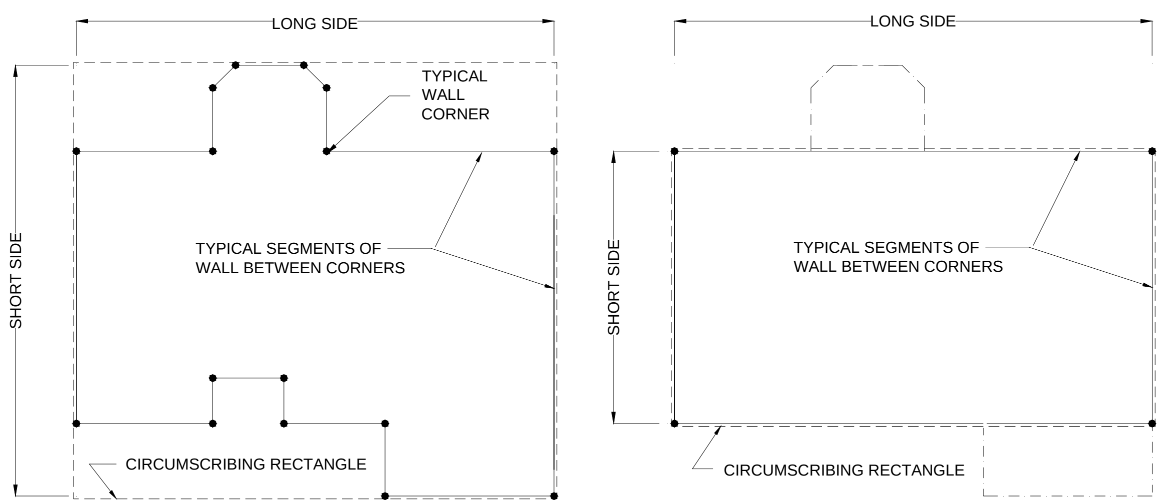
Modify the proposal as follows:

R602.12 Simplified wall bracing. Buildings meeting all of the conditions listed below shall be permitted to be braced in accordance with this section as an alternate to the requirements of Section R602.10. <u>The entire building shall be braced in accordance with this section; the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.</u>

- ~~1.~~ ~~A rectangle circumscribing the entire enclosed building, as shown in Figure R602.12.3, shall have no side longer than 60 feet (18 288 mm), and the ratio between the long side and short side shall be a maximum of 3:1.~~
- 1~~2~~. There shall be no more than two stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.
- 2~~3~~. Floors shall not cantilever more then 24 inches (607 mm) beyond the foundation or bearing wall below.
- 3~~4~~. Wall height shall not be greater than 10 feet (2743 mm).
- ~~5.~~ ~~Interior walls shall not contribute toward bracing required in this section.~~
- 4~~6~~. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.
- 5~~7~~. All exterior walls shall have gypsum board with a minimum thickness of $^1/_2$ inches (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.
- 6~~8~~. The structure shall be located where the basic wind speed is less than or equal to 90 mph (40 m/s), and the Exposure Category is A or B.
- 7~~9~~. The structure shall be located in Seismic Design Category of A, B or C for detached one- and two-family dwellings or Seismic Design Category A or B for townhouses.
- 8~~10~~. Cripple walls shall not be permitted in two-story buildings.

~~When the bracing described in this section is used, the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.~~

<u>**R602.12.1 Circumscribed rectangle.** The bracing required for each building shall be determined by circumscribing a rectangle around the entire building on each floor as shown in Figure R602.12.1. The rectangle shall surround all enclosed offsets and projections such as sunrooms and attached garages. Open structures, such as carports and decks shall be permitted to be excluded. The rectangle shall have no side greater than 60 feet (18 288 mm), and the ratio between the long side and short side shall be a maximum of 3:1.</u>



<u>**FIGURE R602.12.1**</u>
<u>**RECTANGLE CIRCUMSCRIBING AN ENCLOSED BUILDING**</u>

~~R602.12.1~~ <u>R602.12.2</u> Sheathing materials. The following sheathing materials installed on the exterior side of exterior walls shall be used to construct a bracing unit as defined in Section R602.12.3~~2~~. Mixing materials is prohibited.

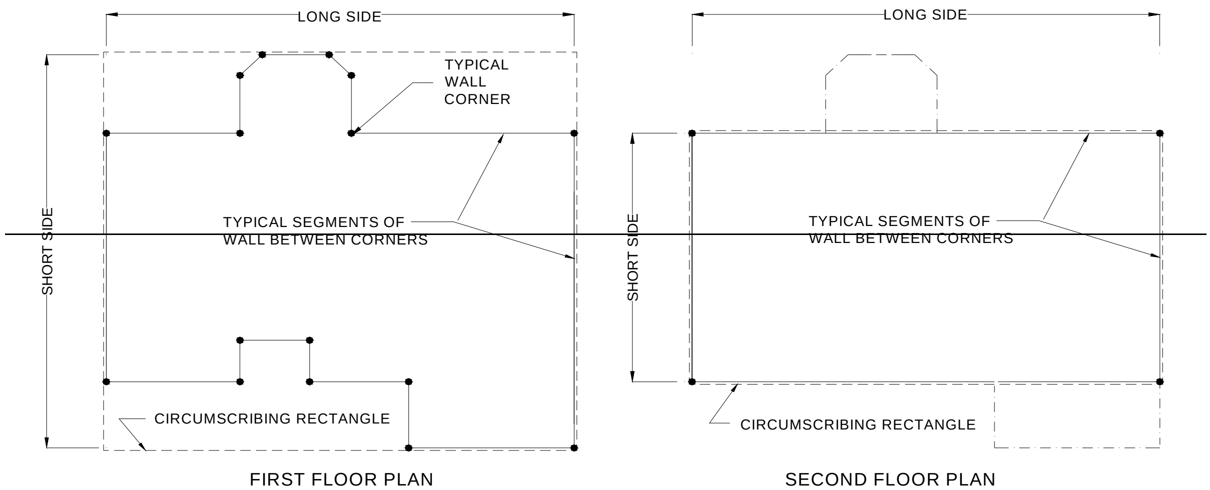
1. Wood structural panels with a minimum thickness of $^3/_8$ inch (9.5 mm) fastened in accordance with Table R602.3(3).
2. Structural fiberboard sheathing with a minimum thickness of $^1/_2$ inch (12.7 mm) fastened in accordance with Table R602.3(1).

~~R602.12.2~~ R602.12. 3Bracing unit. A bracing unit shall be a full-height sheathed segment of the exterior wall with no openings or vertical or horizontal offsets and a minimum length as specified below. Interior walls shall not contribute toward the amount of required bracing. Mixing of Items 1 and 2 below is prohibited on the same story.

1. ~~When~~Where all framed portions of all exterior walls are ~~continuously~~ sheathed in accordance with Section ~~R602.12.1~~, R602.12.2 ~~Including~~ including wall areas between bracing units, above and below openings and on gable end walls, the minimum length of a bracing unit shall be 3 feet (914 mm).
2. ~~When~~Where the exterior walls are braced with ~~intermittent~~ sheathing panels in accordance with Section ~~R602.12.1~~ R602.12.2 and areas between bracing units are ~~infilled~~covered with other materials, the minimum length of a bracing unit shall be 4 feet (1219 mm).

~~R602.12.2.1~~ R602.12.3.1 Multiple bracing units. Segments of wall compliant with Section R602.12.2 and longer than the minimum bracing unit length shall be considered as multiple bracing units. The number of bracing units shall be determined by dividing the wall segment length by the minimum bracing unit length. ~~The number of bracing units provided by one or more compliant wall segments shall be added together and rounded down to the nearest whole number.~~ Full-height sheathed segments of wall ~~shorter~~ narrower than the minimum bracing unit length shall not contribute toward a bracing unit except as specified in Section R602.12.6~~.1~~.

~~R602.12.3~~ R602.12.4 Number of bracing units. ~~The number of bracing units required along each side of a building shall be determined by circumscribing a rectangle around the entire enclosed building for each story level as shown in Figure R602.12.3.~~ Each side of the circumscribed rectangle, as shown in Figure R602.12.1, shall have, at a minimum, the number of bracing units per Table R602.12.4~~3~~ placed on the parallel exterior walls facing the side of the rectangle. Bracing units shall then be placed using the distribution requirements specified in Section R602.12.5~~4~~. ~~Mixing intermittent and continuous sheathing shall not be permitted.~~



~~FIGURE R602.12.3~~
~~RECTANGLE CIRCUMSCRIBING AN ENCLOSED BUILDING~~

TABLE ~~R602.12.3~~ R602.12.4
MINIMUM NUMBER OF BRACING UNITS ON EACH SIDE OF ~~A~~ THE CIRCUMSCRIBED RECTANGLE

STORY LEVEL	EAVE-TO RIDGE HEIGHT (FEET)	MINIMUM NUMBER OF BRACING UNITS ON EACH LONG SIDE [a,b]						MINIMUM NUMBER OF BRACING UNITS ON EACH SHORT SIDE [a,b]					
		Length of short side (ft) [c]						Length of long side (ft) [c]					
		10	20	30	40	50	60	10	20	30	40	50	60
~~One-story house or second floor of a two-story~~	10	1	2	2	2	3	3	1	2	2	2	3	3
~~First floor of a two-story house~~	10	2	3	3	4	5	6	2	3	3	4	5	6
~~One-story house or second floor of a two-story~~	15	1	2	3	3	4	4	1	2	3	3	4	4
~~First floor of a two-story house~~	15	2	3	4	5	6	7	2	3	4	5	6	7

For SI: 1 ft = 304.8 mm
a Interpolation shall not be permitted.
b Cripple walls or wood-framed basement walls in a walk-out condition of a one-story structure shall be designed as the first floor of a two-story house.
c Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.

~~R602.12.4~~ R602.12.5 Distribution of bracing units. The placement of bracing units on exterior walls shall meet all of the following requirements as shown in Figure ~~R602.12.4~~ R602.12.5.

1. A bracing unit shall begin no more than 12 feet (3658 mm) from any wall corner.
2. The distance between adjacent edges of ~~two~~ bracing units shall be no greater than 20 feet (6096 mm).
3. Segments of wall greater than 8 feet (2438 mm) in length shall have a minimum of one bracing unit.

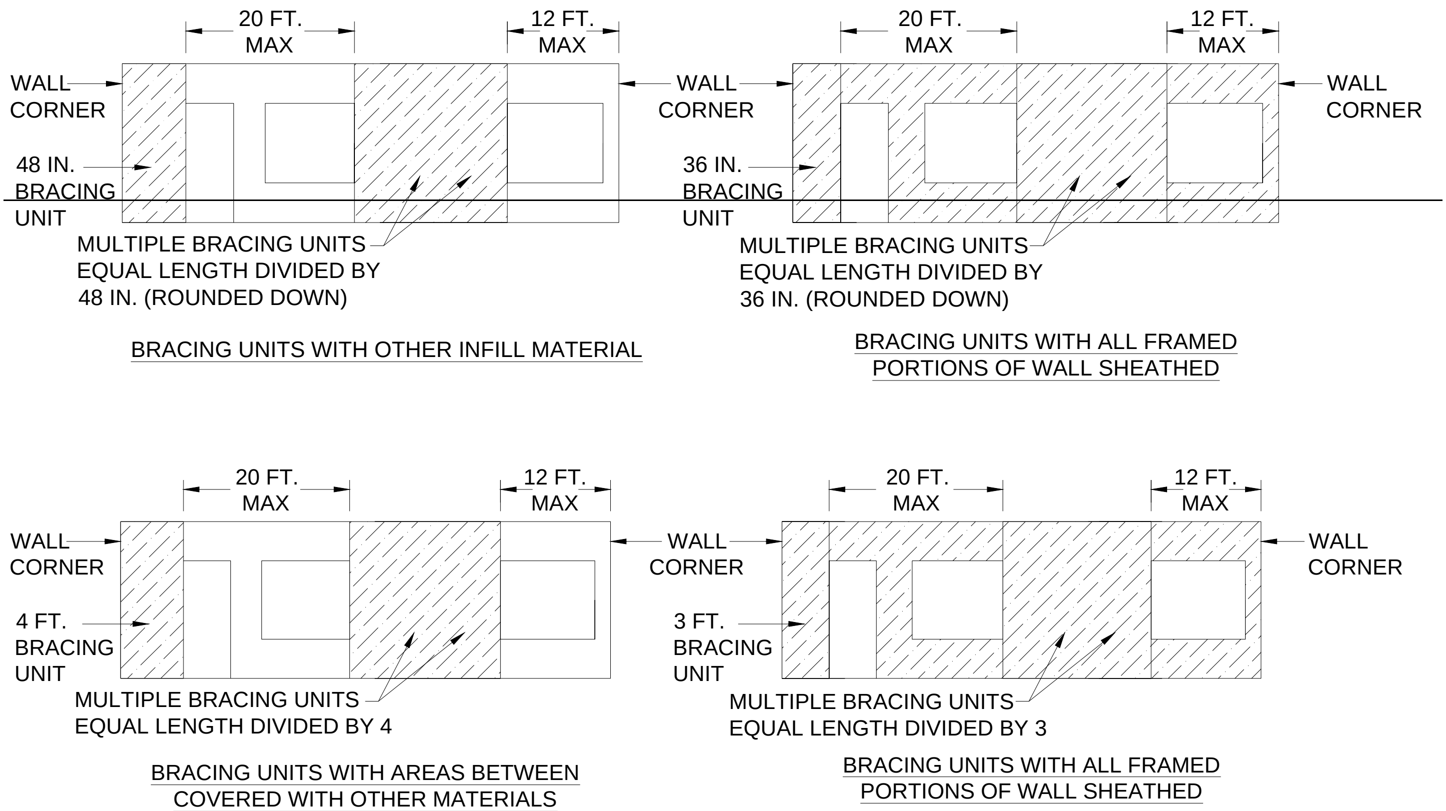


FIGURE ~~R602.12.4~~ R602.12.5
BRACING UNIT DISTRIBUTION

~~R602.12.5~~ R602.12.6 Narrow panels. The bracing methods referenced in Section R602.10 and specified in Sections R602.12.6.1 through R602.12.6.3 shall be permitted when using simplified wall bracing.

~~R602.12.5.1~~ R602.12.6.1 Method CS-G. Braced wall panels constructed as Method CS-G in accordance with Tables R602.10.4.1. and R602.10.4.2 shall be permitted for ~~single~~ one-story garages when all framed portions of all exterior walls are sheathed with wood structural panels. Each CS-G panel shall be equivalent to 0.5 of a bracing unit. Segments of wall which include a Method CS-G panel shall meet the requirements of Section R602.10.4.4.

~~R602.12.5.2~~ R602.12.6.2 Method CS-PF. Braced wall panels constructed as Method CS-PF in accordance with Section R602.10.4.1.1 shall be permitted when all framed portions of all exterior walls are sheathed with wood structural panels. Each CS-PF panel shall equal 0.5 bracing units. A maximum of four CS-PF panels shall be permitted on all the segments of walls parallel to each side of the circumscribed rectangle. Segments of wall which include a Method CS-PF panel shall meet the requirements of Section R602.10.4.4.

~~R602.12.5.3~~ R602.12.6.3 Methods PFH and PFG. Braced wall panels constructed as Method PFH and PFG shall be permitted when bracing units are constructed using wood structural panels. Each PFH and panel shall equal one bracing unit and each PFG shall be equal to 0.75 bracing units.

~~R602.12.6~~ R602.12.7 Lateral support. For bracing units located along the eaves, the vertical distance from the outside edge of the top wall plate to the roof sheathing above shall not exceed 9.25 inches (235 mm) at the location of a bracing unit unless lateral support is provided in accordance with Section R602.10.6.2.

~~R602.12.7~~ R602.12.8 Stem walls. Masonry stem walls with a height and length of 48 inches (1219 mm) or less supporting a bracing unit or a Method CS-G, CS-PF or PFG braced wall panel shall be constructed in accordance with Figure R602.10.7. Concrete stem walls with a length of 48 inches (1219 mm) or less, greater than 12 inches (305 mm) tall and less than 6 inches (152 mm) thick shall be reinforced sized and located in accordance with Figure R602.10.7.

Commenter's Reason: The proposed amendments, which are housekeeping in nature, clarify the simplified approach and further defines bracing units and their material requirements.

Final Action: AS AM AMPC____ D

RB112-09/10

R602.12, R603.12.1, R602.12.1.3, Table R602.12(1), Table R602.12(2), Figure R602.12, R703.7, Table R703.7(1), Table R703.7(2)

Proposed Change as Submitted

Proponent: Charles Clark, Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

R602.12 Wall bracing and stone and masonry veneer. Where stone and masonry veneer is installed in accordance with Section R703.7, wall bracing on exterior *braced wall lines*, and *braced wall lines* on the interior of the building, shall comply with this section. In Seismic Design Categories D_0, D_1 and D_2, cripple walls shall not be permitted, and required *braced wall lines* on the interior of the building shall be supported on continuous foundations.

For all buildings in Seismic Design Categories A and~~,~~ B, ~~and~~ for townhouses in Seismic Design Category C, and for one- or two-family dwellings in Seismic Design Category D_0, wall bracing ~~at exterior and interior *braced wall lines*~~ shall be in accordance with Section R602.10 and the additional requirements of Table R602.12(1).

For townhouses in Seismic Design Category D_0 and detached one- or two-family *dwellings* in Seismic Design Categories D_0, D_1 and D_2, wall bracing and hold downs ~~at exterior and interior *braced wall lines*~~ shall be in accordance with Sections R602.10 and R602.11 and the additional requirements of Section R602.12.1, ~~and~~ Table R602.12(2) and Figure R602.12. ~~In Seismic Design Categories D_0, D_1 and D_2, cripple walls are not permitted, and required interior *braced wall lines* shall be supported on continuous foundations.~~

R602.12.1 Townhouses in Seismic Design Category D_0 and one- or two-family dwellings in Seismic Design Categories ~~D_0,~~ D_1 and D_2. Wall bracing where stone and masonry veneer exceeds the first story height for townhouses in Seismic Design Category D_0 and one- or two-family dwellings in Seismic Design Categories ~~D_0,~~ D_1 and D_2 shall conform to the requirements of Sections R602.10 and R602.11 and ~~the following requirements~~ Sections R602.12.1.1 to R602.12.1.6.

R602.12.1.3 Braced wall panel construction. *Braced wall panels* shall be constructed of wood structural panel sheathing with a thickness of not less than 7/16 inch (11 mm) nailed with 8d common nails spaced 4 inches (102 mm) on center at all panel edges and 12 inches (305 mm) on center at intermediate supports. The end of each *braced wall panel* shall have a hold down device in accordance with Table R602.12(2) installed at each end. Size, height and spacing of wood studs shall be in accordance with Table R602.3(5).

TABLE R602.12(1)
STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS USING TABLE R602.10.1.2(2)~~, WOOD OR STEEL FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C~~

STRUCTURE TYPE AND SEISMIC DESIGN CATEGORY	NUMBER OF ~~WOOD FRAMED~~ STORIES	~~WOOD FRAMED~~ STORY	MINIMUM ~~SHEATHING AMOUNT~~ BRACED WALL PANEL LENGTH ~~(length of braced wall line length)~~ [~~a~~b]
All Structures in SDC A or B and Detached one- and two-family dwellings in SDC C	1, 2 or 3	all	Table R602.10.1.2(2)
Townhouses in SDC C and Detached one- and two-family dwellings in SDC D_0 [a]	1	1 only	Table R602.10.1.2(2)
	2	top	Table R602.10.1.2(2)
		bottom	1.5 times length required by Table R602.10.1.2(2)
	3	top	Table R602.10.1.2(2)
		middle	1.5 times length required by Table R602.10.1.2(2)
		bottom	1.5 times length required by Table R602.10.1.2(2)

a. In Seismic Design Category D_0, cripple walls shall not be permitted and required braced wall lines on the interior of the building shall be supported on a continuous foundation.

b.~~a.~~ Applies to exterior ~~and interior~~ braced wall lines~~,~~ and braced wall lines on the interior of the building.

TABLE R602.12(2)
STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS
USING 7/16 INCH WOOD STRUCTURAL PANEL SHEATHING~~,~~
~~ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2~~

STRUCTURE TYPE AND SEISMIC DESIGN CATEGORY	NUMBER OF STORIES [a]	STORY	MINIMUM ~~SHEATHING AMOUNT~~ BRACED WALL PANEL (percent ~~length~~ of braced wall line length) [b]	MINIMUM BRACED WALL PANEL SHEATHING THICKNESS AND FASTENING	SINGLE STORY HOLD DOWN FORCE (lb) [c]	CUMULATIVE HOLD DOWN FORCE (lb) [d]
Townhouses in SDC D_0	1	1 only	35	7/16-inch wood structural panel sheathing with 8d common nails spaced at 4 inches on center at panel edges, 12 inches on center at intermediate supports; 8d common nails at 4 inches on center at braced wall panel end posts with hold down attached	N/A	---
	2	top	35		1900	---
		bottom	45		3200	5100
	3	top	40		1900	---
		middle	45		3500	5400
		bottom	60		3500	8900
One- or two-family dwellings in SDC D_1	1	1 only	~~45~~ 35		2100	---
	2	top	~~45~~ 35		2100	---
		bottom	~~45~~ 40		3700	5800
	3	top	~~45~~ 35		2100	---
		middle	~~45~~ 40		3700	5800
		bottom	60		3700	9500
One- or two-family dwellings in SDC D_2	1	1 only	~~55~~ 50		2300	---
	2	top	~~55~~ 50		2300	---
		bottom	55		3900	6200

a. Cripple walls ~~are~~ shall not be permitted in Seismic Design Categories D_0, D_1 or D_2.

b. Applies to exterior ~~and interior~~ braced wall lines~~,~~ and braced wall lines on the interior of the building. Required braced wall lines on the interior of the building shall be supported on a continuous foundation.

c. Comply with Figure R602.12. Hold down force is minimum allowable stress load for connector providing uplift tie from wall framing at end of braced wall panel at the noted story to wall framing at end of braced wall panel at the story below, or to foundation or foundation wall. Use single story hold down force where edges of braced wall panels do not align; a continuous load path to the foundation shall be maintained. ~~[See Figure R602.12].~~

d. Comply with Figure R602.12. Where hold down connectors from stories above align with stories below, use cumulative hold down force size middle and bottom story hold down connectors. ~~(See Figure R602.12)~~

FIGURE R602.12
~~HOLD DOWNS AT EXTERIOR AND INTERIOR BRACED WALL PANELS~~
STONE OR MASONRY VENEER WALL BRACING HOLD-DOWN REQUIREMENTS FOR SEISMIC DESIGN

(No change to figure)

R703.7 Stone and masonry veneer, general. Stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4 and Figure R703.7. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first *story* above-grade and shall not exceed 5 inches (127 mm) in thickness. See Section R602.12 for wall bracing requirements for masonry veneer for wood framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for cold-formed steel construction.

Exceptions:

1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
2. For all buildings in Seismic Design Category D_0 and for detached one- or two-family *dwellings* in Seismic Design Categories ~~D_0,~~ D_1 and D_2, exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.

TABLE R703.7(1)
STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS, WOOD OR STEEL FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C

SEISMIC DESIGN CATEGORY	NUMBER OF WOOD OR STEEL FRAMED STORIES	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION OR FOUNDATION WALL[a] (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf)[b]	~~WOOD OR STEEL FRAMED STORY~~
A or B	Steel: 1 or 2 Wood: 1, 2 or 3	30	5	50	~~All~~
C	1	30	5	50	~~1 only~~
	2	30	5	50	~~top~~
					~~bottom~~
	Wood only: 3	30	5	50	~~top~~
					~~middle~~
					~~bottom~~

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa.

a. An additional 8 feet ~~is~~ shall be permitted for gable end walls. ~~See also~~ Comply with story height limitations of Section R301.3.

b. Maximum weight ~~is~~ shall be installed weight and shall include~~s~~ weight of mortar, grout, lath and other materials used for installation. Where veneer is placed on both faces of a wall, the combined weight shall not exceed that specified in this table.

TABLE R703.7(2)
STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS, ~~ONE- AND TWO-FAMILY DETACHED DWELLINGS,~~ WOOD FRAMING, SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

STRUCTURE TYPE AND SEISMIC DESIGN CATEGORY	NUMBER OF WOOD FRAMED STORIES	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION OR FOUNDATION WALL (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf)
All buildings in SDC D_0	1	20[c]	4	40
	2	20[c]	4	40
	3	30[d]	4	40
One- and two-family dwellings in SDC D_1	1	20[c]	4	40
	2	20[c]	4	40
	3	20[c]	4	40
One- and two-family dwellings in SDC D_2	1	20[c]	3	30
	2	20[c]	3	30

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa, 1 pound-force = 4.448 N.

a. Cripple walls ~~are~~ shall not be permitted in Seismic Design Categories D_0, D_1 and D_2.

b. Maximum weight ~~is~~ shall be installed weight and shall include~~s~~ weight of mortar, grout and lath, and other materials used for installation.

c. The veneer shall not exceed 20 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls, or 30 feet in height with an additional 8 feet for gable end walls where the lower 10 feet has a backing of concrete or masonry wall. ~~See also~~ Comply with story height limitations of Section R301.3.

d. The veneer shall not exceed 30 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls. ~~See also~~ Comply with story height limitations of Section R301.3.

Reason: This code change adjusts the overly conservative special wall bracing requirements for houses with masonry veneer in moderate to high-seismic regions. This adjustment is based on full-scale whole-building shake-table testing that has demonstrated that the in-plane shear performance of anchored masonry veneer can resist a portion its own seismically-induced load. It showed that the shear capacity of the veneer is significant and can effectively carry a portion of its load directly to the foundation. (Bibliography References 3 & 4 below)

This testing is substantiated by other full-scale tests on whole-houses in the United States, Australia, England, Japan and New Zealand. One study in the United States reported that a two-story split foyer dwelling had a maximum deflection of 0.04 inches (1 mm) at a uniform wind pressure of 25 psf. This deflection was significantly less than that predicted by conventional analysis. Numerous whole-house tests have also been conducted in Australia. These tests demonstrated that conventional residential construction (only slightly different than that in the United States) withstood 2.4 times to 4.75 times its intended design load without failure. In England, researchers have determined that shear loads transferred from veneer to wood-framed shear walls in a full brick-veneered building were reduced by as much as 45% for wind loads. In New Zealand, tests demonstrated that for masonry veneer on conventional wood-stud framing, the veneer can take up to 50% of the lateral in-plane load.

This code change effectively reduces the special wall bracing requirements for wood-stud framing behind masonry veneer in recognition that the veneer carries a significant portion of its own load in-plane.

Bibliography:

1. Johnson, Eric N., McGinley, W. Mark, The In Plane Shear Performance of Brick Veneer and Wood Stud Walls, Ninth *North American Masonry Conference*, June, 2003.
2. Johnson, Eric N., The In-Plane Shear Performance of Brick Veneer and Wood Stud Walls, Master of Science Thesis, North Carolina A & T State University, Greensboro, North Carolina, 2003.

3. Klingner, Richard E., Shing, P. Benson, McGinley, Mark W., McLean, David I., Okail, Hussein, and Jo, Seongwoo, "NSF NEES Small-Group Project on Performance-based Design of Masonry and Masonry Veneer: Overview and Preliminary Results," *TMS Journal*, The Masonry Society, Boulder, Colorado, December 2008 (date submitted for publication).
4. Klingner, Richard E., "Behavior of Anchored Masonry Veneer with Light Wood Stud-Framing or Masonry Backing in Full-Scale Whole-Building Shaking-Table Tests," *TMS Journal*, The Masonry Society, Boulder, Colorado, June 2009 (date submitted for publication).
5. Thurston,S.J., Beattie, G. J., "Seismic performance of New Zealand two-storey brick veneer houses," *2009 New Zealand Society for Earthquake Engineering Conference Proceedings*, Wellington, New Zealand, April, 2009.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CLARK-RB-5-R602.12

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee agrees with the intent and this is a needed addition, however the Final Report or the full-scale shake-table test is needed in order to further evaluate this issue.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Charles Clark, Brick Industry Association, representing Masonry Alliance for Codes and Standards (MACS), requests Approval as Modified by this Public Comment.

Modify proposal as follows:

602.12 Wall bracing and stone and masonry veneer. Where stone and masonry veneer is installed in accordance with Section R703.7, wall bracing on exterior *braced wall lines*, and *braced wall lines* on the interior of the building, shall comply with this section. In Seismic Design Categories D_0, D_1 and D_2, cripple walls shall not be permitted, and required *braced wall lines* on the interior of the building shall be supported on continuous foundations.

For all buildings in Seismic Design Categories A ~~and~~ , B, ~~for townhouses in Seismic Design Category~~ and C, and for detached one- or two-family dwellings in Seismic Design Category D_0, wall bracing shall be in accordance with Section R602.10 and the additional requirements of Table R602.12(1).

For townhouses in Seismic Design Category D_0 and detached one- or two-family *dwellings* in Seismic Design Categories D_0, D_1 and D_2, wall bracing and hold downs shall be in accordance with Sections R602.10 and R602.11 and the additional requirements of Section R602.12.1, Table R602.12(2) and Figure R602.12.

TABLE R602.12(2)
STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS USING 7/16 INCH WOOD STRUCTURAL PANEL SHEATHING

STRUCTURE TYPE AND SEISMIC DESIGN CATEGORY	NUMBER OF STORIES [a]	STORY	MINIMUM BRACED WALL PANEL (percent of braced wall line length) [b]	MINIMUM BRACED WALL PANEL SHEATHING THICKNESS AND FASTENING	SINGLE STORY HOLD DOWN FORCE (lb) [c]	CUMULATIVE HOLD DOWN FORCE (lb) [d]
Townhouses in SDC D_0	1	1 only	35	7/16-inch wood structural panel sheathing with 8d common nails spaced at 4 inches on center at panel edges, 12 inches on center at intermediate supports; 8d common nails at 4 inches on center at braced wall panel end posts with hold down attached	N/A	---
	2	top	35		1900	---
		bottom	45		3200	5100
	3	top	40		1900	---
		middle	45		3500	5400
		bottom	60		3500	8900
Detached One- or two-family dwellings in SDC D_1	1	1 only	35		2100	---
	2	top	35		2100	---
		bottom	40		3700	5800
	3	top	35		2100	---
		middle	40		3700	5800
		bottom	60		3700	9500
Detached One- or two-family dwellings in SDC D_2	1	1 only	50		2300	---
	2	top	50		2300	---
		bottom	55		3900	6200

a. Cripple walls are shall not be permitted in Seismic Design Categories D_0, D_1 or D_2.
b. Applies to exterior and interior braced wall lines, and braced wall lines on the interior of the building. Required braced wall lines on the interior of the building shall be supported on a continuous foundation.
c. Comply with Figure R602.12. Hold down force is minimum allowable stress load for connector providing uplift tie from wall framing at end of braced wall panel at the noted story to wall framing at end of braced wall panel at the story below, or to foundation or foundation wall. Use single story hold down force where edges of braced wall panels do not align; a continuous load path to the foundation shall be maintained. [See Figure R602.12].
d. Comply with Figure R602.12. Where hold down connectors from stories above align with stories below, use cumulative hold down force size middle and bottom story hold down connectors. (See Figure R602.12)

TABLE R703.7(2)
STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS, WOOD FRAMING, SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

STRUCTURE TYPE AND SEISMIC DESIGN CATEGORY	NUMBER OF WOOD FRAMED STORIES	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION OR FOUNDATION WALL (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf)
All buildings in SDC D_0	1	20[c]	4	40
	2	20[c]	4	40
	3	30[d]	4	40
Detached One- and two-family dwellings in SDC D_1	1	20[c]	4	40
	2	20[c]	4	40
	3	20[c]	4	40
Detached One- and two-family dwellings in SDC D_2	1	20[c]	3	30
	2	20[c]	3	30

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa, 1 pound-force = 4.448 N.
a. Cripple walls are shall not be permitted in Seismic Design Categories D_0, D_1 and D_2.
b. Maximum weight is shall be installed weight and shall includes weight of mortar, grout and lath, and other materials used for installation.
c. The veneer shall not exceed 20 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls, or 30 feet in height with an additional 8 feet for gable end walls where the lower 10 feet has a backing of concrete or masonry wall. See also Comply with story height limitations of Section R301.3.
d. The veneer shall not exceed 30 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls. See also Comply with story height limitations of Section R301.3.

Commenter's Reason: This public comment is filed anticipating the release of a report documenting the full-scale whole-building shaking-table tests conducted as a part of the NFS NEES Small-Group Project on masonry veneer. Preliminary reports from the testing show that the in-plane shear performance of anchored masonry veneer can resist a portion its own seismically-induced load. It shows that the shear capacity of the veneer is significant and can effectively carry a portion of its load directly to the foundation.

This code change adjusts the overly conservative special wall bracing requirements for houses with masonry veneer in moderate to high seismic regions. This code change effectively reduces the special wall bracing requirements for wood-stud framing behind masonry veneer in recognition that the veneer carries a significant portion of its own load in-plane.

The test results from the NFS NEES Small-Group Project are substantiated by other full-scale tests on whole-houses in the United States, Australia, England, Japan and New Zealand. One study in the United States reported that a two-story split foyer dwelling had a maximum deflection of 0.04 inches (1 mm) at a uniform wind pressure of 25 psf. This deflection was significantly less than that predicted by conventional analysis. Numerous whole-house tests have also been conducted in Australia. These tests demonstrated that conventional residential construction (only slightly different than that in the United States) withstood 2.4 times to 4.75 times its intended design load without failure. In England, researchers have determined that shear loads transferred from veneer to wood-framed shear walls in a full brick-veneered building were reduced by as much as 45% for wind loads. In New Zealand, tests demonstrated that for masonry veneer on conventional wood-stud framing, the veneer can take up to 50% of the lateral in-plane load.

Final Action: AS AM AMPC____ D

RB113-09/10
R602.12, Table R602.12(1), Table R602.12(2)

Proposed Change as Submitted

Proponent: Gary Ehrlich, National Association of Home Builders (NAHB)

Revise as follows:

R602.12 Wall bracing and stone and masonry veneer. Where stone and masonry veneer is installed in accordance with Section R703.7, wall bracing on exterior *braced wall lines*, and *braced wall lines* on the interior of the building, perpendicular to veneered walls shall comply with this section.

For all buildings in Seismic Design Categories A, B and C, wall bracing ~~at exterior and interior *braced wall lines*~~ shall be in accordance with Section R602.10 and the additional requirements of Table R602.12(1).

For detached one- or two-family *dwellings* in Seismic Design Categories D0, D1 and D2, wall bracing and hold downs ~~at exterior and interior *braced wall lines*~~ shall be in accordance with Sections R602.10 and R602.11 and the additional requirements of Section R602.12.1 and Table R602.12(2). In Seismic Design Categories D0, D1 and D2, cripple walls are not permitted, and required ~~interior~~ *braced wall lines* on the interior of the building shall be supported on continuous foundations.

TABLE R602.12(1)
STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS, WOOD ~~OR STEEL~~ FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C

SEISMIC DESIGN CATEGORY	NUMBER OFWOOD FRAMED STORIES	WOOD FRAMED STORY	MINIMUM SHEATHING AMOUNT ~~(length of braced wall line length)~~ [a]
A or B	1, 2 or 3	all	Table R602.10.1.2(2)
C (detached one- and two-family dwellings)	1, 2 or 3	all	Table R602.10.1.2(2)
C (townhouses)	1	1 only	Table R602.10.1.2(2)
	2	top	Table R602.10.1.(2)
		bottom	1.5 times length required by Table R602.10.1.2(2)
	3	top	Table R602.10.1(1)
		middle	1.5 times length required by Table R602.10.1.2(2)
		bottom	1.5 times length required by Table R602.10.1.2(2)

a. Applies to exterior ~~and interior~~ braced wall lines, and braced wall lines on the interior of the building, perpendicular to veneered walls.

TABLE R602.12(2)
STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS, ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

SEISMIC DESIGN CATEGORY	NUMBER OF STORIES[a]	STORY	MINIMUM SHEATHING AMOUNT (percent ~~length~~ of braced wall line length) [~~b~~]	MINIMUM SHEATHING THICKNESS AND FASTENING	SINGLE STORY HOLD DOWN FORCE (lb)[~~b~~c]	CUMULATIVE HOLD DOWN FORCE (lb)[~~c~~d]

b. Applies to exterior ~~and interior~~ braced wall lines, and braced wall lines on the interior of the building, perpendicular to veneered walls.

(Portions of table and footnotes not shown remain unchanged)

FIGURE R602.12
~~HOLD DOWNS AT EXTERIOR AND INTERIOR BRACED WALL PANELS~~
STONE OR MASONRY VENEER WALL BRACING HOLD-DOWN REQUIREMENTS, ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

(No change to figure)

Reason: The purpose of this proposal is to revise the overly conservative special wall bracing requirements for dwellings with stone or masonry veneer in moderate and high-seismic regions. A common application is for only the front wall of a dwelling to be provided with stone or masonry veneer. However, the provisions as currently stated require the specified bracing length to be increased for every braced wall in the dwelling (both exterior and on the interior), and in high-seismic conditions for hold-downs to be provided on every segment of every braced wall panel in the dwelling.

In recent testing at the University of Texas and UC San Diego, masonry veneer on individual wood-framed wall segments and on a full wood-framed building did not fail until subjected to peak ground accelerations well above the ground motions characteristic of Seismic Design Category D2. Thus, failure did not occur until well beyond the seismic limits of the IRC. Additionally, the major failure mode is veneer falling off the segments and building, rather than any damage to the wood framing back-up.

Additionally, testing at BRANZ in New Zealand of conventionally-braced structure with masonry veneer has shown that the masonry itself is capable of taking as much as 50% of the lateral load delivered in-plane to the wall. Further, the veneer showed good performance up to deflections of an inch. The allowable design capacities for bracing in the IRC result in deflections of around ½-inch, well within the range of good performance seen in the BRANZ tests.

There are no documented racking failures of a properly-braced house with stone or masonry veneer due to a seismic event. (Obviously, lack of veneer reinforcing and ties is an entirely different issue). Based on that fact and the UT, UCSD and BRANZ testing, the current requirement is not technically justified and clearly an onerous burden on masonry veneer construction. The proposed revisions will limit the increases in bracing and vertical load-path connections to just those walls that need to resist the seismic loads imparted to the structure by the masonry veneer.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EHRLICH-RB-8-R602.12

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that a truly quantified result is not available that would allow this change, based on the previous action on RB112-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, National Association of Home Builders, requests Approval as Modified by this Public Comment.

Modify the proposal as:

R602.12 Wall bracing and stone and masonry veneer. Where stone and masonry veneer is installed in accordance with Section R703.7, wall bracing on exterior *braced wall lines*, and *braced wall lines* on the interior of the building, backing or perpendicular to and laterally supporting veneered walls shall comply with this section.

For all buildings in Seismic Design Categories A, B and C, wall bracing shall be in accordance with Section R602.10 and the additional requirements of Table R602.12(1).

For detached one- or two-family *dwellings* in Seismic Design Categories D0, D1 and D2, wall bracing and hold downs shall be in accordance with Sections R602.10 and R602.11 and the additional requirements of Section R602.12.1 and Table R602.12(2). In Seismic Design Categories D0, D1 and D2, cripple walls shall not be permitted, and required *braced wall lines* on the interior of the building shall be supported on continuous foundations.

TABLE R602.12(1)
STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS, WOOD FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C

SEISMIC DESIGN CATEGORY	NUMBER OFWOOD FRAMED STORIES	WOOD FRAMED STORY	MINIMUM SHEATHING AMOUNT
A or B	1, 2 or 3	all	Table R602.10.1.2(2)
~~C (detached one- and two-family dwellings)~~	~~1, 2 or 3~~	~~all~~	~~Table R602.10.1.2(2)~~
C ~~(townhouses)~~	1	1 only	Table R602.10.1.2(2)
	2	top	Table R602.10.1.(2)
		bottom	1.5 times length required by Table R602.10.1.2(2)
	3	top	Table R602.10.1(1)
		middle	1.5 times length required by Table R602.10.1.2(2)
		bottom	1.5 times length required by Table R602.10.1.2(2)

a. Applies to exterior braced wall lines, and braced wall lines on the interior of the building, backing or perpendicular to and laterally supporting veneered walls.

TABLE R602.12(2)
STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS,
ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D0, D1 AND D2

b. Applies to exterior braced wall lines, and braced wall lines on the interior of the building, backing or perpendicular to and laterally supporting veneered walls.

(Remainder of table and footnotes remain unchanged)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The purpose of this public comment is to incorporate the modification that was ruled out-of-order during the Public Hearings in Baltimore. This modification accomplishes two things. First, by adding the phrase "backing or", the requirement for a wood-framed wall providing backup for masonry veneer to be braced using these special seismic bracing provisions is maintained. Second, by adding the phrase "laterally supporting", the intent of the proposal to remove the bracing requirement from walls not seeing load from the veneer is maintained. An example of a wall meeting this provision would be the outermost wall of a one-story garage constructed without masonry veneer but attached to a veneered or partially-veneered two-story house.

This proposal does not reduce the required amount of bracing on any wall backing masonry veneer, or on any wall perpendicular to and laterally supporting a masonry veneer wall. These are the walls that will see seismic loads imposed on them due to the masonry and need the additional bracing. What this proposal is trying to address is walls such as the back wall of a house with masonry only on the front wall that will see little, if any, additional force due to the presence of the veneer. These walls should not have to be transformed into fully-restrained shear walls with hold-downs or subject to increased bracing lengths simply because there is masonry veneer on the opposite side of the house.

For SDC D0, D1 and D2, the walls that are exempted from the special bracing provisions by this change still need to be braced using one of the eight standard intermittent bracing methods, with the standard 48" minimum braced wall panel length required. This is consistent with the rules which forbid mixing of intermittent and continuous bracing methods on the same story in high-seismic regions. Similarly, the "partial-credit" provision for intermittent panels between 36" and 48" is also prohibited in high-seismic regions. Thus, the total amount of bracing which would be provided on the walls not subject to the special increases will likely be greater than the total amount which would be provided if the dwelling had no veneer. Therefore, concerns about potential torsional effects or deformation compatibility do not apply. The performance of the bracing will be equivalent regardless of whether the braced wall panels have veneer and/or hold-downs on them or not.

Final Action: AS AM AMPC____ D

RB116-09/10
R606.6.1

Proposed Change as Submitted

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

Revise as follows:

R606.6.1 Pier cap. Hollow piers shall be capped with 4 inches (102 mm) of *solid masonry* or concrete, a masonry cap block, or shall have cavities of the top course filled with concrete or grout, unless a sill plate of 2-inch (51 mm) minimum nominal thickness and bearing on two face shells is provided. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm). ~~or other *approved* methods.~~

Reason: The purpose of this proposal is to provide additional options for providing bearing at the top of masonry piers. No guidance is currently provided in the code for the common condition where the top of a masonry pier does not match the bottom of the floor framing. Even if the pier has been properly constructed with solid masonry or grouted cells, the code does not clearly require direct bearing, and this gap is often filled with shims or small blocks that are not adequate to transfer the reaction from the beam or girder to the pier. Language previously included in Section 1804.6.4 of the 1999 SBC requiring a nominal section of sill plate is added to R606.6.1. Also, a reference to a masonry cap block (or "FHA block") is added. These blocks have a solid top surface over hollow cores and are intended to be used at the top courses of masonry piers or walls. However, the "cap" is not 4" thick, hence the need for a separate reference.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EHRLICH-RB-9-R606.6.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the committee's previous action on RB80-09/10 and the proponent's request for disapproval with intent to rework and bring back to Final Action.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, PE, National Association of Home Builders, request Approval as Modified by this Public Comment

Modify the proposal as:

R502.6 Bearing. The ends of each joist, beam or girder shall have not less than 1.5 inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on masonry or concrete except where supported on a 1-inch-by-4-inch (25.4 mm by 102 mm) ribbon strip and nailed to the adjacent stud or by the use of *approved* joist hangers. The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch (51 mm) minimum nominal thickness shall be provided under the joist, beam or girder. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm).

R606.6.1 Pier cap. Hollow piers shall be capped with 4 inches (102 mm) of *solid masonry* or concrete, a masonry cap block, or shall have cavities of the top course filled with concrete or grout~~, unless a sill plate of 2-inch (51 mm) minimum nominal thickness and bearing on two face shells is provided. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm)~~.

R802.6 Bearing. The ends of each rafter or ceiling joist shall have not less than 1 1/2 inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on masonry or concrete. <u>The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch (51 mm) minimum nominal thickness shall be provided under the rafter or ceiling joist. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm).</u>

Commenter's Reason: The purpose of this public comment is to address concerns raised during testimony regarding the ability of the sill plate to provide sufficient bearing and load transfer across a hollow cell. While this is not an issue for many typical spans and load conditions, it could be for long spans, three-story dwellings and dwellings in areas of high snow loads. In recognition of these possible conditions, and to keep the code as simple as possible, we have agreed to delete the hollow-cell option.

The need still exists to address the condition where a gap does occur, for whatever reason, between the top of a pier and the floor or roof framing. For this reason, the sill plate language must be retained. Otherwise, a dowel or pile of shims filling the gap would be acceptable as long as the dowel or shims are at least three inches long. A sill plate segment will provide stronger and more stable bearing. The sill plate requirement is removed from R606.6.1 and moved to the end of Sections R502.6 and R802.6 where it is more appropriate.

Final Action: AS AM AMPC____ D

RB119-09/10

R612.1, R703.8

<u>Proposed Change as Submitted</u>

Proponent: Jeff Lowinski, representing the Window and Door Manufacturers Association (WDMA)

Revise as follows:

R612.1 General. This section prescribes performance and construction requirements for exterior window and door <u>assemblies</u> installed in wall<u>s</u>. Windows and doors shall be installed ~~and flashed~~ in accordance with the fenestration manufacturer's written installation instructions. Window and door openings shall be flashed in accordance with Section R703.8. Written installation instructions shall be provided by the fenestration manufacturer for each window or door.

R703.8 Flashing. ~~*Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:~~ <u>Penetrations and openings in exterior walls shall be flashed or sealed in such a manner that will inhibit entry of water into the wall cavity or penetration of water to the building structural framing components. Flashing components shall be applied shingle fashion and shall direct water to the surface of the exterior wall finish. Material and components used to flash penetrations and openings shall be water-resistant and corrosion-resistant. Self-adhered membranes used as flashing shall comply with AAMA 711. The following locations shall be flashed:</u>

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

<u>Exterior wall plumbing penetrations shall be in accordance with Section P2606.</u>

Reason: The revisions proposed for Chapter 6 clarify that it is window and door assemblies that are installed in walls, and removes the inappropriate flashing text in this chapter since flashing requirements for windows and doors are explicit in Chapter 7.

In Chapter 7, the proposed is intended to be editorial and improves the charging language for flashing. The proposal also directs the reader to the requirements in Section P2606 for exterior wall plumbing penetrations.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LOWINSKI-RB-4-R612.1-R703.8

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that this change does not clearly define who is responsible for the instructions, the manufacturer or the code. ASTM E 2112 needs to be brought into compliance and brought into the code and that would resolve these issues. It is not clear that this is adequate for all openings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeff Inks, Window and Door Manufacturer's Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R612.1 General. This section prescribes performance and construction requirements for exterior window<u>s</u> and door<u>s</u> installed in wall<u>s</u>. Windows and doors shall be installed in accordance with the fenestration manufacturer's written installation instructions. Window and door openings shall be flashed in accordance with Section R703.8. Written installation instructions shall be provided by the fenestration manufacturer. ~~for each window or door~~.

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. <u>Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:</u>
   <u>1.1.</u> <u>The fenestration manufacturer's written flashing instructions.</u>
   <u>1.2.</u> <u>For applications not addressed in the fenestration manufacturer's written instructions, in accordance with the flashing manufacturer's written instructions.</u>
   <u>1.3</u> <u>In accordance with the flashing method of a registered design professional.</u>
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Exterior wall plumbing penetrations shall be in accordance with Section P2606.

Commenter's Reason: The intent of the original proposal is to clarify that the installation of windows is part of the design and construction of walls and partitions as provided for in Chapter 6, and that flashing is part of the design and construction of the exterior wall covering as provided for in Chapter 7, which is not disputed. In addition the intent was to clarify the respective Chapter 7 language accordingly.

The modification proposed for 703.8 by this public comment addresses the Committee's reason for rejecting the original proposal by clearly defining who is responsible for the (flashing) instructions, while also clarifying that door and window installation is to be in accordance with manufacturer's instructions as part of the design and construction of walls and partitions provided for in Chapter 6, and window and door flashing in accordance with 703.8 as part of the design and construction of the exterior wall covering which is already explicitly provided for in Chapter 7. Amending the sections in this way will help to avoid any confusion over how the IRC window and door installation and flashing requirements are to apply to doors and windows.

The requirement that instructions be provided for every single window and door is deleted from the last sentence in Section 612.1 because it is simply not necessary. Manufacturers are required to provide written instructions and they do, but there is no reason why the same set of printed instructions needs to be provided with every window and door when the products are identical. Duplicative copies are not needed, not used, and simply wasted at the jobsite. Complete manufacturer's instructions are readily available to builders, designers and installers in many ways. Requiring a separate set for every window and door is an unnecessary waste of resources.

This modification also addresses the Committee's other comment noting ASTM E 2112 as one way of providing a comprehensive set of installation and flashing instructions that the IRC could rely upon. At this time, E 2112 is undergoing significant revision and does not currently fully meet ICC criteria for referenced standards and therefore cannot be referenced by the IRC until revised. The above modification provides an acceptable alternative and one that the Committee agreed with in their consideration of RB-145.

While a window and door manufacturer's installation and flashing instructions do cover a wide variety of wall and project conditions, they simply cannot account for every conceivable project specific condition that may need to be considered given the virtually limitless set of conditions that are possible in residential construction, or for when a builder or design professional wants to employ a proven flashing method that may not be covered by a particular manufacturer's instructions. The IRC therefore needs to provide some flexibility at the local level to allow for flashing alternatives that are compliant with the performance requirements of 703.8, but may not be expressly provided for in the manufacturer's instructions. This modification serves that purpose while still maintaining the requirement that manufacturer's must provide instructions in accordance with Section 612.1, but also provides the noted flexibility that is needed by builders and design professionals.

Final Action: AS AM AMPC____ D

RB122-09/10, Part I
R612.2

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

PART I – IRC BUILDING/ENERGY

Revise as follows:

R612.2 Window sills. In *dwelling* units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished *grade* or surface below, the lowest part of the clear opening of the window shall be a minimum of ~~24~~ 36 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch (102 mm) diameter sphere where such openings are located within ~~24~~ 36 inches (610 mm) of the finished floor.

Exceptions:

1. Windows whose openings will not allow a 4-inch diameter(102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. Openings that are provided with window fall prevention devices that comply with Section R612.3.
3. Openings that are provided with fall prevention devices that comply with ASTM F 2090.
4. Windows that are provided with opening limiting devices that comply with Section R612.4.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Child Window Safety". The scope of the activity is noted as:

> Study the incidence and mechanisms of falls from open windows by children and to investigate the necessity and suitability of potential safeguards and/or revisions to the current codes.

The intent of IBC Section 1405.13.2 and IRC Section R612.2 is clearly to provide safety mechanisms to reduce the possibility of children falling through a window. The CTC has determined that this can be realized in the code in three ways: window fall prevention devices; window opening control devices; or reducing the possibility of accessing the window by increasing the minimum sill height. The purpose of this code change is to reduce the potential hazard by increasing the sill height from 24 inches to 36 inches.

In response to the CTC studying the Climbability of Guards, the National Ornamental & Miscellaneous Metals Association (NOMMA) commissioned a paper entitled "Review of Fall Safety of Children Between the Ages of 18 months and 4 Years in Relation to Guards and Climbing in the Built Environment", referred to in this code change as "NOMMA paper". This paper is posted on the CTC website as noted below. The paper provides a summary of the building code requirements, a critical review of relevant per-reviewed scientific literature on guard research and injury data and includes a section entitled "Children's Interaction with the Built Environment". Included in this section is an analysis of falls from windows where it is noted that "Falls from windows are among the most common types of unintended injuries to children and they are a major health concern" (NOMMA paper page 30). The study efficiently places within a few pages the data on window fall incidents and the means of reducing the number of incidents.

U.S. Fall Injury Data

NOMMA report page 7: The 1,421,137 injuries reported by NEISS between 2002 and 2005, inclusive, correspond to a national average of 51,217,603 based on weighting data included with the record data. The average over the four years is 12,804,401. The weighted estimate of 1,117,278 incidents on average annually for children between the ages of 18 months and 4 years represents 8.7 percent of these incidents. For all the incidents to children between the ages of 18 months and 4 years, 5.6 percent involved stairs, 1.22 percent involved windows, and 0.87 percent involved porches, balconies, open-sided floors, and floor openings.

NOMMA paper page 30 – 33. The paper further cites reports which have been compiled in the table below:

Study	Location	Falls	% fatalities
Vish et al. (2005)	**Chicago**	**11/yr**	
Istre et al. (2003)	**Dallas county**	**17/yr**	
Benoit et al. (2002)	**L.A. county**	**12/yr (11%)**	**4% (4 yrs old or less)**
Stone et al. (2000)	**Cincinnati**	**12/yr (6.3%)**	**4.7%**
Benoit et al. (2000)	**Northern Virginia**	**11/yr (11%)**	

Center of Gravity
NOMMA paper page 11, Table 2: The standing center of gravity of children aged 2 to 3.5 years is 24.1 inches (50th percentile is 22.2 inches) and of children aged 3.5 to 4.5 is 25.2 (50th percentile is 23.6).

A reasonable expectation for the Code is that, absent any fall protection in the window opening, a minimum sill height will be required to reduce the ability of a child to climb onto the sill enabling the fall through the opening. Using a child target age of up to 4 years of age and the associated center of gravity, the code mandated height of 24" is not adequate. A child need only extend themselves on their toes, stand on modest stack of books or blocks or hoist themselves a matter of a few inches with their arms to be able to flop onto the sill and expose themselves to the window opening and the associated risk of falling.

The hazards associated with child window falls cannot be understated as evidenced by the following CPSC Press release dated May 15, 2008:

NEWS from CPSC
U.S. Consumer Product Safety Commission
Office of Information and Public Affairs Washington, DC 20207

FOR IMMEDIATE RELEASE
May 15, 2008
Release #08-270

CPSC Hotline: (800) 638-2772
CPSC Media Contact: (301) 504-7908

Window Falls Prompts CPSC to Issue Warning
WASHINGTON, D.C. - With the arrival of the warmer spring weather, families across the nation are opening their windows to let the fresh air in. This pleasant feeling can quickly turn tragic in households with small children. In recent weeks, several children have fallen from windows. The U.S. Consumer Product Safety Commission is warning parents and caregivers to take precautions to keep children from falling from windows.
"CPSC staff is aware of at least 18 falls from windows through media reports, including two deaths, involving small children since April," said CPSC Acting Chairman Nancy Nord. "We are issuing this warning so parents will take the necessary steps to prevent these incidents from happening."

These deaths and injuries frequently occur when kids push themselves against window screens or climb onto furniture located next to an open window.

From 2002-2004, CPSC staff received an average of 25 reports a year of fatalities associated with falls from windows. Children younger than five years of age account for approximately one-third of these reported fatalities. For all age categories, more males died from window falls than females.

To help prevent injuries and tragedies, CPSC recommends the following safety tips:
* Safeguard your children by using window guards or window stops.
* Install window guards to prevent children from falling out of windows. (For windows on the 6th floor and below, install window guards that adults and older children can open easily in case of fire.)
* Install window stops so that windows open no more than 4 inches.
* Never depend on screens to keep children from falling out of windows.
* Whenever possible, open windows from the top -- not the bottom.
* Keep furniture away from windows, to discourage children from climbing near windows.

To see this release on CPSC's web site, please go to:
http://www.cpsc.gov/cpscpub/prerel/prhtml08/08270.html

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HEILSTEDT-RB-2-R612-IBC 1405.13.2

Public Hearing Results

PART I – IRC

Committee Action: Disapproved

Committee Reason: The committee feels the 24 inch height has not been in use long enough to accumulate needed data to justify a change to 36 inches.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, P.E., Hon. AIA, Chair, ICC Code Technology Committee (CTC), requests Approval as Submitted.

Commenter's Reason: This code change proposal included two parts, one to the IRC (part 1) and one to the IBC (part 2), to increase the minimum sill height for windows from 24" to 36". Part 2 to the IBC was approved. In approving the code change to the IBC, the committee noted "…increasing the current 24 inch sill height requirement to 36 inches was justified by the data submitted by the proponent."

This public comment coordinates the requirements between the IRC and the IBC. The focus of this change is to provide for the safety of children that are accidentally injured and killed each year due to falls through windows. The window industry has illustrated its ability to provide the type of barrier that can easily offer the level of protection needed to prevent such accidents. CTC does not pretend that this will prevent children from falling from windows that are higher than this 36" threshold because they or others provide opportunities to climb. This doesn't mean we shouldn't establish rational thresholds that would avoid the accidental fall from windows as we have with guards.

Public Comment 2:

Gregory R. Istre, M.D., Injury Prevention Center of Greater Dallas, requests Approval as Submitted.

Commenter's Reason: I am writing in support of the proposal to change "RB 122" to set a minimum height of 36" for window sills in dwelling units. Our organization (the Injury Prevention Center of Greater Dallas), in collaboration with the Texas Department of Health, undertook a three-year study of children who had fallen from heights, in Dallas, Texas, and the data from that study support a mandate for a minimum height of window sills[1]. We found that 89% of the children who fell from a window had fallen directly out of a window whose sill was within 3 feet of the floor. In each case the windows were open and most had a screen, but the screens did not prevent the fall. Also, in almost every case, we found that a parent had been supervising the child but they could not prevent the fall. Our study concludes that most of the falls could have been prevented if either the window sills had been higher off the floor or if the windows had been manufactured to not open far enough to allow a child to pass through the opening.

I am aware that the current number in the code since 2006 is 24", which will go a long way toward decreasing window fall-related injuries to children. By our calculations from our data, ~75% of these falls may be prevented by having minimum sill height of 24", which is the current building standard, and an additional ~15% of falls could be prevented by raising the minimum sill height requirement to 36".

I am aware of Mr. Sealy's work for the past several years and have studied his current proposal, and am convinced that implementation of this code change will go a long way in preventing window fall-related injuries to children.-Gregory Istre, M.D.2/8/2010

Bibliography:

1) Istre, et al. "Childhood injuries due to falls from apartment windows and balconies" *Injury Prevention* 2003;9:349-352.

Public Comment 3:

Jim. W. Sealy, FAIA representing self, requests Approval as Submitted.

Commenter's Reason: This process began for me in early 2000 when I became involved in a legal action involving a toddler falling from an open window in his third floor apartment. During the course of my work I did a lot of research in window placement and falls from windows involving children. As a result of my work, I submitted a proposed change to both the IBC and IRC whereby windowsills would be required to be a minimum distance (36") above the finished floor of the room in which the window is located.

All of the technical requirements in my proposals were based on existing code language and none of it was arbitrary or contrived. My first proposals were submitted in 2002 and both failed because of objections from the window industry and homebuilders and building designers; with the 36" sill height being the major concern on their part. In the following cycle, I resubmitted both proposals and ultimately made concessions to the opposition and I accepted a sill height of 24". However, that height had no logical basis and had not been researched or studied – it was merely a concession on my part.

Both committees approved the section with the 24" height in the first part of the cycle and they were also approved in the final hearings held in Overland Park, Kansas. HOWEVER, in order t delay the section from going into the 2003 edition of the codes, one of the opponents filed a “formal challenge”. I continued my mission and I ultimately received approval of the modified section and it was printed in the 2006 edition of he codes.

Subsequently the ICC Code Technology Committee (CTC) began to study the sections dealing with this issue and they submitted code changes to resurrect my original proposals on the windowsills being positioned at 36” above the floor. They concluded that logic and outside studies confirmed my original premise and they have been successful in getting the 36” height passed by the IBC committee at the hearings in Baltimore. However, the IRC committee is still reluctant to accept logic and stated that the 24” height has not been in the codes long enough to determine its effectiveness.

The 24” dimension was purely arbitrary and was nothing more than a concession made to get something in the code. The 36” dimension, on the other hand, was and still is based on logic and has been proven in the codes for decades. In summary, the 36” height is justifiable and no lengthy study or research is necessary. It has been in the codes for decades and has not been challenged. In my opinion, this is proof that the 24” height is unacceptable in addressing the problem of children falling from windows and further proof that Approval As Submitted is the correct action for RB 122 09/10 Part 1.

Final Action: AS AM AMPC____ D

RB122-09/10, Part II
IBC 1405.13.2

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

PART II – IBC FIRE SAFETY

Revise as follows:

1405.13.2 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than ~~24~~ 36 inches (610 mm) above the finished floor surface of the room in which the window is located. Glazing between the floor and a height of ~~24~~ 36 inches (610 mm) shall be fixed or have openings through which a 4-inch (102 mm) diameter sphere cannot pass.

Exception: Openings that are provided with window guards that comply with ASTM F 2006 or F 2090.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC’s investigation of the area of study entitled “Child Window Safety”. The scope of the activity is noted as:

> Study the incidence and mechanisms of falls from open windows by children and to investigate the necessity and suitability of potential safeguards and/or revisions to the current codes.

The intent of IBC Section 1405.13.2 and IRC Section R612.2 is clearly to provide safety mechanisms to reduce the possibility of children falling through a window. The CTC has determined that this can be realized in the code in three ways: window fall prevention devices; window opening control devices; or reducing the possibility of accessing the window by increasing the minimum sill height. The purpose of this code change is to reduce the potential hazard by increasing the sill height from 24 inches to 36 inches.

In response to the CTC studying the Climbability of Guards, the National Ornamental & Miscellaneous Metals Association (NOMMA) commissioned a paper entitled “Review of Fall Safety of Children Between the Ages of 18 months and 4 Years in Relation to Guards and Climbing in the Built Environment”, referred to in this code change as “NOMMA paper”. This paper is posted on the CTC website as noted below. The paper provides a summary of the building code requirements, a critical review of relevant per-reviewed scientific literature on guard research and injury data and includes a section entitled “Children’s Interaction with the Built Environment”. Included in this section is an analysis of falls from windows where it is noted that “Falls from windows are among the most common types of unintended injuries to children and they are a major health concern” (NOMMA paper page 30). The study efficiently places within a few pages the data on window fall incidents and the means of reducing the number of incidents.

U.S. Fall Injury Data

NOMMA report page 7: The 1,421,137 injuries reported by NEISS between 2002 and 2005, inclusive, correspond to a national average of 51,217,603 based on weighting data included with the record data. The average over the four years is 12,804,401. The weighted estimate of 1,117,278 incidents on average annually for children between the ages of 18 months and 4 years represents 8.7 percent of these incidents. For all the incidents to children between the ages of 18 months and 4 years, 5.6 percent involved stairs, 1.22 percent involved windows, and 0.87 percent involved porches, balconies, open-sided floors, and floor openings.

NOMMA paper page 30 – 33. The paper further cites reports which have been compiled in the table below:

Study	Location	Falls	% fatalities
Vish et al. (2005)	**Chicago**	**11/yr**	
Istre et al. (2003)	**Dallas county**	**17/yr**	
Benoit et al. (2002)	**L.A. county**	**12/yr (11%)**	**4% (4 yrs old or less)**
Stone et al. (2000)	**Cincinnati**	**12/yr (6.3%)**	**4.7%**
Benoit et al. (2000)	**Northern Virginia**	**11/yr (11%)**	

Center of Gravity
NOMMA paper page 11, Table 2: The standing center of gravity of children aged 2 to 3.5 years is 24.1 inches (50^{th} percentile is 22.2 inches) and of children aged 3.5 to 4.5 is 25.2 (50^{th} percentile is 23.6).

A reasonable expectation for the Code is that, absent any fall protection in the window opening, a minimum sill height will be required to reduce the ability of a child to climb onto the sill enabling the fall through the opening. Using a child target age of up to 4 years of age and the associated center of gravity, the code mandated height of 24" is not adequate. A child need only extend themselves on their toes, stand on modest stack of books or blocks or hoist themselves a matter of a few inches with their arms to be able to flop onto the sill and expose themselves to the window opening and the associated risk of falling.

The hazards associated with child window falls cannot be understated as evidenced by the following CPSC Press release dated May 15, 2008:

NEWS from CPSC
U.S. Consumer Product Safety Commission
Office of Information and Public Affairs Washington, DC 20207

FOR IMMEDIATE RELEASE
May 15, 2008
Release #08-270

CPSC Hotline: (800) 638-2772
CPSC Media Contact: (301) 504-7908

Window Falls Prompts CPSC to Issue Warning
WASHINGTON, D.C. - With the arrival of the warmer spring weather, families across the nation are opening their windows to let the fresh air in. This pleasant feeling can quickly turn tragic in households with small children. In recent weeks, several children have fallen from windows. The U.S. Consumer Product Safety Commission is warning parents and caregivers to take precautions to keep children from falling from windows.

"CPSC staff is aware of at least 18 falls from windows through media reports, including two deaths, involving small children since April," said CPSC Acting Chairman Nancy Nord. "We are issuing this warning so parents will take the necessary steps to prevent these incidents from happening."

These deaths and injuries frequently occur when kids push themselves against window screens or climb onto furniture located next to an open window.

From 2002-2004, CPSC staff received an average of 25 reports a year of fatalities associated with falls from windows. Children younger than five years of age account for approximately one-third of these reported fatalities. For all age categories, more males died from window falls than females.

To help prevent injuries and tragedies, CPSC recommends the following safety tips:
* Safeguard your children by using window guards or window stops.
* Install window guards to prevent children from falling out of windows. (For windows on the 6th floor and below, install window guards that adults and older children can open easily in case of fire.)
* Install window stops so that windows open no more than 4 inches.
* Never depend on screens to keep children from falling out of windows.
* Whenever possible, open windows from the top -- not the bottom.
* Keep furniture away from windows, to discourage children from climbing near windows.

To see this release on CPSC's web site, please go to:
http://www.cpsc.gov/cpscpub/prerel/prhtml08/08270.html

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HEILSTEDT-RB-2-R612-IBC 1405.13.2

Public Hearing Results

PART II - IBC Fire Safety

Committee Action: Approved as Submitted

Committee Reason: The committee agreed that increasing the current 24 inch sill height requirement to 36 inches was justified by the data submitted by the proponent.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jeff Inks, Window and Door Manufacturer's Association, requests Disapproval.

Commenter's Reason: First, the ICC CTC has determined that the intent of 1405.13.2 can be met in three ways: window fall prevention devices; window opening control devices; or reducing the possibility of accessing the window by increasing the minimum sill height.

All three of those ways are already provided for in the current code as a result of the long debate that lead to the inclusion of the 24" requirement in the 2006 edition of the IBC. There is no adequate justification to further increase the height of the sills other than what we believe is a subjective determination by the CTC based upon a paper – not actual research -- that did not focus on window sill heights, but rather on climbable guards.

The "NOMMA paper" cited as the justification for proposing a minimum 36" sill height is in fact just a review which is clearly declare by its authors in the abstract that the paper who state that the paper, "*provides a summary of the building code requirements, a critical review of relevant peer-reviewed scientific literature on guard research and injury data related to children's climbing, and an analysis of the latest injury statistics*."

The paper was not commissioned nor is it intended to serve as the bases for building code requirements and there is nothing to suggest that it should. This too is clearly declared by the authors who expressly stated in the Executive Summary that the "*Results from either the research studies or the injury data are neither specific enough nor consistent enough to constitute a solid basis for building code requirements*."

The authors go even further with respect to the injury data in the report by stating that "*Caution should be used in applying the NEISS data to assign causation of an event. The designations provided in the NEISS reporting system focus on "product codes" and not on the mechanism or physical environment surrounding the injury.*" A copy of the report is available at http://www.iccsafe.org/cs/CTC/Documents/guards/resource/NOMMA_Final_Report_20080506R_May_08.pdf

If the authors of the report that is being used as the basis for approving this code change are adding such caveats for their own work, we believe that makes it clear that the report is not intended to serve as the basis for establishing building code requirements.

Second, the proponents reason statement goes on to state that with respect to the current 24" requirement "*a child need only extend themselves on their toes, stand on modest stack of books or blocks or hoist themselves a matter of a few inches with their arms to be able to flop onto the sill and expose themselves to the window opening and the associated risk of falling*." All of the factors cited in that statement as contributing to falls are factors that don't go away by raising the sill height, and there is no sound data to substantiate that raising the sill height further than 24" will result in a reduction of child falls. Equally concerning is the lack of consideration given to the potential for higher sill heights to actually encourage the placement of climbable/stepable objects or furniture near or under the window making the sill even more accessible. One can equally conclude from intuitive reasoning that there is a greater likelihood of this occurring the higher the sill height is. In fact, this could also encourage a child to climb to see out the window regardless of whether there are climbable/stepable objects available.

Regardless, those factors are precisely why most child safety advocacy organizations focus their fall prevention guidance on things such as keeping windows closed in rooms where children play, ensuring appropriate supervision, opening windows from the top, avoiding the placement of furniture and other climbable objects near the window, etc.

All of those factors are outside the control of the building code. We therefore do not believe that increasing the sill height to 36" will have a meaningful impact on reducing child falls. Promoting window safety awareness does however have a proven, meaningful impact versus a minimum 36" sill height and we therefore urge disapproval of it.

Public Comment 2:

Tim Pate, representing, City & County of Broomfield, CO, representing Colorado Chapter of ICC, requests Disapproval.

Commenter's Reason: This public comment is asking for the membership to overturn the IBC Fire Safety Committee and disapprove this code change. The IRC-Building/Energy Committee disapproved this same code change due to lack of any substantial data to show that the requirement for this sill height at 24" minimum which was put into the 2006 IBC and IRC has been effective in stopping child falls out of windows.

We need to wait until there is sufficient data to show that the 24" is not working (or even helping) before raising the number any higher. The original proponent himself stated that a child need only extend themselves on their toes, stand on modest stack of books or blocks or hoist themselves a matter of a few inches with their arms to be able to flop onto the sill and expose themselves to the window opening and the associated risk of falling.

Raising the window sill to 36" will only require the same child to stack up a higher stack of books or blocks and potentially fall out. There would even be a potentially higher risk of having an end table pushed up to the exterior wall in these locations and therefore make it even easier for child to get on top of and potentially fall out. Nowhere in the CPSC list of recommendations that the proponent has shown in original reason statement does it say to have a higher window sill. It does say to keep furniture away and use window stops and guards.

Public Comment 3:

Julie Ruth, JRuth Code Consulting, representing American Architectural Manufacturer's Association, requests Disapproval.

Commenter's Reason: RB122, Part II raises the minimum height required to the lowest part of the clear opening of an operable window from 24 inches to 36 inches in the IBC. The stated intent of doing so, by the proponent, is to reduce the risk of children falling through the open window. AAMA opposes this increase in the minimum sill height requirements of the IBC for the following reasons:

1. No evidence has been presented that establishing any minimum sill height, or raising that height, will prevent or reduce the number of **children who fall through windows each year.** The proponent of RB122 points to a study that was conducted by the National Ornamental and Miscellaneous Metals Association (NOMMA) regarding the ability of children to climb over guard rails as evidence of the need to raise the minimum sill height. The results of that study, which was conducted for NOMMA by the National Association of Home Builders Research Center, were published in a paper entitled ""Review of Fall Safety of Children Between the Ages of 18 months and 4 Years in Relation to Guards and Climbing in the Built Environment".

The study itself does not make any recommendations regarding an effective barrier height for young children. In fact, the Executive Summary includes the following statement. "Results from either the research studies or the injury data are neither specific enough nor consistent enough to constitute a solid basis for building code requirements."

Another result from the study, however, was consistent with a viewpoint that the fenestration industry has expressed many times as the dialog regarding the establishment of minimum sill heights has continued. That view is that children climb. The specific statement from the Executive Summary of the NOMMA report is: "Research shows that climbing plays an important role in the physical, cognitive, and social development of the young child, and that this is encouraged in many situations, such as playgrounds and school gymnasia."

Within the body of the report, the topic of children's climbing abilities is further expanded. "Children begin to practice climbing skills early in life. Many children learn rudimentary climbing before they begin to walk and climbing has been observed as early as 8 months of age (McGraw, 1935, cited in Readdick and Park, 1998). By around one year a child is able to pull himself up onto a ledge or table. By the age of 13 months many children have started walking unaided. By 14 months 25 percent of children are climbing, and this rises to 50 percent by 17 months (Readdick and Park, 1998). At 21 months 75 percent of children are climbing and 90 percent or more are climbing by 22 months of age (ibid.). By 4 years of age boys have started to develop greater upper body strength than girls. By the age of 6 years many children can begin to climb in a manner similar to an adult (van Herrewegen, Molenbroek and Goossens, 2004). As a consequence of these developmental processes, the acquisition of climbing skills mostly occurs between 3 and 6 years of age (van Herrewegen et al., 2004)."

Given children's documented ability to climb, it would not be realistic to expect a barrier of any height to be sufficient to prevent a child from going over it, unless the establishment of such a barrier were accompanied by a ban on the placement of any object adjacent to that barrier that might facilitate climbing, at any time during the occupancy of the building. This of course would be unenforceable. A previous review of window fall reports received from the Consumer Product Safety Commission indicates that in some instances children move objects, such as toys, Styrofoam coolers, pillows and small pieces of furniture, to enable themselves to climb to the sill height. It then becomes obvious that the establishment of a barrier of any height could still be overcome by a child who wishes to satisfy their own curiosity about what is going on outside the room they are in.

2. Raising the sill height could have the effect of raising the height from which children fall. Since we understand that children can and will climb, if we raise the height of the sill we are in essence raising the height they need to climb to if their objective is to see outside the window. By doing so, we also raise the height from which they may fall, both to the exterior of the building, and to the interior. This obviously increases the risk of injury to the child, rather than reducing it.

3. Raising the sill height would definitely make it more difficult for other occupants of the building to egress from the building through an open window. Although children can climb over barriers of great height, relative to their own, other occupants of the building may have difficulty doing so. This is particularly true of elderly, or the disabled. The likelihood of this, and the percentage of the population who could not overcome a barrier, increases as the height of the barrier does. Therefore, establishing any minimum sill height merely puts in place a barrier that may not reduce the number of children that fall through the window while increasing the likelihood that other occupants of the building will not be able to egress the building through that opening. Raising the height makes that situation worse – it does not improve it.

Final Action: AS AM AMPC____ D

RB123-09/10-PART II
IBC 1405.13.2, 1405.13.2.1 (New)

NOTE: PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART I IS REPRODUCED ONLY FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART II.

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

PART II – IBC FIRE SAFETY

1. Revise as follows:

1405.13.2 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches

(610 mm) above the finished floor surface of the room in which the window is located. ~~Glazing between the floor and a height of 24 inches (610 mm) shall be fixed or have openings such that a 4-inch (102 mm) diameter sphere cannot pass through.~~ Operable sections of windows shall not permit openings that allow passage of a 4 inch diameter sphere where such openings are located within 24 inches of the finished floor.

Exceptions:

~~Openings that are provided with window guards that comply with ASTM F 2006 or F 2090.~~

1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
3. Windows that are provided with window opening control devices that comply with Section 1405.13.2.1..

2. Add new text as follows:

1405.13.2.1 Window opening control devices. When required elsewhere in this code, window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2. The device or any portion thereof shall not project more than 1 inch into the required net clear opening for a length not exceeding 3 inches when the window is in the fully open position.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public. This proposed change is a result of the CTC's investigation of the area of study entitled "Child Window Safety". The scope of the activity is noted as:

> Study the incidence and mechanisms of falls from open windows by children and to investigate the necessity and suitability of potential safeguards and/or revisions to the current codes.

This code change is a follow-up to code change RB173-07/08 last cycle. At the Final Action Hearings in Minneapolis, the membership approved RB 173-07/08 Part 1 (Public Comment 2) to the IRC to include prescriptive provisions for window opening limiting devices but failed to approve the corresponding and identical provisions to the IBC. The proposal corrects this inconsistent action as well as replaces the prescriptive provisions with a reference to a consensus standard which has been updated to specifically address these devices.

IRC/IBC coordination: The result of this two part code change will be consistency between the IBC and IRC in terms of requirements.
Updated standard ASTM F2090 – 08: Both the IBC and IRC currently reference the 2007 edition of the standard entitled "Specification for Window Fall Prevention Devices with Emergency Escape (Egress Release Mechanisms". This standard was updated in 2008 to address window opening control devices. However, it was not updated in time to be included by reference in the 2009 IBC and IRC. This standard includes the necessary window operational criteria which results in the window not being able to be opened beyond the 4 inch performance threshold which is currently found in IRC Section R612.4.1. This control device can be released to allow the window to be fully opened in order to comply with the emergency escape provisions in both the IBC (1029.2) and IRC (R310.1.1)

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: HEILSTEDT-RB-1-R612-IBC 1405.13.2

Public Hearing Results

PART II - IBC Fire Safety
Committee Action: **Approved as Modified**

Modify the proposal as follows:

1405.13.2.1 Window opening control devices. ~~When required elsewhere in this code, w~~Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2. ~~The device or any portion thereof shall not project more than 1 inch into the required net clear opening for a length not exceeding 3 inches when the window is in the fully open position.~~

(Portions of the proposal not shown remain unchanged)

Committee Reason: The committee agreed that it was appropriate to have consistency between the IRC and the IBC with respect to the provisions for window sills and window opening control devices. The modification appropriately removes projection requirements that have not been justified.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeff Inks, Window and Door Manufacturer's Association, requests Approved as Modified by this public comment.

Modify the proposal as follows:

1405.13.2 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor surface of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch diameter sphere where such openings are located within 24 inches of the finished floor.

Exceptions:

1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
3. Windows that are provided with window opening control devices that comply with Section ~~1405.13.2.1~~ 1405.13.3.

~~1405.13.2.1~~ 1404.13.3 Window opening control devices. Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2.

Commenter's Reason: This change in the section number formatting is intended to ensure that all window opening control devices, regardless of whether or not they are used to serve as an exception to the sill height requirement, meet ASTM F2090.

Final Action: AS AM AMPC____ D

NOTE: PART I REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

PART I – IRC BUILDING/ENERGY

1. Revise as follows:

R612.2 Window sills. In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch diameter sphere where such openings are located within 24 inches of the finished floor.

Exceptions:

1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. ~~Openings that are provided with window fall prevention devices that comply with Section R612.3.~~
3. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
4. Windows that are provided with window opening ~~limiting~~ control devices that comply with ~~Section R612.4.~~ R612.3.

2. Delete without substitution:

~~**R612.3 Window fall prevention devices.** Window fall prevention devices and window guards, where provided, shall comply with the requirements of ASTM F 2090.~~

3. Renumber and revise Section R612.4 as follows:

~~R612.4~~ R612.3 Window opening ~~limiting~~ control devices. When required elsewhere in this code, window opening ~~limiting~~ control devices shall comply with ~~the provisions of this section.~~ ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section R 310.1.1. The device or any portion thereof shall not project more than 1 inch into the required net clear opening for a length not exceeding 3 inches when the window is in the fully open position.

4. Delete without substitution:

~~**R612.4.1 General requirements**. Window opening limiting devices shall be self- acting and shall be positioned so as to prohibit the free passage of a 4.0-in. (102-mm) diameter rigid sphere through the window opening when the window opening limiting device is installed in accordance with the manufacturer's instructions.~~

~~**R612.4.2 Operation for Emergency Escape.** Window opening limiting devices shall be designed with release mechanisms to allow for emergency escape through the window opening without the need for keys, tools or special knowledge. Window opening limiting devices shall comply with all of the following:~~

1. ~~Release of the window opening-limiting device shall require no more than 15 lbf (66 N) of force.~~
2. ~~The window opening limiting device release mechanism shall operate properly in all types of weather.~~
3. ~~Window opening limiting devices shall have their release mechanisms clearly identified for proper use in an emergency.~~
4. ~~The window opening limiting device shall not reduce the minimum net clear opening area of the window unit below what is required by Section R310.1.1 of the code.~~

PART I - IRC
Committee Action: **Approved as Modified**

Modify the proposal as follows:

R612.3 Window opening control devices. ~~When required elsewhere in this code,~~ Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section R 310.1.1. ~~The device or any portion thereof shall not project more than 1 inch into the required net clear opening for a length not exceeding 3 inches when the window is in the fully open position.~~

(Portions of proposal not shown remain unchanged)

Committee Reason: The committee feels this is a good change and the ICC CTC and industry has reached a consensus for a solution to the window opening control devices and achieves consistency with the IBC. The modification requires all window opening control devices to comply with the standard and eliminate the proposed language about hardware projection.

Assembly Action: **None**

RB127-09/10
R612.8, Chapter 44 (New)

Proposed Change as Submitted

Proponent: Jeff Burton, Director of Codes and Standards, representing Association of Millwork Distributors

1. Revise as follows:

R612.8 Other exterior window and door assemblies. Exterior windows and door assemblies not included within the scope of Section R612.6 or Section R612.7 shall be tested in accordance with ASTM E 330 or AMD SHEDS. Glass in assemblies covered by this exception shall comply with Section R308.5.

2. Add new standard to Chapter 44 as follows:

AMD Association of Millwork Distributors
10047 Robert Trent Jones Boulevard
Port Richey, FL 34655

SHEDS Side Hinged Exterior Door Standard

Reason: The code change proposal adds an additional requirement (option) to the code in that it includes a structural component interchangeability methodology that is prevalent in the side hinged exterior door (SHED) industry but is not addressed in the building codes or its current referenced standards. The addition of the AMD SHEDS (Side Hinged Exterior Door Standard), which is designed in accordance with the current industry ASTM E330 static pressure test, adds that needed structural component interchangeability option.

The current minimum code requirements for SHEDs adequately address concerns with public safety and protection of property, in that, to date, no empirical evidence or testimony has been provided to the ICC code development process proving that SHEDs are a significant failure relating to variable pressure from hurricanes force or high winds, in fact, the foremost leading post hurricane/building code experts provide no significant evidence of actual failures relating to SHEDs*. This lack of evidence supports current regulation and commonly used industry practices (component interchange) in place today. The current code is too restrictive in that it references SHED “system only” test standards and should allow for a SHEDs component interchange option similar to its allowances relating to fire rated doors.

*__Bibliography__

Rainwater Management Performance of Newly Constructed Residential Building Enclosures During August and September 2004 by Dr. Joe Lstiburek of the Building Science Corp., the Home Builders Association of Metro Orlando and the Florida Home Builders Association

The Benefits of Modern Wind Resistant Building Codes on Hurricane Claim Frequency and Severity-A Summary Report by Dr. Timothy Reinhold at the Institute for Business and Home Safety

Post 2004 Hurricane Field Survey-an Evaluation of the Relative Performance of the Standard Building Code and the Florida Building Code by Dr. Kurt Gurley of the University of Florida.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, AMD SHEDS, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: BURTON-RB-1-R612.8

Public Hearing Results

Note: The following analysis was not in the Code Change Monograph:

Analysis: Review of proposed new standard indicated that, in the opinion of ICC Staff, the standard did not comply with ICC standards criteria, Section 3.6.3.1.

Committee Action: Approved as Submitted

Committee Reason: The committee feels this is a needed change and reflects industry practice as stated in the proponent's published reason. The new reference standard is in draft form and must be available by Final Action.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jonathan Humble, ICC Reference Standards Committee, requests Disapproval.

Commenter's Reason: The ICC Reference Standards Committee is a committee that was organized "to support the codes development committees through the review of reference standards for the International Codes." We submit this code challenge to provide an opinion regarding code change.

It is the reference standards committee's view that the proposal currently lacks sufficient information concerning the promulgation process. We would preface this opinion that it is not our view to state that the proposed document is technically deficient or that the proposal does not have technical merit, but rather to state that the document development process and maintenance process do not comply with ICC Council Policy 28, specifically Section 3.6.3, which requires standards be completed and readily available.

We therefore request Disapproval.

Public Comment 2:

Jeff Inks, Window and Door Manufacturer's Association, requests Disapproval.

Commenter's Reason: The first and foremost reason we are requesting disapproval is because as of submission of this public comment, the document is still in drafting stages and has not yet undergone even an initial public review.

While component interchangeability is not new, it is complex and must be carefully considered. Although we appreciate the efforts of the proponent to include a standard that can address the issue, approval of a draft standard such as that proposed by RB127 is not justified and does not meet ICC criteria for referenced standards.

Public Comment 3:

Julie Ruth: JRuth Code Consulting, representing American Architectural Manufacturer's Association, requests Disapproval.

Commenter's Reason: RB127 adds a new standard to the IRC, Association of Millwork Distributor's *Side Hinged Exterior Door Standard (SHEDS)*, for the determination of the design pressure rating of exterior side hinged doors. The proposal would permit the use of the component interchangeability methodology provided in AMD SHEDs as an alternative to the current code requirement for full system testing of side hinged doors in accordance with ASTM E330.

AAMA seeks the disapproval of RB127 for several reasons:

1. The standard is not yet complete. The IRC Building and Energy Committee approved a draft of AMD SHEDs during the 2009 Code Development Hearings without knowledge of what the final content of the standard would be. For example, there were several instances in the draft edition of the standard that was approved where actual values had not yet been determined, and the value "x" or "xx" only was stated. Two such examples were Section 8.3.3, which stated "Determine change in length from original measurement and record percentage. The lineal shrinkage shall not exceed XX%" and Section 8.4.3, which stated "Determine change in height and record percentage. The change in functional height shall not exceed XX%."

Obviously, a document that contains such language is not enforceable, and should not be approved for reference in the IRC, or any other International Code.

Furthermore, although AMD indicated during the Code Development Hearing it was their intent to seek approval of AMD SHEDs from the American National Standards Institute, they had not yet begun the process to achieve such approval at that time. Although ICC procedures do not require standards to be approved by ANSI to be referenced in International Codes, it does require they be developed in an open, consensus process such as ANSI or ASTM. If approval of the standard by ANSI has not been received by the Final Action Hearings on RB proposals in May 2010, then compliance with the requirement for development of the standard through an open, consensus process should be demonstrated in some other manner. As of the date of this submittal, evidence of compliance with the requirements of the ICC procedures has not been provided.

2. The provisions of the standard are inadequate. The members of the American Architectural Manufacturers Association (AAMA) Door Council have been working towards the development of a component interchangeability methodology for the rating of exterior side hinged doors for several years now. What we have found is that even just rating these products for structural design pressure (not even including consideration of resistance to air infiltration or water penetration) is significantly complicated. Analysis of an exterior door subject to a uniform design pressure perpendicular to the door is the analysis of a flat plate subject to a uniform load. Such analysis is difficult even if the plate is uniform in composition and symmetrically supported within the opening. An exterior door is not uniform in composition in that some sections of the door consist of door skins over framing, some sections consist of door skins over insulation, some sections consist of glazing, with or without its own framing, and some sections include hardware. The door is also not uniformly supported. One long edge will typically be supported against design pressure perpendicular to the plane of the door by three or four hinges that are varying distances from the corner of the door. The other long edge is typically supported by one lock/latch that is located somewhere along the edge, but usually not quite centered on it, and which in some cases anchors into a door jamb, and in other cases, anchors into the long edge of another door. This may be coupled by bolts on the top or bottom of the door that anchor it further at those corners, or it may not.

Overall, the analysis of what happens to that door (both the slab itself, and the hardware securing it to the opening) when subjected to structural loads is extremely complex. AAMA has been certifying fenestration products for structural performance, as well as resistance to air and water infiltration, for almost 50 years. Drawing upon the experience gained through that, and in an attempt to begin to address this complexity, a series of preliminary tests were conducted. Significant, unexpected inconsistencies in overall design pressures (ranging from 2.5 to 45 psf) resulted during door system testing using doors of like panel, frame and glazing constructions that would have otherwise been anticipated to have consistent results.

The door systems tested were provided by three different manufacturers and were produced with the following commonalities: overall size, type and gauge of skin material, stile material, insulating material, glass make-up, and identical lock/deadbolt. Some variables included hinges, frame/stop design, density of insulating material, and IG sealants.

The test results demonstrated that even with predominately common elements in the construction of the door, variation of single components such as the hinges, the frame/stop design, the density of the insulation material, and the sealants on the Insulating Glass (IG) units could provide dramatically different results with regards to the doors ability to withstand uniform pressure.

The methodology provided by AMD in their SHED does not address this variation in the overall door assemblies' ability to withstand structural load.

3. Validation test data from proponents of AMD SHEDs has not been made available for review. Confirmation of the validity of a proposed new testing and rating method, either through peer review, round robin testing, or some other method of verifying the validity of the results, is the hallmark of meaningful standards development. The need for it should not be dismissed or lightly set aside.
AAMA intends to continue to conduct research, including both testing and structural analysis, to develop the appropriate method to be used for interchangeability of components in door systems. We believe it can be done, and we intend to draw upon our years of experience in testing and certification of fenestration products to do that. But we also know the approach taken by AMD in their SHEDs is not the correct approach. It is premature and inadequate. Its use will result in erroneously rated door systems that will not perform as anticipated, hoped or needed when subjected to high wind events.

4. Use of the proposed referenced standard would significantly weaken the current requirements of the IRC. During the committee discussion on RB127 there seemed to be some confusion with regards to the current requirements of the IRC. Some parties seemed to be of the impression that there currently are no requirements for side hinged doors in the IRC, and that adding reference to AMD SHEDs would "at least be better than nothing."

In actuality, the 2009 IRC does have requirements for determining the resistance of side hinged exterior doors to design wind pressure. It requires doors such as these, which are not within the scope of AAMA/WDMA/CSA 101/I.S.2/A440, to be tested in accordance with ASTM E330. ASTM E330 requires a full scale test of the entire assembly being evaluated. Testing individual components and then compiling those components into an assembly under the methodology presented in AMD SHEDs does not provide an equivalent amount of information with regards to the performance of the completed assembly as a full scale test conducted in accordance with ASTM E330 does. Whether or not AMD SHEDs is "better than nothing" could be argued one way or the other, but it is very clear that AMD SHEDs is not better than the current code requirement for full scale testing in accordance with ASTM E330, or even equivalent.

Public Comment 4:

Thomas Meyers, City of Central City, CO, representing Colorado Chapter of ICC, requests Disapproval.

Commenter's Reason: The IRC building and energy committee approved the SHEDS standards with the understanding that the standard would be finalized and published prior to the final action hearings. This proposal is intended to provide a means to disapprove the standard should the SHEDS standards body fail to have the document completed in time for testimony in Dallas, TX.

Analysis: The standard proposed for reference in the code, AMD SHEDS was not completed and readily available at the time of the Code Development Hearings in Baltimore. ICC Council Policy CP#28-05, Code Development, Section 3.6.3.1, required that the standard must be completed and readily available at the time of these Final Action Hearings in order to be considered for inclusion in the code.

Final Action: AS AM AMPC____ D

RB129-09/10
R613.7

Proposed Change as Submitted

Proponent: Edward L. Keith, representing APA – The Engineered Wood Association

Revise as follows:

R613.7 Drilling and notching. The maximum vertical chase penetration in SIPs shall have a maximum side dimension of 2 inches (51 mm) centered in the panel core. Vertical chases shall have a minimum spacing of 24-inches (610 mm) on center. Maximum of two horizontal chases shall be permitted in each wall panel - one at 14 inches (360 mm) from the bottom of the panel and one at mid-height of the wall panel. The maximum allowable penetration size in a wall panel shall be circular or rectangular with a maximum dimension of 12 inches (300 mm). <u>The minimum wall length for such a penetration shall be 20 feet (6100 mm) and only one such penetration shall be permitted in each full 20 foot (6100 mm) length of wall. Where multiple penetrations are to be located in a single wall line, they shall be placed no closer together than 20 feet (6100 mm) measured between adjacent edges of two penetrations.</u> Overcutting of holes in facing panels shall not be permitted.

Reason: The existing R613.7 provides no limitation on the field-placement of these holes up to 12" x 12" in size. As such, the proposed language is added to clarify the limitation proposed in the original code proposal in 2006. From an engineering perspective, a hole this size will have minimal impact on the capacity of the wall system as long as the wall or the spacing between holes is sufficiently long (20 feet or longer).

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KEITH-RB-1-R613.7

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The SIP Panels are an engineered product and the code cannot provide a prescriptive requirement. The penetration will have to be approved by the manufacturer and will be shown on the engineered drawings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edward L. Keith, APA- The Engineered Wood Association, requests Approval as Submitted.

Commenter's Reason: I ask that the body overturn the Committee's recommendation and accept the proposal as submitted. While it is true that SIP panels are delivered with a set of construction documents that have window and door openings "engineered" on the drawings, it is not uncommon that, during construction, the need arises for small field-applied openings that are not shown on the drawings. Some typical examples would be plumbing penetrations, "wet" room vents, or through-wall vented zero-clearance fire places, etc.

This proposal was developed on behalf of the Structural Insulated Panel Association to provide for some guidance for the builder and/or inspector on what size and how often such small openings can be installed without an engineering analysis by the manufacturer. The prescriptive limits of this proposal were determined as being appropriate by the technical staffs of the SIP manufacturers.

Another purpose of this proposal is to provide guidance for building officials in the evaluation of remodeling permits in the future that require small through-wall penetrations. Note that the maximum 12-inch by 12-inch hole size was specified as this is the size of the through-wall vent (with thermal protection) most commonly specified for the installation of high-efficiency zero-clearance fire places.

Final Action: AS AM AMPC____ D

RB135-09/10
Table R703.4

Proposed Change as Submitted

Proponent: Jay H. Crandell, PE, d/b/a ARES Consulting, representing the Foam Sheathing Coalition

Revise table as follows:

TABLE R703.4
WEATHER–RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

				TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS [b,c,d]					
SIDING MATERIAL	NOMINAL THICKNESS[a] (INCHES)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	WOOD OR WOOD STRUCTURAL PANEL SHEATHING INTO STUD	FIBERBOARD SHEATHING INTO STUD	GYPSUM SHEATHING INTO STUD	FOAM PLASTIC SHEATHING INTO STUD	DIRECT TO STUDS	NUMBER OR SPACING OF FASTENERS

(Portions of table not shown remain unchanged)

a. through c. *(No change)*

d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where ~~for~~ fiberboard, ~~or~~ gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, nails shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.

e. through z. *(No change)*

Reason: For many cases with siding attached over wood or wood structural panel sheathing, insufficient fastener penetration is provided if siding nails required by Table R703.4 are driven only into the sheathing. Only in cases where specific fastening instructions are provided for use of sheathing as a nail base should such a practice be permitted. In general, this will require a closer fastener spacing than currently required in Table R703.4 to account for the reduced withdrawal resistance of the siding nails installed in sheathing only (which may be no thicker than 3/8"). The change to the column heading for 'wood or wood structural panel sheathing' and footnote 'd' in Table R703.4 is needed to address this issue and avoid a common source of confusion resulting in potentially inadequate siding installations.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: CRANDELL-RB-4-T. R703.4

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard, gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, ~~nails~~ fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.

(Portions of proposal not shown remains unchanged)

Committee Reason: The committee feels this provides further clarity to the code and gives options where not nailed into studs. This helps to bring new products into the code. The modification changes the word "nails" to "fasteners" and will add flexibility to the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dennis Pitts, American Wood Council, American Forest & Paper Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE R703.4

SIDING MATERIAL	**NOMINAL THICKNESS[a] (inches)**	**JOINT TREATMENT**	**WATER-RESISTIVE BARRIER REQUIRED**	**TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b,c,d]**					
				Wood or wood structural panel sheathing ~~into stud~~	**Fiberboard sheathing into stud**	**Gypsum sheathing into stud**	**Foam plastic sheathing into stud**	**Direct to studs**	**Number of spacing of fasteners**
(Remainder of table unchanged)									

a. through c. *(No change)*

d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where fiberboard,gypsum, or foam plastic sheathing ~~backing~~ is used as backing material to support siding. Where wood or wood structural panel sheathing is used, fasteners shall be driven into studs ~~unless otherwise permitted to be driven into~~ or sheathing in accordance with the provisions of this code or in accordance with the siding manufacturer's installation instructions.

e. through z. *(No change)*

Commenter's Reason: The original change raised the point that some proprietary siding products have special provisions for attaching the siding material to wood structural panels in order to meet higher wind load ratings. The proposed solution eliminated the option of attaching siding to wood structural panels to avoid any misapplication. However, this solution only corrects the misapplication of proprietary siding while eliminating a common application permitted in the IRC such as wood shakes and shingles (703.5.3) and exterior plaster (R703.6.1). The proposed modifications recognizes that attachment of siding directly to wood structural panel sheathing is desirable and often recommended in the IRC while still highlighting the problem identified by the previous proposal.

Public Comment 2:

Edward L. Keith, APA-The Engineered Wood Association, request Disapproval.

Commenter's Reason: I request that the body overturn the Committee's recommendation for approval as submitted and disapprove the original code change proposal.

This code change reverses the way the IRC and legacy One and Two Family Dwelling Codes have dealt with nailable structural panel wall sheathing. Since 1995, the One and Two Family Dwelling Codes has recognized wood structural panels as a nailable sheathing in essentially the same table as Table R703.4 in the 2009 IRC. As such, the heading of the fifth column from the left ("Wood or Wood Structural Panel Sheathing") for the last 15 years has permitted nailing into wood or wood structural panel sheathing and not required nailing into the studs unless specifically recommended by the siding manufacturer.

Testimony was heard from the vinyl siding industry that they do currently have recommendations for nailing into studs as well as additional nailing into the wood structural panel sheathing for increased wind performance. This change makes the code's minimum recommendations more stringent than the manufacturer's!

Note also that "Wood Structural Panel Lap Siding" in this same table requires nailing into the nailable sheathing in that it requires nails along bottom edge at 8 inches on center. With the change as proposed, this lap siding could only be applied over studs at 8 inches on center, which is not only impractical, but is not supported by the good performance history of the current code provisions known to every jurisdiction in this country.

The proposed change will also eliminate the installation of siding products over structural insulated panels (SIPs) as recognized in Section R613.

Elimination of the recognition of wood or wood structural panel as a nailable sheathing may have numerous unintended consequences besides those mentioned above. Remember there are 17 different kinds of siding listed in the table and each with traditional attachment methods. Altering the code to not permit nailing into wood structural panel sheathing has the potential to make the accepted installation practices for numerous types of siding (in addition to vinyl siding and wood structural panel lap siding) no longer valid.

For over 15 years – it will be 17 years by the time the 2012 IRC is published – wood structural panels have been recognized as nailable sheathing. The current attachment provisions have performed adequately in the past and are the appropriate minimum attachment standard. For all these years, if a manufacturer has had more stringent attachment recommendations, these specific requirements have always controlled over the code minimum recommendations. This is not going to change in the 2012 IRC. This code change proposal reverses the way the code reads. It treats wood and wood structural panel sheathing like the non-structural sheathings and essentially sets a maximum attachment standard when wood structural panel sheathing is used.

The purpose of this code change proposal is not fire and life safety and was accompanied with no technical justification. This proposal ignores the 17 year history of good performance history by wood structural panels as nailable sheathing and will ignore significant advantages for components and cladding installed in conjunction with wood structural panels. Please reverse the Committee's decision by disapproving the proposed changes.

Final Action: AS AM AMPC____ D

RB137-09/10
R703.7

Proposed Change as Submitted

Proponent: Kimdolyn Boone, representing DuPont Building Innovations

Revise as follows:

R703.7 Stone and masonry veneer, general. Stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4, ~~and~~ Figure R703.7, Section R703.6.3 and Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS-402. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first *story* above-grade and shall not exceed 5 inches (127 mm) in thickness. See Section R602.12 for wall bracing requirements for masonry veneer for wood framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for cold-formed steel construction.

Exceptions:

1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
2. For detached one- or two-family *dwellings* in Seismic Design Categories D0, D1 and D2, exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.

Reason: Clarification of current requirement of the code. The requirements are currently listed in the Table 703.4 and footnotes. Adding the reference to the text makes both the table & text agree.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BOONE-RB-1-R703.7

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the proponent's request for disapproval. The committee feels the proponent should work with interested parties on a consensus of what is required for anchored and adhered veneer and bring this back to Final Action.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Kimdolyn Boone, DuPont Building Innovations, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R703.7 Stone and masonry veneer, general. Stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4~~,~~ and Figure R703.7~~, Section R703.6.3 and Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS-402~~. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first *story* above-grade and shall not exceed 5 inches (127 mm) in thickness. See Section R602.12 for wall bracing requirements for masonry veneer for wood framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for coldformed steel construction.

Exceptions:

1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
2. For detached one- or two-family *dwellings* in Seismic Design Categories D_0, D_1 and D_2, exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.

R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall be installed in accordance with the manufacturer's instructions, Section R703.6.3 and Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS-402.

Commenter's Reason: This modification was developed with interested parties within industry in response to the technical committee's direction to *"work with interested parties on a consensus of what is required for anchored and adhered veneer and bring this back to Final Action".*

The purpose of the original code change was to clarify and make explicitly clear the existing provisions to install adhered masonry veneer. Currently, these provisions reside in Table R703.4 under "adhered veneer", footnote "w" of Table R703.4 and Section R703.12 on adhered masonry veneer installation. Section R703.7 addresses anchored masonry veneer and is not appropriate for adhered masonry veneer.

This change adds footnote "w" of Table R703.4 to the adhered masonry veneer installation provisions found in Section R703.12. In this way, it is explicitly clear that adhered masonry veneer must not only comply with the manufacturer's instructions, but also that it be installed in accordance with Section R703.6.3 and the requirements of Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS 402. By not including this text in Section R703.12, the User may not install the water-resistive barrier required by Section R703.6.3 and may weigh more than 15 lb/ft^2 as required by Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS 402.

This change is necessary in order to ensure that adhered masonry veneer is installed correctly. It does this by having all the adhered masonry veneer requirements included in the code text.

Final Action: AS AM AMPC____ D

RB140-09/10
R703.7.4, R703.7.4.2, R703.7.4.3, Table R703.7.4 (New)

Proposed Change as Submitted

Proponent: Charles Clark, Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS)

1. Revise as follows:

R703.7.4 Anchorage. Masonry veneer shall be anchored to the supporting wall with corrosion-resistant metal ties embedded in mortar or grout and extending into the veneer a minimum of 11/2 inches (38 mm), with not less than 5/8 inch (15.9 mm) mortar or grout cover to outside face. Masonry veneer shall conform to Table R703.7.4. ~~Where veneer is anchored to wood backings by corrugated sheet metal ties, the distance separating the veneer from the sheathing material shall be a maximum of a nominal 1 inch (25 mm). Where the veneer is anchored to wood backings using metal strand wire ties, the distance separating the veneer from the sheathing material shall be a maximum of 41/2 inches (114 mm). Where the veneer is anchored to cold-formed steel backings, adjustable metal strand wire ties shall be used. Where veneer is anchored to cold-formed steel backings, the distance separating the veneer from the sheathing material shall be a maximum of 41/2 inches (114 mm).~~

2. Delete without substitution:

~~**R703.7.4.2 Air space.** The veneer shall be separated from the sheathing by an air space of a minimum of a nominal 1 inch (25 mm) but not more than 41/2 inches (114 mm).~~

3. Revise as follows:

R703.7.4. 3 Mortar or grout fill. As an alternate to the air space required by ~~Section~~ ~~R703.7.4.2~~ Table R703.7.4, mortar or grout shall be permitted to fill the air space .When the air space is filled with mortar, a water-resistive barrier is required over studs or sheathing. When filling the air space, replacing the sheathing and water-resistive barrier with a wire mesh and *approved* water-resistive barrier or an *approved* water-resistive barrier-backed reinforcement attached directly to the studs is permitted.

4. Add new table as follows:

TABLE R703.7.4
TIE ATTACHMENT AND AIR SPACE REQUIREMENTS

BACKING AND TIE	MINIMUM TIE	MINIMUM TIE FASTENER [A]	MINIMUM AIR SPACE	MAXIMUM AIR SPACE
Wood Backing with Corrugated Sheet Metal	22 U.S. gage (0.0299 in.) x 7/8 in. wide	8d common nail [b]	Nominal 1 in. between sheathing and veneer	Nominal 1 in. between sheathing and veneer
Wood Backing with Metal Strand Wire	W1.7 (No. 9 U.S. gage; 0.148 in.) with hook embedded in mortar joint	8d common nail [b]	Nominal 1 in. between sheathing and veneer	4½ in. between backing and veneer
Cold-Formed Steel Backing with Adjustable Metal Strand Wire	W1.7 (No. 9 U.S. gage; 0.148 in.) with hook embedded in mortar joint	No. 10 screw	Nominal 1 in. between sheathing and veneer	4½ in. between backing and veneer

For SI: 1 inch = 25.4 mm.

a. In Seismic Design Category D_0, D_1 or D_2, the minimum tie fastener shall be an 8d ring-shank nail or a No. 10 screw, 2 ½ inches long.
b. All fasteners shall have rust inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion.

Reason: This code change adds a table to the anchored masonry veneer provisions that accomplishes the following:

1) Makes the code easier to use by having minimum requirements for tie and tie fastener in a tabular form. The table also includes minimum and maximum air space requirements.
2) Footnote a) adds a requirement that a ring-shank nail is to be used when the veneer is constructed in a Seismic Design Category D_0, D_1 or D_2. Recent full-scale building shaking-table testing conducted at the University of California San Diego found that “fasteners on one side of the specimen failed by extraction of nails under dynamic tensile loads, at levels of shaking less than the Design Basis Earthquake (DBE). This behavior is not consistent with performance objectives for veneer. Current IRC requirements for the attachment of connectors to wood-stud backing need improvement in Seismic Design Category D_0 and above. (See references in Bibliography below)
3) Footnote b) requires that the fasteners be able to resist corrosion. This text is very similar to existing text in Section R603.2.4 on fastening requirements.

Bibliography:

1. Klingner, Richard E., Shing, P. Benson, McGinley, Mark W., McLean, David I., Okail, Hussein, and Jo, Seongwoo, “NSF NEES Small-Group Project on Performance-based Design of Masonry and Masonry Veneer: Overview and Preliminary Results,” *TMS Journal*, The Masonry Society, Boulder, Colorado, December 2008 (date submitted for publication).
2. Klingner, Richard E., “Behavior of Anchored Masonry Veneer with Light Wood Stud-Framing or Masonry Backing in Full-Scale Whole-Building Shaking-Table Tests,” *TMS Journal*, The Masonry Society, Boulder, Colorado, June 2009 (date submitted for publication).

Cost Impact: The code change proposal may slightly increase the cost of anchored masonry veneer construction in Seismic Design Categories D_0, D_1 and D_2.

ICCFILENAME: CLARK-RB-4-R703.7.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the proponent's request for disapproval. The committee feels the proponent should work with interested parties on a consensus of what is required for anchored and adhered veneer and bring this back to Final Action.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Charles Clark, AIA, PE, of the Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS); Steven Winkel, FAIA, PE, and J. Daniel Dolan, PhD, PE, representing the Federal Emergency Management Agency/Building Seismic Safety Council Code Resource Support Committee (FEMA/BSSCCRSC); Bonnie Manley, American Iron and Steel Institute (AISI), representing The Steel Framing Alliance (SFA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R703.7.4 Anchorage. Masonry veneer shall be anchored to the supporting wall studs with corrosion-resistant metal ties embedded in mortar or grout and extending into the veneer a minimum of 1 ½ inches (38 mm), with not less than 5/8 inch (15.9 mm) mortar or grout cover to outside face. Masonry veneer shall conform to Table R703.7.4.

TABLE R703.7.4
TIE ATTACHMENT AND AIR SPACE REQUIREMENTS

Backing and Tie	Minimum Tie	Minimum Tie Fastener [a]	~~Minimum Air Space~~	~~Maximum Air Space~~
			Air Space	
Wood Stud Backing with Corrugated Sheet Metal	22 U.S. gage (0.0299 in.) x 7/8 in. wide	8d common nail [b] (2 ½ in. x 0.131 in.)	~~Nominal 1 in. between sheathing and veneer~~ Nominal 1 in. between sheathing and veneer	~~Nominal 1 in. between sheathing and veneer~~
Wood Stud Backing with Metal Strand Wire	W1.7 (No. 9 U.S. gage; 0.148 in.) with hook embedded in mortar joint	8d common nail [b] (2 ½ in. x 0.131 in.)	Minimum ~~N~~nominal 1 in. between sheathing and ~~veneer~~	Maximum 4½ in. between backing and ~~veneer~~
Cold-Formed Steel Stud Backing with Adjustable Metal Strand Wire	W1.7 (No. 9 U.S. gage; 0.148 in.) with hook embedded in mortar joint	No. 10 screw extending through the steel framing a minimum of three exposed threads	Minimum ~~N~~nominal 1 in. between sheathing and veneer	Maximum 4½ in. between backing and veneer

For SI: 1 inch = 25.4 mm.

a. In Seismic Design Category D_0, D_1 or D_2, the minimum tie fastener shall be an 8d ring-shank nail (2 ½ in. x 0.131 in.) or a No. 10 screw~~, 2 ½ inches long.~~ extending through the steel framing a minimum of three exposed threads.
b. All fasteners shall have rust inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion.

(Portions of proposal not shown remain unchanged)

Commenter's' Reason: While the IRC Building/Energy Committee recommended that this code change be Approved as Submitted (AS), they also indicate in their Committee Reason statement that the change needs more work and the proponent should work with interested parties and bring back in a public comment the modification that was ruled out of order. The proposed modification submitted with this Public Comment complies with the committee's request and adds further clarity to the provisions.

Specifically, the modification accomplishes four things:

1) Clarifies that the air space requirements in the table are either minimums or maximums depending on the situation.
2) Includes the dimensions of the nails to be used for wood construction.
3) Specifies the minimum penetration for acceptable performance of screws used with steel framing.
4) Specifies that the ties are required to be attached to the studs and not the sheathing.

Final Action: AS AM AMPC____ D

RB145-09/10
R703.8

Proposed Change as Submitted

Proponent: Jeff Lowinski, representing the Window and Door Manufacturers Association (WDMA)

1. Add new definition as follows:

<u>**PAN FLASHING.** Corrosion-resistant flashing at the base of an opening that is integrated into the building exterior wall to direct water to the exterior and is pre-manufactured, fabricated, formed or applied at the job site.</u>

2. Revise as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. <u>Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:</u>
    <u>1.1.</u> <u>The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall also incorporate flashing or protection at the head and sides.</u>
    <u>1.2.</u> <u>In accordance with the flashing design or method of a registered design professional.</u>
    <u>1.3.</u> <u>In accordance with other approved methods.</u>
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Reason: This proposal identifies alternate flashing methods for windows and doors that complement the requirements of Section R703.8 and includes mandatory options for window and door flashing depending on the conditions of the project.

Window and door manufactures are required, by Section R613.1, to provide installation instructions for each window and door. Most window and door manufacturers require installation per their instructions and many window and door manufacturers are incorporate a pan flashing in their window and door installation instructions. Window and door manufacturers create installation and flashing instructions for a wide variety of wall conditions but are unable to create installation instructions for every conceivable wall condition. The 2nd and 3rd flashing methods identified in this proposal allows necessary flexibility while retaining the performance requirements of Section R703.8.

This proposal also introduces a definition of pan flashing into the code.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LOWINSKI-RB-5-R703.8

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels this is close but needs more work. Item 1.1 is confusing and should be a list rather than text. Also, the term "other approved methods" needs to be defined.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeff Inks, Window and Door Manufacturer's Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. <u>Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:</u>
   <u>1.1</u> <u>The fenestration manufacturer's installation and flashing instructions.</u>
   <u>1.2</u> <u>For applications not addressed in the fenestration written manufacturer's instructions, in accordance with the flashing manufacturer's written instructions, or flashing method of a registered design professional.</u>
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

Commenter's Reason: As noted by the Committee in their reason statement, they agreed with the intent of the original proposal which is to respond to the need for providing the flexibility to use alternative flashing methods that are compliant with the requirements in section R703.8, if there are project specific conditions that are not covered by the manufacturer's installation instructions. However, the Committee recommended that the provisions in item 1.1 in the original proposal be listed instead of combined in a single paragraph and that item 1.4 "Other approved methods" be defined if it was to be included.

The modification proposed by this comment addresses the Committee's concerns and actually further simplifies the section. Pan flashing language was removed because it can be covered by items 1.1 & 1.2 as proposed in this comment, and "Other approved methods" was removed because it is not necessary. Manufacturers are still required by Section 612.1 to provide written instructions, which they do. However, while a manufacturer's instructions do cover a wide variety of wall and project conditions, they simply cannot account for every conceivable project specific condition that may need to be considered given the virtually limitless set of conditions that are possible in residential construction. The IRC therefore needs to provide some flexibility at the local level to allow for flashing alternatives that are compliant with the performance requirements of 703.8, but may not be expressly provided for in the manufacturer's instructions. Item 1.2 covers that situation.

Final Action: AS AM AMPC____ D

RB146-09/10
R703.8

Proposed Change as Submitted

Proponent: Mike Rice, Maplewood, MN, representing the Association of Minnesota Building Officials

Revise as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.

6. At wall and roof intersections. Kick out flashing shall be installed where the lower portion of a sloped roof stops within the plane of an intersecting wall cladding in such a manner as to divert or kick out water away from the assembly.
7. At built-in gutters.

Reason: This change would complement the current code addressing wall and roof intersections and further prevent water from entering the wall cavity or penetrating to the structural building components. Step flashing at wall and roof intersections is incomplete without the kick out flashing, where the lower portion of a sloped roof stops within the plane of an intersecting wall. The water must be diverted away or it will find a way behind the water-resistive barrier and the siding or, in some cases, it will go through the siding. The benefit of adding the kick out flashing would far exceed the cost, as the cost would be little.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: RICE-RB-2-R703.8

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels this needs to be addressed but it belongs in Chapter 9. The proponent needs to rework and bring this back. This needs a detail or definition of "kick out flashing".

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Scott Dornfeld, City of Delano, requests Approval as Modified by this Public Comment.

Modify the proposal as:

R703.8 Flashing. Approved corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. Approved corrosion-resistant flashing shall be installed at all of the following locations:

1. Exterior window and openings. Flashing at exterior window openings shall extend to the surface of the wall finish or to the water-restive barrier for subsequent drainage.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood framed construction.
6. At wall and roof intersections. ~~Kick out~~ A flashing shall be installed to divert the water away from where the eave ~~lower portion~~ of a sloped roof ~~stops within the plane of an~~ ~~intersecting~~ intersects a vertical sidewall ~~wall cladding in such a manner as to divert or kick out water away from the assembly~~.
7. At built-in gutters.

Commenter's Reason: When this was brought forward at the Baltimore hearings, the idea was very good. The committee thought that there were some terms that needed work, in order to move forward I have been in contact with other concerned parties, I believe that this language will now make it clear on where the flashing at the eaves edge needs to be placed to prevent the water damage to the structure that we have been seeing for many years.

Final Action: AS AM AMPC____ D

RB147-09/10

Table R703.4, R703.11.2, R703.11.2.1,R703.11.2.2, R703.11.2.3, Table R703.11 (New)

Proposed Change as Submitted

Proponent: Dennis Pitts, American Forest & Paper Association

1. Revise as follows:

TABLE R703.4
WEATHER–RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (INCHES)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS b,c,d					
				WOOD OR WOOD STRUCTURAL PANEL SHEATHING	FIBERBOARD SHEATHING INTO STUD	GYPSUM SHEATHING INTO STUD	FOAM PLASTIC SHEATHING INTO STUD	DIRECT TO STUDS	NUMBER OR SPACING OF FASTENERS
VINYL SIDING[l]	0.035	LAP	Yes	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN[y,z]	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN[y]	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN[y]	~~0.120 NAIL (SHANK) WITH A 0.313 HEAD PER~~ SEE SECTION R703.11.2	NOT ALLOWED	16 INCHES ON CENTER OR AS SPECIFIED BY THE MANUFACTURER INSTRUCTIONS OR TEST REPORT

(Portions of table and footnotes not shown remain unchanged)

2. Delete and substitute as follows:

~~**R703.11.2 Foam plastic sheathing.** Vinyl siding used with foam plastic sheathing shall be installed in accordance with Section R703.11.2.1, R703.11.2.2, or R703.11.2.3.~~

> ~~**Exception:** Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other *approved* backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Section R703.11.1.~~

R703.11.2 Backing material. Vinyl siding certified per D 3679 is rated for use where the vinyl siding is directly applied over wood structural panels, structural fiberboard, exterior gypsum sheathing, or other approved backing material capable of independently resisting the design suction wind loads in Table R703.11, Case 1. For vinyl siding over foam plastic sheathing or other backing material not approved to independently resist the design wind loads, the vinyl siding must be rated for the design suction wind loads in Table R703.11, Case 2 or 3.

3. Delete without substitution:

~~**R703.11.2.1 Basic wind speed not exceeding 90 miles per hour and Exposure Category B.** Where the basic wind speed does not exceed 90 miles per hour (40 m/s), the Exposure Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 11/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C578, 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C1289, or 1-inch-thick (25 mm)(nominal) expanded polystyrene perASTMC578.~~

~~**R703.11.2.2 Basic wind speed exceeding 90 miles per hour or Exposure Categories C and D.** Where the basic wind speed exceeds 90 miles per hour (40 m/s) or the Exposure Category is C or D, or all conditions of Section~~

~~R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Tables R301.2(2) adjusted for height and exposure using Table R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:~~

1. ~~For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.~~
2. ~~For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.~~

~~**R703.11.2.3 Manufacturer specification.** Where the vinyl siding manufacturer's product specifications provide an *approved* design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.~~

4. Add new table as follows:

TABLE R703.11
REQUIRED NEGATIVE (SUCTION) WIND LOAD RATINGS (psf) FOR VINYL SIDING CERTIFIED PER ASTM D 3679[a,b]

Case	Backing Material	Wind Exposure	Basic Wind Speed (mph - 3 second gust)				
			85	90	100	105	110
1	Exterior Side: Wood structural panels, structural fiberboard, exterior gypsum sheathing, or other approved backing capable of independently resisting the design wind load. Infill materials are permitted between the vinyl siding and the backing material if the minimum fastener penetration is maintained.	B	17.4 [c]	19.5 [c]	24.1 [c]	26.6 [c]	29.1 [c]
		C	24.4 [c]	27.3 [c]	33.7	37.2	40.7
		D	28.9 [c]	32.4	40.0	44.2	48.3
2	Exterior Side: Foam plastic sheathing or other backing material not approved to independently resist the design wind loads. Interior Side: Gypsum wallboard or equivalent on interior side of wall.	B	45.1	50.6	62.5	69.0	75.4
		C	63.2	70.8	87.5	96.5	105.6
		D	74.9	83.9	103.7	114.5	125.2
3	Exterior Side: Foam plastic sheathing or other backing material not approved to independently resist the design wind loads. Interior Side: None	B	64.4	72.2	89.3	98.5	107.8
		C	90.2	101.1	125.0	137.9	150.9
		D	107.0	119.9	148.2	163.5	178.9

Reason: Vinyl siding is required to be certified per ASTM D3679 which includes negative (suction) wind testing to set a design wind rating. This wind rating is based on tests conducted with OSB or plywood used as backing material and assumes that the vinyl siding will be applied over similar backing material that can independently resist the negative wind loads. During the last cycle, provisions were added to IRC 703.11 to address the common condition where vinyl siding is installed over foam sheathing. Under this condition, the vinyl siding must resist the full wind load since the foam sheathing does not resist the negative wind loads.

At the final hearings, a new provision was added that provided a prescriptive solution for the case where the basic wind speed does not exceed 90 mph, the Exposure Category is B, and gypsum wallboard or equivalent is installed on the side of the wall opposite the foam plastic sheathing. In support, the following data was provided:

WIND PRESSURE TESTING OF WALL ASSEMBLIES
WITH FOAM SHEATHING AND VINYL SIDING PRODUCTS
(NAHB Research Center Report #4107003013108)

	Backing Material	Ult. Test Capacity (psf)	Wind Load resisted by Vinyl Siding	Safety Factor on Vinyl Siding	Wind Rating (psf)	Reference
Low Capacity Vinyl Siding	**CONTROL:** Vinyl Siding test (OSB backing material perforated per D 3679)					
	(none)	22.7	36%	1.50	42.1	D 3679
	Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)					
	3/8" EPS	29.1	100%	2.00	14.6	2009 IRC
	1/2" ISO	41.1	100%	2.00	20.6	2009 IRC
	1/2" XPS	41.6	100%	2.00	20.8	2009 IRC
High Capacity Vinyl Siding	**CONTROL:** Vinyl Siding test (OSB backing material perforated per D 3679)					
	(none)	81.9	36%	1.50	151.6	D 3679
	Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)					
	3/8" EPS	77.0	100%	2.00	38.5	2009 IRC
	1/2" ISO	86.1	100%	2.00	43.1	2009 IRC
	1/2" XPS	89.5	100%	2.00	44.7	2009 IRC

For the CONTROL case, the vinyl siding was wind rated at 42.1 psf using the procedures in D 3679. This rating was determined from the ultimate test capacity of the vinyl siding acting alone, divided by 0.36 in recognition that the backing material is resisting most of the wind load and by a safety factor of 1.5 since the vinyl siding is serving primarily as an exterior covering. The ultimate test capacity of the vinyl siding backed by solid foam sheathing was divided by 1.0 in recognition that the vinyl siding attachment must resist the wind load and by a safety factor of 2.0 since the vinyl siding is now acting as a structural sheathing to protect the building envelop. For the low capacity vinyl siding, the vinyl siding backed by 3/8" EPS was not capable of resisting the minimum wind loads in the IRC; however, ½" ISO and ½" XPS were capable of resisting the 19.5 psf negative wind loads associated with 90 mph, Exposure B. This case was selected as the basis of the current prescriptive provisions in R703.11.2.1.

Upon further study of the CONTROL case in the previous table, it can be seen that the low-capacity vinyl siding used in the tests would have a wind rating of 42.1 psf, not the minimum of 29.1 psf permitted by D 3679. A re-analysis was conducted to see what the result would be if minimum vinyl siding was used over foam sheathing:

	Backing Material	D 3679 min. Capacity (psf)	Wind Load resisted by Vinyl Siding	Safety Factor on Vinyl Siding	Wind Rating (psf)	Reference
D 3679 min. Vinyl Siding	OSB	15.7	36%	1.50	29.1	D 3679
	3/8" EPS	15.7	100%	2.00	7.9	2009 IRC
	1/2" ISO	15.7	100%	2.00	7.9	2009 IRC
	1/2" XPS	15.7	100%	2.00	7.9	2009 IRC

In order for the vinyl siding to resist the full wind load, this re-analysis suggests that it would take a medium grade of vinyl siding to meet the minimum negative wind loads and a high grade of vinyl siding and attachment to meet the moderate negative wind loads. For this reason, it is recommended that Section R703.11.2 and R703.11.2.1 be deleted and replaced with wind Table R703.11. Also, the prescriptive fastening in Table R703.4 should be replaced by a reference to the general section since the fastening schedule is linked to the wind rating.

Section R703.11.2.2 was previously added to provide an adjustment to the D 3679 wind ratings for cases where foam sheathing is used as the backing material. It requires the user to multiply the D 3679 wind ratings provided by the vinyl siding manufacturer in literature or an Evaluation Report, with a factor associated with the construction. In this proposed change, Section R703.11.2.2 was deleted and the adjustment factors were incorporated as increases in the required wind ratings in a new Table R703.11. Until D 3679 is modified to provide a means of determining wind ratings using the actual backing materials, this method should be used to prevent confusion and aid the user in selecting the proper vinyl siding.

Section R703.11.3 was added to provide guidance on the use of data for combined vinyl siding and foam sheathing tests. However, no standardized test procedure exists and any information developed by the vinyl siding manufacturer should be evaluated carefully prior to approval. This section is redundant with Section R104.11 and is, therefore, recommended for deletion.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: PITTS-RB-5-T. R703.4-R703.11

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that the deleting of this section may unfairly penalize the use of vinyl siding. Section R703.11.2 contains permissive language. There is a conflict between Footnote b in the proposed new table and Table R703.4. Also, Footnote c requires contact with the manufacture for higher wind loads.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Dennis Pitts, American Wood Council, American Forest & Paper Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

TABLE R703.4
WEATHER–RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL	NOMINAL THICKNESS[a] (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS[b,c,d]					
				Wood or wood structural panel sheathing	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
(remainder of table unchanged)									
Vinyl siding ~~[l]~~	0.035	Lap	Yes	0.120 nail (shank) with a .313 head or 16 gauge staple with 3/8 to ½-in crown [y, z]	0.120 nail (shank) with a .313 head or 16 gauge staple with 3/8 to ½-in crown [y]	0.120 nail (shank) with a .313 head or 16 gauge staple with 3/8 to ½-in crown [y]	~~.0120 nail (shank) with a 0.313 head per~~ <u>See</u> Section R703.11.2	Not allowed	16 inches on center or as specified by the manufacturer instructions or test report

(Footnotes remain unchanged)

R703.11 Vinyl siding. Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D 3679 by an *approved* quality control agency.

R703.11.1 Installation. Vinyl siding, soffit and accessories shall be installed in accordance with the manufacturer's installation instructions.

R703.11.1.1 Soffit panels shall be individually fastened to a supporting component such as a nailing strip, fascia, or subfascia component or as specified by the manufacturer's instructions.

R703.11.2 Foam plastic sheathing. Vinyl siding used with foam plastic sheathing shall be installed in accordance with R703.11.2.1, R703.11.2.2, or R703.11.2.3.

> **Exception:** Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing, or other *approved* backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with R703.11.1.

R703.11.2.1 Basic wind speed not exceeding 90 miles per hour and exposure Category B. Where the basic wind speed does not exceed 90 miles per hour (40 m/s), the Exposure Category is B and gypsum wallboard or equivalent is installed on the side of the wall opposite the foam plastic sheathing, <u>the vinyl siding shall be certified to a design wind pressure rating of at least 42 psf per ASTM D 3679 and</u> the minimum siding fastener penetration into wood framing shall be 1-1/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum ½-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C578, ½-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C1289, or 1-inch-thick (25 mm) (nominal) expanded polystyrene per ASTM C578.

R703.11.2.2 Basic wind speed exceeding 90 miles per hour or exposure Categories C and D. Where the basic wind speed exceeds 90 miles per hour (40 m/s) or the Exposure Category is C or D, or all conditions of Section R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Tables R301.2(2) adjusted for height and exposure using Section R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the ~~vinyl siding's~~ <u>ASTM D 3679</u> design wind pressure rating <u>of the vinyl siding</u> shall be multiplied by 0.39.
2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the ~~vinyl siding's~~ <u>ASTM D 3679</u> design wind pressure rating <u>of the vinyl siding</u> shall be multiplied by 0.27.

R703.11.2.3 Manufacturer specification. Where the vinyl siding manufacturer's product specifications provide an *approved* design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.

Commenter's Reason: Vinyl siding is required to be certified per ASTM D3679 which includes negative (suction) wind testing to set a design wind rating. This wind rating is based on tests conducted with OSB or plywood used as backing material and assumes that the vinyl siding will be applied over similar backing material that can independently resist the negative wind loads. During the last cycle, provisions were added to IRC 703.11 to address the common condition where vinyl siding is installed over foam sheathing. Under this condition, the vinyl siding must resist the full negative wind load since the foam sheathing does not resist the negative wind loads.

R703.11.2.1

At the final hearings during the last cycle, proposal RB195-07/08 added a new provision that provided a prescriptive solution for the case where the basic wind speed does not exceed 90 mph, the Exposure Category is B, and gypsum wallboard or equivalent is installed on the side of the wall opposite the foam plastic sheathing. In support of that proposal, the following data was provided:

WIND PRESSURE TESTING OF WALL ASSEMBLIES WITH FOAM SHEATHING AND VINYL SIDING PRODUCTS

(from NAHB Research Center Report #4107003013108)

	Backing Material	Ult. Test Capacity (psf)	Wind Load resisted by Vinyl Siding	Safety Factor on Vinyl Siding	Wind Rating (psf)	Reference
Low Capacity Vinyl Siding	**CONTROL:** Vinyl Siding test (OSB backing material perforated per D 3679)					
	(none)	22.7	36%	1.50	42.1	D 3679
	Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)					
	3/8" EPS	29.1	100%	2.00	14.6	2009 IRC
	1/2" ISO	41.1	100%	2.00	20.6	2009 IRC
	1/2" XPS	41.6	100%	2.00	20.8	2009 IRC
High Capacity Vinyl Siding	**CONTROL:** Vinyl Siding test (OSB backing material perforated per D 3679)					
	(none)	81.9	36%	1.50	151.6	D 3679
	Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)					
	3/8" EPS	77.0	100%	2.00	38.5	2009 IRC
	1/2" ISO	86.1	100%	2.00	43.1	2009 IRC
	1/2" XPS	89.5	100%	2.00	44.7	2009 IRC

For the CONTROL case, the vinyl siding was evaluated and found to resist 22.7 psf which equates to a wind rating of 42.1 psf using the procedures in D 3679. This rating was determined from the ultimate test capacity of the vinyl siding acting alone, divided by 0.36 in recognition that the backing material resists most of the wind load and by a safety factor of 1.5 since the vinyl siding is serving primarily as an exterior covering.

The ultimate test capacity of the vinyl siding was then backed by various types of solid foam sheathing was tested. An equivalent wind rating of the composite system was estimated per the requirements of the 2009 IRC R703.11.2 by dividing the ultimate test capacity by 1.0 in recognition that the vinyl siding attachment must resist the wind load and by a safety factor of 2.0 since the vinyl siding is now acting as a structural component necessary to protect the building envelop.

For the low capacity vinyl siding, the vinyl siding backed by 3/8" EPS was not capable of resisting the minimum wind loads in the IRC with the required safety factor; however, ½" ISO and ½" XPS were capable of providing a rated resistance of 20.6 and 20.8 psf, respectively, slightly higher than the 19.5 psf negative wind loads associated with 90 mph, Exposure B. This case was selected as the basis of the current prescriptive provisions in R703.11.2.1.

Upon further study of the CONTROL case in the previous table, it can be seen that the low-capacity vinyl siding used in the tests would have a wind rating of 42.1 psf, not the minimum of 29.1 psf permitted by D 3679. In order for the vinyl siding/foam sheathing composite described in R703.11.2.1 to resist the wind loads with the required safety factor, the test data clearly indicates that the vinyl siding needs to be rated per D 3679 for about 42 psf, not the minimum value of 29.1. This proposal states this limit explicitly in Section R703.11.2.1.

R703.11.2.2

This revision is simply editorial.

Table R703.4

The prescriptive fastening schedule for vinyl siding over foam sheathing in Table R703.4 has been replaced by a reference to R703.11.2. Use of products and systems in R703.11.2 can result in a wide variety of fastener types, sizes, and schedules. R703.11.2.1 already provides the prescriptive fastening schedule currently in Table R703.4 for the special case associated with R703.11.2.1. For other conditions covered in R703.11.2.2 and R703.11.2.3, different fastening schedules and detailing will likely be required to meet the higher wind loads. This change corrects this inconsistency.

Final Action: AS AM AMPC____ D

RB148-09/10
R202 (New), R703.13 (New), Chapter 44 (New)

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

1. Add new definition as follows:

POLYPROPYLENE SIDING. A shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings.

2. Add new text as follows:

R703.13 Polypropylene siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of R703.13.1, of R703.13.2 or of R703.3 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the manufacturer's installation instructions.

R703.13.1 Flame spread index. The polypropylene siding material shall comply with the requirements of ASTM D 7254. The certification shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E 84 or UL 723.

R703.13.2 Heat release. The polypropylene siding material shall comply with the requirements of ASTM D 7254 and a 4 foot by 8 foot (1.22 x 2.44 m) section of the polypropylene siding material shall exhibit a peak rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source at the thickness intended for use.

R703.13.3 Fire separation distance. The polypropylene siding shall comply with all the requirements of ASTM D 7254 and the fire separation distance between a building with polypropylene siding and the adjacent building shall be no less than 10 feet (3.05 m).

3. Add new standards to Chapter 44 as follows:

NFPA
289 Standard Method of Fire Test for Individual Fuel Packages (2009)

ASTM
D 7254 Standard specification for polypropylene (PP) siding

Reason: Polypropylene siding is being used in construction now although the IBC does not permit it. Therefore, it is important to regulate the use of polypropylene siding in a way that it can be used safely. The new sections are similar to the existing sections on vinyl siding, except for the fire testing. Vinyl siding is known to have adequate fire performance since the siding needs to be made of rigid (unplasticized) PVC in accordance with ASTM D 3679. Polypropylene is known not to have adequate fire performance unless properly fire retarded.

A new standard specification has been issued for polypropylene siding, ASTM D 7254. The specification addresses many of the key requirements for the material. Unfortunately the fire test requirement in ASTM D 7254 is not explicit enough. ASTM D 7254 does not require that, when fire testing is conducted in the ASTM E 84 (Steiner tunnel), the test specimen must remain in place during the test and flaming drips and falling test specimens are not allowed to happen. This requirement is critical for materials that are used exposed so that the flame spread index assesses actual surface flame spread on the material surface. The standards committee responsible for the ASTM E 84 fire test (ASTM E05) decided that this issue should be addressed in the code rather than in the standard itself. Polypropylene that has not been appropriately fire retarded will release abundant amount of heat, much more than other combustible sidings permitted by the code, such as wood siding or vinyl (PVC) siding, and spread fire through flaming drips. Such flaming drips will contribute to ignite mulch and debris found near the building and spread the fire. Table 1 shows such results.

Recent fire tests were also conducted in the Steiner tunnel, ASTM E 84, on a rigid PVC material 0.06 in. thick; it exhibited a flame spread index of 10. Under the same test conditions, a fire retarded polypropylene material 0.15 in. thick exhibited a flame spread index of 50. These are both very adequate values, in view of the fact that both the polypropylene material and the PVC material remained in place during the ASTM E 84 test and did not generate flaming drips.

Table 1: Results of Steiner Tunnel Tests (ASTM E 84)

Material	Flame Spread Index	Maximum Flame Front Advance (ft)	Time to Max. Flame Front Advance (min:s)	Flaming on Floor (Duration) (min:s)
PVC	10	4.6	7:48	None
FR Polypropylene	50	19.5	6:24	4:18

This shows that it is possible to use fire retarded polypropylene materials that give very adequate flame spread values and also very adequate heat release values, without flaming drips. Consequently, polypropylene siding should only be used when it is shown to exhibit the appropriate fire performance.

When polypropylene siding material (which does not have the appropriate fire performance) is tested in ASTM E 84 (Steiner tunnel) the test specimen will often fall ahead of the arrival of the flame giving incorrect results.

Table 2 shows new results of cone calorimeter heat release tests with polypropylene and PVC:

Table 2: Results of Cone Calorimeter (ASTM E 1354) Tests

Material	Peak Heat Release Rate	Total Heat Released	Time to Ignition	Effective Heat of Combustion	Fire Performance Index
	kW/m^2	MJ/m^2	s	MJ/kg	$s\ m^2/kW$
PVC	186.8	16.7	36	9.2	0.19
Non FR Polypropylene	768.3	47.2	23	40.3	0.03

Table 3 shows some earlier results with polypropylene, PVC and wood materials in the cone calorimeter:

Table 3 - Cone Calorimeter Data on Plastics and Douglas Fir

	Flux 20 kW/m^2				
Material	**Pk HRR**	**THR**	**TTI**	**EHC**	**FPI**
	(kW/m^2)	**(MJ/m^2)**	**(s)**	**(MJ/kg)**	**($s\ m^2/kW$)**
PVC Rigid, Custom Inj. Mold.	40	3.0	5159	1.4	1343
PVC Rigid, Extrusion	102	2.9	3591	7.3	31.4
PP Non FR	1170	231.3	218	72.0	0.19
PP FR	236		382	23.6	1.62
PE Non FR	913	161.9	403	41.1	0.44
XLPE FR	88	87.6	750	22.4	8.08
Douglas Fir	237	46.5	254	13.1	1.10
	Flux 40 kW/m^2				
PVC Rigid, Custom Inj. Mold.	175	24.3	73	5.1	0.42
PVC Rigid, Extrusion	183	90.8	85	13.3	0.46
PP Non FR	1509	206.9	86	42.1	0.06
PP FR	243		80	23.9	0.33
PE Non FR	1408	221.0	159	46.6	0.06
XLPE FR	192	126.2	105	24.2	0.55
Douglas Fir	221	64.1	34	17.6	0.15
	Flux 70 kW/m^2				
PVC Rigid, Custom Inj. Mold.	191	93.0	45	12.7	0.24
PVC Rigid, Extrusion	190	96.5	48	10.8	0.25
PP Non FR	2421	231.1	41	43.1	0.02
PE Non FR	2735	227.5	47	42.6	0.02
XLPE FR	268	129.2	35	24.7	0.13
Douglas Fir	196	50.0	12	13.5	0.06

Table 3 shows that, when tested in the cone calorimeter, ASTM E 1354, under the same conditions, it was found that non fire retarded polypropylene exhibits a peak heat release rate of 1509 kW/m^2, while a non fire retarded PVC material exhibits a peak heat release rate of 183 kW/m^2, and a Douglas fir material exhibits a peak heat release rate of 221 kW/m^2. Such a very high heat release rate is unacceptable for a siding material. Testing in the cone calorimeter, including the testing above, is normally conducted in the horizontal orientation with radiant heat exposing the test specimen from above, thus capturing any flaming drips and assessing their effects.

Table 4 shows that wood materials, when not fire retarded, will usually exhibit flame spread index values that are less than 200 and will correspond to Class B or Class C categories. At the same time rigid PVC (vinyl) materials will generally exhibit flame spread index values less than 25. Neither wood nor PVC materials will cause flaming drips or molten material burning on the ground.

Table 4. Steiner tunnel (ASTM E 84) Data for Wood and Vinyl Materials					
Material/Product	Flame Spread Index		Material/Product	Flame Spread Index	
	Low	High		Low	High
Cellulose fiberboard ceiling tile	70	80	Ponderosa pine B	105	170
Cottonwood	115		Poplar	170	185
Cypress	145	150	Red Gum	140	155
Douglas fir	70	100	Red oak flakeboard	70	190
Douglas fir overlay	110	140	Red Oak Flooring	100	100
Douglas fir/cedar plywood	190	230	Red Pine	140	
Eastern White Pine	85		Redwood	65	70
Hemlock/cedar plywood	190		Southern yellow pine	130	195
Lauan hardwood	150	170	Vinyl faced plywood	110	130
Lodgepole Pine	95		Vinyl profile	15	20
Maple flooring	105		Vinyl Siding	10	15
Northern white pine A	190	215	Vinyl vapor barrier	10	15
Northern white pine B	120	180	Walnut	130	140
Pacific silver fir	70		West Coast Hemlock	60	70
Pacific Yellow Cedar	80		Western Red Cedar	70	
Particleboard	135	180	Western spruce	100	
Plywood paneling over gypsum	130	150	Western white pine	75	
Ponderosa pine A	170	230	Yellow birch	105	110

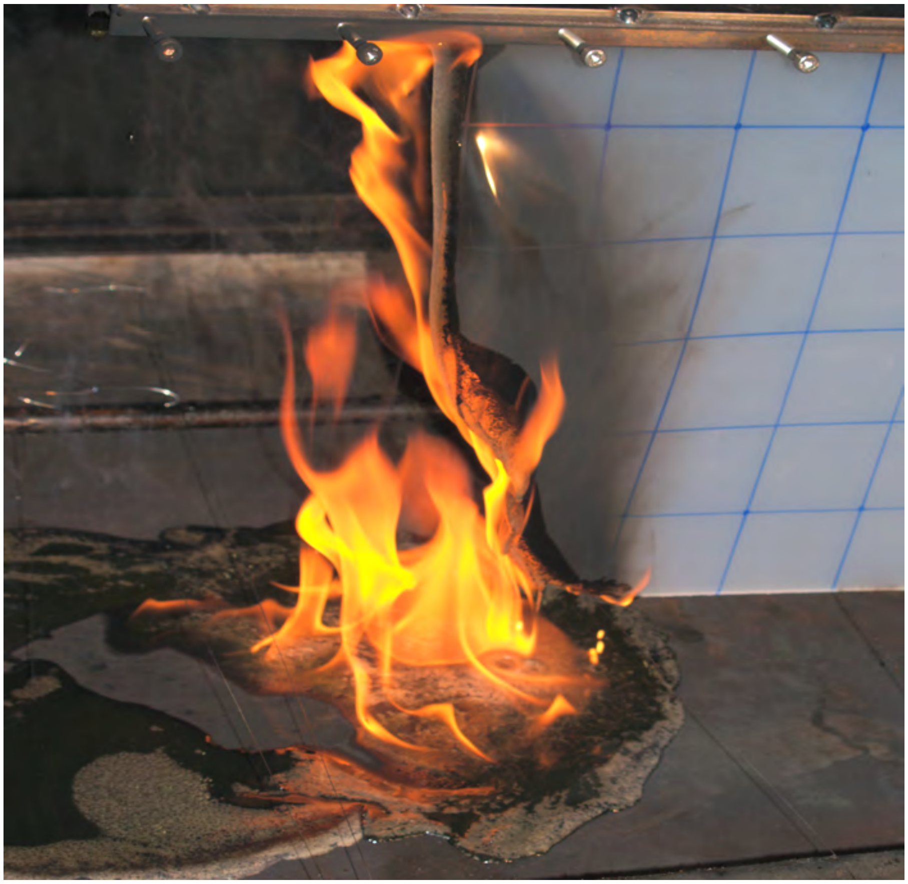
Figure 1 shows char from a PVC siding fire (no foam backing): the material softened, charred and burned but is still substantially intact. Figure 2 shows a vertical PP sheet melting and resulting in flaming drips on the floor.

The reason that heat release rate and floor flaming are important issues is because it has been shown that the heat radiated by siding is a major contributor to the ignition of neighboring houses, as is the spread of fire along the ground, particularly when there are loose combustibles present.

That is the reason that the third option allows polypropylene siding to be used, but with a larger separation distance, when the results of the ASTM E 84/UL 723 (Steiner tunnel) test are based on a test specimen that is not self supporting and falls to the floor of the tunnel during the test. The standard ASTM E 84 states: "1.4 Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place." Therefore valid test results require the test specimen to stay in place ahead of the exposing flame.

Figure 1 – Remains of vinyl siding fire

Figure 2 Polypropylene siding melting and flaming on the floor.



NFPA 289 was developed to test individual fuel packages and is similar in concept to UL 1975, already widely used in the ICC codes.

Cost Impact: The code does not at present allow the use of polypropylene siding. In order to safely use polypropylene siding construction costs would have to increase either by using materials that would meet test requirements for adequate fire safety or by increasing fire separation distances.

Analysis: A review of the standards proposed for inclusion in the code, NFPA 289 and ASTM D 7254, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: HIRSCHLER-RB-5-R202-R703.13

Public Hearing Results

Analysis: Review of proposed new standards indicated that, in the opinion of ICC Staff, these standards did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: The committee has serious concerns about the product as to the effect of time after installation will have the fire test results. The committee feels that NFPA 289 is not the appropriate test for the product application.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Marcelo M. Hirschler, GBH International, representing American Fire Safety Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

Polypropylene siding. A shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings.

R703.13 Polypropylene Siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D 7254 and those of R703.13.1 or those of R703.13.2 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the requirements of R703.13.3 and in accordance with the manufacturer's installation instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

R703.13.1 Flame Spread Index. The certification of the flame spread index shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E 84 or UL 723.

R703.13.2 Fire Separation Distance. The fire separation distance between a building with polypropylene siding and the adjacent building shall be no less than 10 feet (3.05 m).

R703.13.3 Installation. Polypropylene siding shall be limited to exterior walls of Type VB construction located in areas where the wind speed specified in Figure R301.2(4) does not exceed 100 miles per hours (45 m/s) and the building height is less than or equal to 40 feet (12,192 mm) in Exposure C.

ASTM
D 7254 Standard specification for polypropylene (PP) siding

Commenter's Reason: The committee had a valid concern regarding the use of NFPA 289 for testing this material and this option has been eliminated. Polypropylene siding material does not normally contain flame retardants or any other additives that will prevent it from forming a pool fire as soon as it is exposed to a flame. Therefore, when polypropylene siding is exposed to the flame in the ASTM E 84 Steiner tunnel test it immediately starts melting and burning occurs in the floor of the tunnel, with no material left in the tunnel ceiling where the test sample should be. This material gets a low flame spread index (ASTM D 7254 requires a flame spread index under 200, just like for wood siding) but it is not a valid result because the material is no longer in the test position when the flame comes by.

This is a problem because polypropylene that is not properly flame retarded will generate about 4 times as much heat as vinyl (PVC) or as wood or even as flame retarded polypropylene (see peak heat release rate in the table below) and it ignites much more rapidly. Therefore if polypropylene siding is made with typical polypropylene that has not been treated, the siding is a very dangerous product and polypropylene siding should not be allowed to be used based only on the requirements of ASTM D 7254.

Table: Results of Cone Calorimeter (ASTM E 1354) Tests (4 inch x 4 inch test sample)			
Material	**Peak Heat Release Rate**	**Time to Ignition**	**Effective Heat of Combustion**
	kW/m^2	s	MJ/kg
PVC (vinyl)	190	36	9
Wood	220	34	15
Non FR Polypropylene	770	23	40
FR Polypropylene	200	60	25

It is possible to make properly flame retarded polypropylene and use it for siding because flame retarded polypropylene can easily be compounded so that it does not melt/drip and pass the requirements of a flame spread index of 200 in the ASTM E 84 test. In fact, the original proposal includes an ASTM E 84 test with an FR polypropylene material that gave a flame spread index of 50. Such a material should be permitted for use but not the unsafe material normally offered for sale.

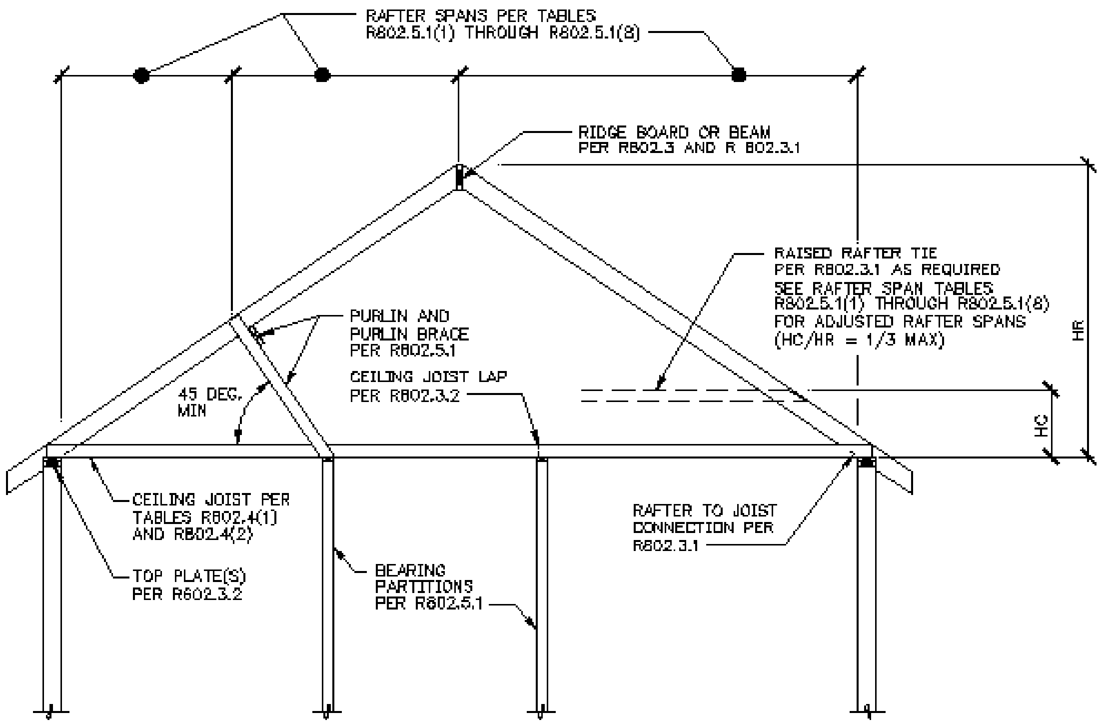
Final Action: AS AM AMPC____ D

RB151-09/10
Figure R802.5.1

Proposed Change as Submitted

Proponent: Robert Rice, Grants Pass, OR, representing Josephine County Building Safety and Southern Oregon Chapter of ICC

Delete existing Figure R802.5.1 and replace as follows:



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.018 rad.
Note: Where ceiling joints run perpendicular to the rafter, rafter ties shall be installed per R802.3.1
HC = Height of ceiling joists or rafter ties measured vertically above the top of rafter support walls
HR = Height of roof ridge measured vertically above the top of the rafter support walls.

FIGURE R802.5.1
BRACED RAFTER CONNECTION

Reason: The existing figure is lacking in some information and references to pertinent sections of code. This proposal updates the figure.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-RB-4-F. R802.5.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Based on the proponent's published reason. This change makes improvements to the figure.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert Rice, Josephine County Oregon, representing Josephine County Oregon and Southern Oregon Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as:

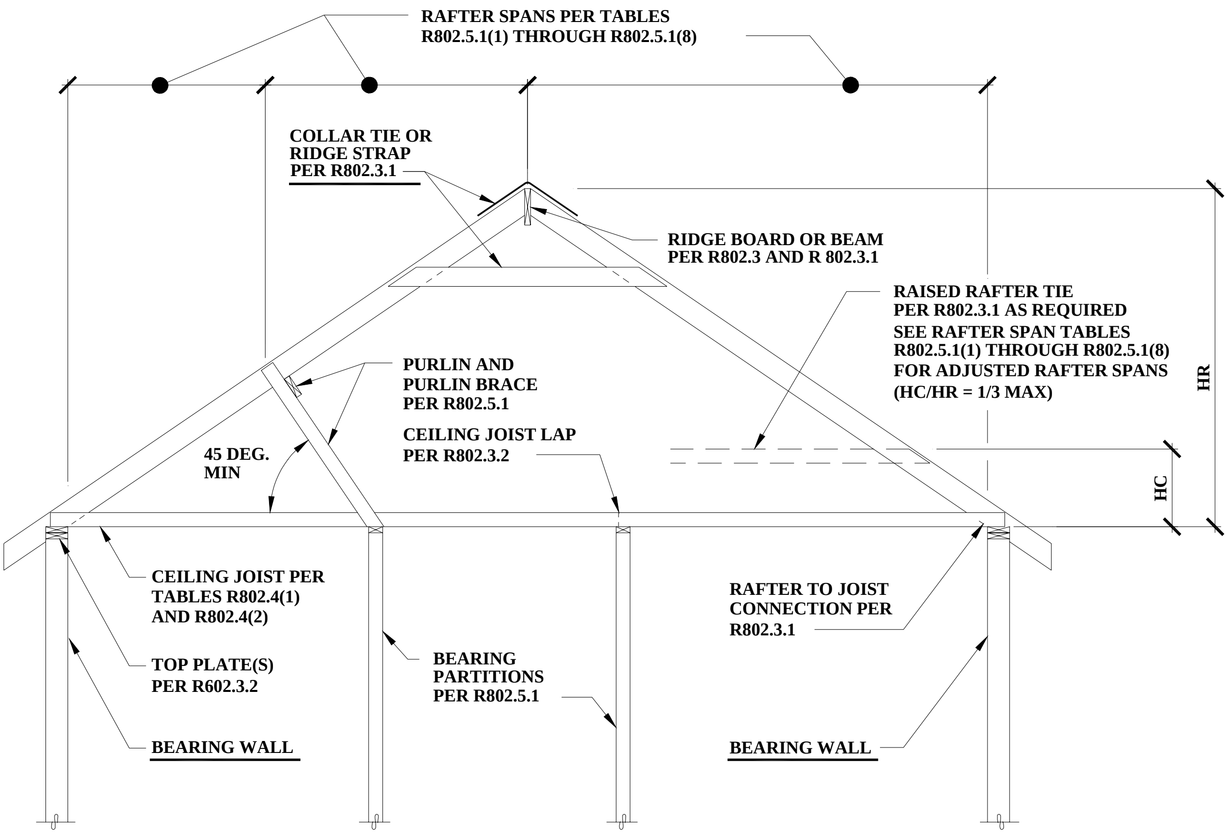


FIGURE R802.5.1
BRACED RAFTER CONNECTION

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.018 rad.
Note: Where ceiling joints run perpendicular to the rafter, rafter ties shall be installed per R802.3.1
HC = Height of ceiling joists or rafter ties measured vertically above the top of rafter support walls
HR = Height of roof ridge measured vertically above the top of the rafter support walls.

Commenter's Reason: The figure submitted in the original proposal was approved As Submitted by the committee in Baltimore. This modification merely adds the collar tie/ridge strap requirement and a note to see R802.3.1. The requirements already exist in the code. This amendment does not add any requirements to the code. Also, notes were added stating that the exterior walls are bearing walls.

Final Action: AS AM AMPC____ D

RB152-09/10

R802.7, R802.7.1, R802.7.1.1 (New), Figure R802.7.1.1 (New), R802.7.1.2 (New), Figure R802.7.1.2

Proposed Change as Submitted

Proponent: Dennis Pitts, American Forest and Paper Association

1. Revise as follows:

R802.7 Cutting, drilling and notching. Structural roof members shall not be cut, bored or notched in excess of the limitations specified in this section.

R802.7.1 Sawn lumber. Cuts, notches, and holes, ~~Notches~~ in solid lumber joists, rafters, blocking and beams shall ~~not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of the holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is also notched, the hole shall not be closer than 2 inches (51 mm) to the notch~~ comply with the provisions of R502.8.1 except that cantilevered portions of rafters shall be permitted in accordance with Section R802.7.1.1.

R802.7.1.1 Cantilevered portions of rafters. ~~**Exception:**~~ Notches on cantilevered portions of rafters are permitted provided the dimension of the remaining portion of the rafter is not less than ~~4~~ 3-1/2-inch ~~nominal~~ (~~102~~ 89 mm) and the length of the cantilever does not exceed 24 inches (610 mm) in accordance with Figure R802.7.1.1.

2. Add new figure as follows:

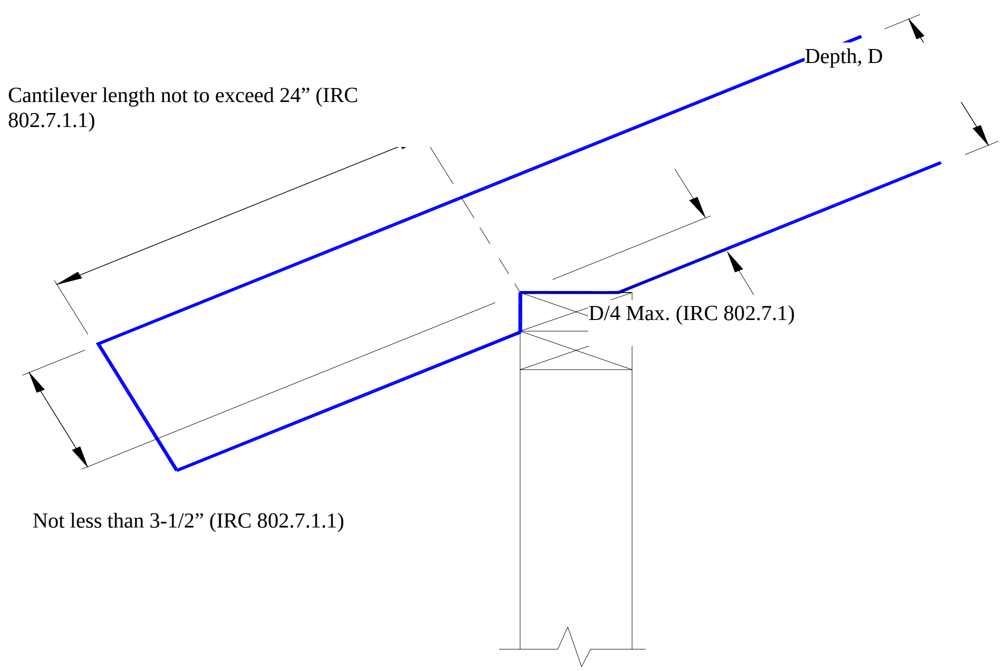


FIGURE R802.7.1.1
RAFTER NOTCH

3. Add new text as follows:

R802.7.1.2 Ceiling joist taper cut. Taper cuts at the ends of the ceiling joist shall not exceed one-fourth the depth of the member in accordance with Figure R802.7.1.2.

4. Add new figure as follows:

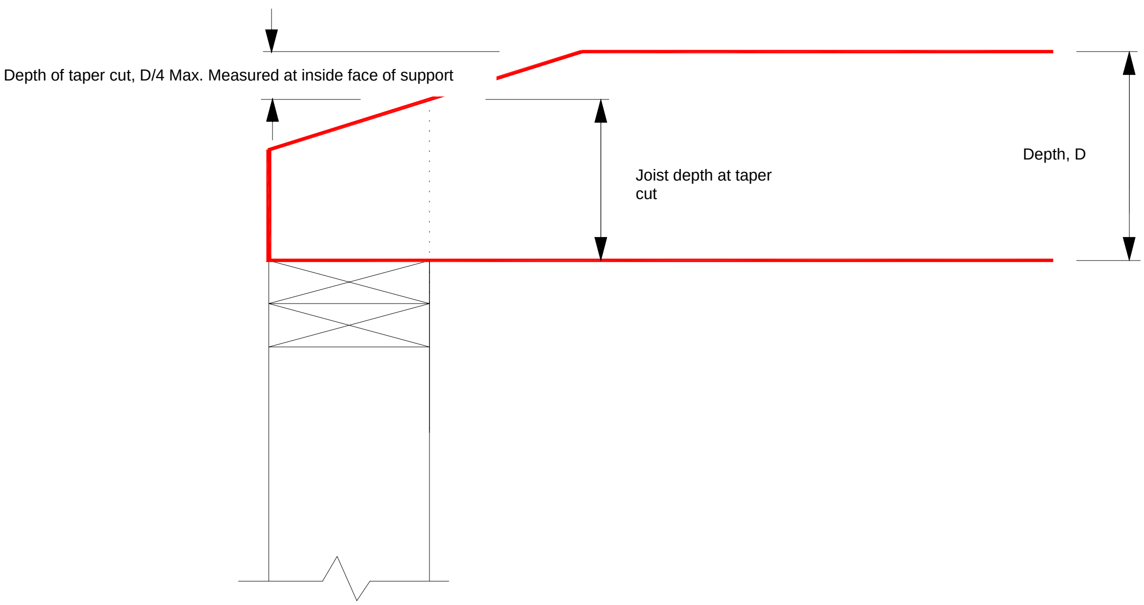


FIGURE R802.7.1.2
CEILING JOIST TAPER CUT

Reason: The revision simplifies text by referencing material elsewhere in the code. The exception is re-written as a section on cantilever portions of rafters and includes a figure to clarify the intent. The actual dimension "3-1/2 inch" replaces "4-inch nominal" to clarify the minimum dimension remaining after the notching. "Nominal" is typically used to describe standard sizes. The section on ceiling joist taper cut is added to clarify application of the D/4 provision to a ceiling joist taper cut.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: PITTS-RB-6-R802.7

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change adds clarification for cutting, drilling and notching of roof members. Adds figures for rafter notch and ceiling joist taper cut.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Davidson, City of Maple Grove, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R802.7.1 Sawn lumber. Cuts, notches, and holes, in solid lumber joists, rafters, blocking and beams shall not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of the holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is also notched, the hole shall not be closer than 2 inches (51 mm) to the notch ~~comply with the provisions of R502.8.1 except that cantilevered portions of rafters shall be permitted in accordance with Section R802.7.1.1~~.

Exception: Cantilevered portions of rafters shall be permitted in accordance with Section R802.7.1.1.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification retains the original proposal but does not delete the language dealing with cuts, notches, and holes. Deleting existing language and referring the user of the code to another section is not user friendly. It does not improve the use of the code. If you are providing copies for the public, you must provide pages from two chapters. Let's leave this language where it is. This modification leaves the original proposal intact except for reinserting previously existing language.

Final Action: AS AM AMPC____ D

RB154-09/10
R301.2.1

Proposed Change as Submitted

Proponent: T. Eric Stafford, PE, representing the Institute for Business and Home Safety

1. Revise as follows:

R301.2.1 Wind limitations. Buildings and portions thereof shall be limited by wind speed, as defined in Table R301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be determined from Figure R301.2(4). Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where loads for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.6. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a,b,c]	SPACING OF FASTENERS
5	Rafter or roof truss to plate, toe nail	~~2~~3-16d box nails (3½"x0.135") or 3-10d common nails (3"x0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss[j]

(Portions of table not shown remain unchanged)

a. through i. (No change)
j. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe-nails on one side of the rafter and toe-nails from the ceiling joist to top plate in accordance with this schedule. The toe-nail on the opposite side of the rafter shall not be required.

2. Delete without substitution:

~~**R802.10.5 Truss to wall connection.** Trusses shall be connected to wall plates by the use of *approved* connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in TableR301.2(2), adjusted for height and exposure per Table R301.2(3), see section R802.11.~~

3. Revise as follows:

R802.11.1 Uplift resistance. Roof assemblies shall have uplift resistance in accordance with Sections R802.11.1.2 and R802.11.1.3 ~~which are subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater shall have roof rafters or trusses attached to their supporting wall assemblies by connections capable of providing the resistance~~

~~required in Table R802.11. Wind uplift pressures shall be determined using an effective wind area of 100 square feet (9.3 m2) and Zone 1 in Table R301.2(2), as adjusted for height and exposure per Table R301.2(3).~~

Where the uplift force does not exceed 200 pounds, rafters and trusses spaced not more than 24 inches on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Where the basic wind speed does not exceed 90 mph, the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet or less, rafters and trusses spaced not more than 24 inches on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

~~A continuous load path shall be designed to transmit the uplift forces from the rafters or trusses to the foundation.~~

4. Add new text as follows:

R802.11.1.2 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings. Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice.

R802.11.1.3 Rafter uplift resistance. Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by Table R802.11 or as determined by accepted engineering practice, Connections for beams used in a roof system shall be designed in accordance with accepted engineering practice.

5. Delete existing Table R802.11 and replace as follows:

TABLE R802.11
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND
(POUNDS PER CONNECTION)

Rafter or Truss Spacing	Roof Span (feet)	EXPOSURE B							
		Basic Wind Speed (MPH)							
		85		90		100		110	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12
12" o.c.	12	47	41	62	54	93	81	127	110
	18	59	51	78	68	119	104	165	144
	24	70	61	93	81	145	126	202	176
	28	77	67	104	90	163	142	227	197
	32	85	74	115	100	180	157	252	219
	36	93	81	126	110	198	172	277	241
	42	105	91	143	124	225	196	315	274
	48	116	101	159	138	251	218	353	307
16" o.c.	12	63	55	83	72	124	108	169	147
	18	78	68	103	90	159	138	219	191
	24	93	81	124	108	193	168	269	234
	28	102	89	138	120	217	189	302	263
	32	113	98	153	133	239	208	335	291
	36	124	108	168	146	264	230	369	321
	42	139	121	190	165	299	260	420	365
	48	155	135	212	184	335	291	471	410
24" o.c.	12	94	82	124	108	186	162	254	221
	18	117	102	155	135	238	207	329	286
	24	140	122	186	162	290	252	404	351
	28	154	134	208	181	326	284	454	395
	32	170	148	230	200	360	313	504	438

	36	186	162	252	219	396	345	554	482
	42	209	182	285	248	449	391	630	548
	48	232	202	318	277	502	437	706	614
Rafter or Truss Spacing	**Roof Span (feet)**	**EXPOSURE C**							
		Basic Wind Speed (MPH)							
		85		**90**		**100**		**110**	
		Roof Pitch		**Roof Pitch**		**Roof Pitch**		**Roof Pitch**	
		<5:12	**≥5:12**	**<5:12**	**≥5:12**	**<5:12**	**≥5:12**	**<5:12**	**≥5:12**
12" o.c.	12	94	82	114	99	157	137	206	179
	18	120	104	146	127	204	177	268	233
	24	146	127	179	156	251	218	330	287
	28	164	143	201	175	283	246	372	324
	32	182	158	224	195	314	273	414	360
	36	200	174	246	214	346	301	456	397
	42	227	197	279	243	394	343	520	452
	48	254	221	313	272	441	384	583	507
16" o.c.	12	125	109	152	132	209	182	274	238
	18	160	139	194	169	271	236	356	310
	24	194	169	238	207	334	291	439	382
	28	218	190	267	232	376	327	495	431
	32	242	211	298	259	418	364	551	479
	36	266	231	327	284	460	400	606	527
	42	302	263	372	324	524	456	691	601
	48	338	294	416	362	587	511	775	674
24" o.c.	12	188	164	228	198	314	273	412	358
	18	240	209	292	254	408	355	536	466
	24	292	254	358	311	502	437	660	574
	28	328	285	402	350	566	492	744	647
	32	364	317	448	390	628	546	828	720
	36	400	348	492	428	692	602	912	793
	42	454	395	558	485	786	684	1040	905
	48	508	442	626	545	882	767	1166	1014

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.

a. The uplift connection forces are based on a maximum 33 foot mean roof height and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated basic wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights.
b. The uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.
c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.
d. The tabulated uplift connection forces shall be permitted to be multiplied by 0.75 for connections not located within 8 feet of building corners.
e. For buildings with hip roofs with 5:12 and greater pitch, the tabulated uplift connection forces shall be permitted to be multiplied by 0.70. This reduction shall not be combined with any other reduction in tabulated forces.
f. For wall-to-wall and wall-to-foundation connections, the uplift connection force shall be permitted to be reduced by 60 plf for each full wall above.
g. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.
h. The tabulated forces for a 12" on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

(Portions of proposal not shown remain unchanged)

Reason: The issue of roof uplift connections, the limits of conventional nailed connections, and the point at which pre-engineered metal clips or straps are required has been a topic of much debate over the last several code cycles. A 200 pound maximum capacity for conventional rafter-to-wall or truss-to-wall connections has been suggested, based largely on capacities calculated directly from AF&PA's NDS. At the same time, the existing Table R802.11 has not been updated in some time and is overly conservative for many typical houses. The uplift loads are based on low-slope (4:12 pitch or less) roofs. The table does not account for the reduction in uplift loads that occur on higher-slope (5:12 pitch or greater) roofs or on hip roofs per ASCE 7. Thus the code does not encourage the use of high-slope roofs, which have been shown to experience significantly less damage in high-wind events. The triggers proposed by the insurance industry, coupled with the current table, would subject many houses in low-wind areas to a requirement for roof-to-wall ties (not to mention continuous straps to the foundation) that is not justified by the actual performance of roof systems in low-wind areas. This requirement is particularly unjustified on higher-slope roofs where the uplift loads can be substantially reduced through a detailed analysis using ASCE 7.

This proposal rolls together elements of several proposals concerning roof uplift connections (RB132-07/08, RB206-07/08, and RB207-07/08) from the last cycle. First, three options are provided for selection of the roof uplift: Table R802.11, the truss designer, or an engineered approach. In many jurisdictions (particularly rural ones), an engineered truss design is not required and the local truss fabricator will run the software from the plate company. These jurisdictions may also have limited or no plan review. Thus, there is less opportunity to insure the proper wind speed, building dimensions, mean roof height, etc. are used, and a possibility that overly conservative roof uplift loads will be generated on the truss design drawing. Hence, the ability to determine an uplift load from Table R802.11 even when there are truss drawings must be preserved. However, to address issues previously raised by code officials in relation to this section, we have introduced language to limit the use of Table R802.11 to roof rafters and single-ply trusses within the applicability limits of R802.10.1.1, and to clarify that and girder trusses and roof beams require engineered connections and/or use of the truss design drawing values.

Second, this proposal replaces the current Table R802.11 with a new table based on Table 2.2A of the WFCM, which is based on the latest ASCE 7 wind load provisions. The new table expands upon both the existing IRC table and the WFCM table by incorporating values for high-slope roofs. These factors were derived using the ASCE 7 wind provisions and the calculation method used to develop Table 2.2A of the WFCM. A factor for hip roofs is also added, as hip roofs have seen similar improved performance in high-wind events. This table was proposed as part of the public comment to RB207-07/08. The failure of the public comment was due to concerns over the triggering language. The technical content of the proposed table was unchallenged; in fact a number of industry groups including IBHS, SBCA, AF&PA, and the Foam Sheathing Coalition who are not often in agreement with each other spoke in favor of the proposed revisions.

By introducing clarity to the trigger language for uplift connectors and providing this revised table, the IRC provisions for roof uplift connections will be substantially improved. Builders and building officials will have improved direction for when pre-engineered metal connectors are actually required. Additionally, the use of hip roofs and high-slope roofs will be encouraged, as designers, engineers and builders will be able to appropriately reduce uplift loads and avoid triggering uplift connector requirements for building locations and for roof configurations where the requirements are not justified.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: STAFFORD-RB-1-R301.2.1-T. R602.3(1)-R802

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee feels like this change should be merged with RB156-09/10. This change should be brought back with a public comment to correlate with RB156-09/10.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bonnie Manley, American Iron and Steel Institute (AISI), representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R301.2.1 Wind limitations. Buildings and portions thereof shall be limited by wind speed, as defined in Table R301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be determined from Figure R301.2(4). Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where loads for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.6. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 <u>or Section R804.3.9</u> from the roof assembly to the foundation.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification simply adds the comparable reference to the section on cold-formed steel roof framing.

Analysis: This proposal contains conflicts with RB156-09/10 as follows:

	RB154 -09/10	**RB156-09/10**
Section R802.11.1	Uplift force trigger of 200 pounds	Uplift force trigger of 230 pounds
Table R802.11	Contains uplift force values for High-slope roofs	Footnote allows adjustment and provides adjustment factors for uplift force for high-slope roofs

Final Action: AS AM AMPC____ D

RB156-09/10
Table R602.3(1), Section R602.10.1.2.1, R802.10.5, R802.11.1, Table R802.11

Proposed Change as Submitted

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

1. Revise as follows:

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a,b,c]	SPACING OF FASTENERS
5	Rafter or roof truss to plate, toe nail	~~2~~3-16d box nails (3½"x0.135") or 3-10d common nails (3"x0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss[j]

(Portions of table not shown remain unchanged)

a. through i. *(No change)*
j. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe-nails on one side of the rafter and toe-nails from the ceiling joist to top plate in accordance with this schedule. The toe-nail on the opposite side of the rafter shall not be required.

R602.10.1.2.1 Braced wall panel uplift load path. *Braced wall panels* located at exterior walls that support roof rafters or trusses (including stories below top *story*) shall have the framing members connected in accordance with one of the following:

1. Fastening in accordance with Table R602.3(1) where~~:~~
   ~~1.1. The basic wind speed does not exceed 90 mph (40 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, or~~
   ~~1.2.~~ The net uplift value at the top of a wall does not exceed ~~100~~ 115 plf. The net uplift value shall be determined in accordance with Section R802.11 and shall be permitted to be reduced by 60 plf (86 N/mm) for each full wall above.
2. Where the net uplift value at the top of a wall exceeds ~~100~~ 115 plf (146 N/mm), installing *approved* uplift framing connectors to provide a continuous load path from the top of the wall to the foundation. The net uplift value shall be as determined in Item 1.2 above.
3. Bracing and fasteners designed in accordance with accepted engineering practice to resist combined uplift and shear forces.

2. Delete without substitution:

~~**R802.10.5 Truss to wall connection.** Trusses shall be connected to wall plates by the use of *approved* connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in TableR301.2(2), adjusted for height and exposure per Table R301.2(3), see section R802.11.~~

3. Delete and substitute as follows:

~~**R802.11.1 Uplift resistance.** Roof assemblies which are subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater shall have roof rafters or trusses attached to their supporting wall assemblies by connections capable of providing the resistance required in Table R802.11.Wind uplift pressures shall be determined using an effective wind area of 100 square feet (9.3m2) and Zone 1 inTableR301.2(2), as adjusted for height and exposure per Table R301.2(3). A continuous load path shall be designed to transmit the uplift forces from the rafter or truss ties to the foundation.~~

R802.11.1 Uplift resistance. Individual rafters and trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by one of the following methods:

1. as specified in Table R802.11; or
2. as specified on the Truss Design Drawings; or

3. as specified by a registered design professional.

Where the uplift force does not exceed 230 pounds, rafters and trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Connections for girder trusses and roof beams shall be designed in accordance with the uplift forces specified on the Truss Design Drawings or as determined by a registered design professional.

~~TABLE R802.11~~
~~REQUIRED STRENGTH OF TRUSS OR RAFTER CONNECTIONS TO RESIST WIND UPLIFT FORCES[a, b, c, e, f]~~
~~(Pounds per connection)~~

TABLE R802.11
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)

Rafter or Truss Spacing	Roof Span (feet)	Exposure B				Exposure C			
		Basic Wind Speed (mph)				Basic Wind Speed (mph)			
		85	90	100	110	85	90	100	110
12" O.C.	12	47	62	93	127	94	114	157	206
	18	59	78	119	165	120	146	204	268
	24	70	93	145	202	146	179	251	330
	28	77	104	163	227	164	201	283	372
	32	85	115	180	252	182	224	314	414
	36	93	126	198	277	200	246	346	456
	42	105	143	225	315	227	279	394	520
	48	116	159	251	353	254	313	441	583
16" O.C.	12	63	83	124	169	125	152	209	274
	18	78	103	159	219	160	194	271	356
	24	93	124	193	269	194	238	334	439
	28	102	138	217	302	218	267	376	495
	32	113	153	239	335	242	298	418	551
	36	124	168	264	369	266	327	460	606
	42	139	190	299	420	302	372	524	691
	48	155	212	335	471	338	416	587	775
24" O.C.	12	94	124	186	254	188	228	314	412
	18	117	155	238	329	240	292	408	536
	24	140	186	290	404	292	358	502	660
	28	154	208	326	454	328	402	566	744
	32	170	230	360	504	364	448	628	828
	36	186	252	396	554	400	492	692	912
	42	209	285	449	630	454	558	786	1040
	48	232	318	502	706	508	626	882	1166

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.

a. The tabulated uplift connection forces are based on a maximum 33 foot mean roof height, and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated basic wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.
b. The tabulated uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.
c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.
d. The tabulated uplift connection forces shall be permitted to be multiplied by one of the reduction factors listed in the table below. Tabulated reduction factors shall not be combined.

Roof Type	Roof Pitch	Connection Location	Adjustment Factor
Any	Any	Within 8 feet of building corners	1.00
		8 feet or more from building corners	0.75
Monoslope or gable roof	5:12 or greater	Within 8 feet of building corners	0.87
		8 feet or more from building corners	0.75
Hip roof	5:12 or greater	Within 8 feet of building corners	0.70
		8 feet or more from building corners	0.75

e. The tabulated forces for a 12" on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

Reason: The purpose of this proposal is to provide sensible and simplified requirements for roof uplift connections. The issue of roof uplift connections, the limits of conventional nailed connections, and the point at which pre-engineered metal clips or straps are required has been a topic of much debate over the last several code cycles. The insurance industry and others have been trying to mandate a 200 pound maximum capacity for conventional rafter-to-wall or truss-to-wall connections, based largely on capacities calculated directly from AF&PA's NDS. At the same time, the existing Table R802.11 has not been updated in some time and is overly conservative for many typical houses. The uplift loads are based on low-slope (4:12 pitch or less) roofs. The table does not account for the reduction in uplift loads that occur on higher-slope (5:12 pitch or greater) roofs or on hip roofs per ASCE 7. Thus the code does not encourage the use of high-slope roofs, which have been shown to experience significantly less damage in high-wind events. The triggers proposed by the insurance industry, coupled with the current table, would subject many houses in low-wind areas to a requirement for roof-to-wall ties (not to mention continuous straps to the foundation) that is not justified by the actual performance of roof systems in low-wind areas. This requirement is particularly unjustified on higher-slope roofs where the uplift loads can be substantially reduced through a detailed analysis using ASCE 7.

This proposal is similar to a companion proposal which rolls together elements of several proposals concerning roof uplift connections (RB132-07/08, RB206-07/08, and RB207-07/08) from the last cycle. The key difference is the proposed trigger of 230 pounds in this proposal. This value is consistent with the capacities seen in uplift testing of both individual components and roof assemblies conducted by the NAHB Research Center, Clemson University, State Farm, and others. It is a modest increase from the 200 pound capacity previously proposed by IBHS. The benefit in this small yet technically-justified increase is an ability to simplify the proposed code language by including a house with a 32' span low-slope roof in 90mph Exposure B in the scope of conventional connections. This will allow the prescriptive kick-out for the 32' high-slope condition to be removed and the overall table to be simplified.

By introducing clarity to the trigger language for uplift connectors and providing this revised table, the IRC provisions for roof uplift connections will be substantially improved. Builders and building officials will have improved direction for when pre-engineered metal connectors are actually required. Additionally, the use of hip roofs and high-slope roofs will be encouraged, as designers, engineers and builders will be able to appropriately reduce uplift loads and avoid triggering uplift connector requirements for building locations and for roof configurations where the requirements are not justified.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EHRLICH-RB-10-T. R602.3(1)-R602.10.1.2.1-R802.10.5-R802.11.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This change adds a simplified method for roof uplift connections as stated in the proponent's published reason.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gary J. Ehrlich, P.E., National Association of Home Builders, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**R802.11.1 Uplift resistance.** Individual rafters and trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by one of the following methods:~~

1. ~~as specified in Table R802.11; or~~
2. ~~as specified on the Truss Design Drawings; or~~
3. ~~as specified by a registered design professional.~~

~~Where the uplift force does not exceed 230 pounds, rafters and trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).~~

~~Connections for girder trusses and roof beams shall be designed in accordance with the uplift forces specified on the Truss Design Drawings or as determined by a registered design professional.~~

R802.11.1 Uplift resistance. Roof assemblies shall have uplift resistance in accordance with Sections R802.11.1.2 and R802.11.1.3.

Where the uplift force does not exceed 230 pounds, rafters and trusses spaced not more than 24 inches on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

R802.11.1.2 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings for the basic wind speed as determined by Figure R301.2(4) and listed in Table R301.2(1). Where Truss Design Drawings are not required to be prepared by a registered design professional in accordance with R802.10.2, uplift forces shall be permitted to be determined from Table R802.11. Connections for girder trusses shall be designed in accordance with the uplift forces specified on the Truss Design Drawings or shall be determined in accordance with accepted engineering practice.

R802.11.1.3 Rafter uplift resistance. Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by Table R802.11 or as determined by accepted engineering practice. Connections for beams used in a roof system shall be designed in accordance with accepted engineering practice.

TABLE R802.11
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)
(No changes to table values)

a. through c. *(No changes)*
d. The tabulated uplift connection forces shall be permitted to be multiplied by one of the reduction factors listed in the table below. Tabulated reduction factors shall not be combined.

Roof Type	Roof Pitch	Connection Location	Adjustment Factor
Any	Any	Within 8 feet of building corners	1.00
		8 feet or more from building corners	0.75
Monoslope or gable roof	5:12 or greater	Within 8 feet of building corners	0.90 ~~0.87~~
		8 feet or more from building corners	0.75
Hip roof	5:12 or greater	Any ~~Within 8 feet of building corners~~	0.75 ~~0.70~~
		~~8 feet or more from building corners~~	~~0.75~~

e. The tabulated forces for a 12" on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: At the public hearings in Baltimore, proposals RB154-09/10 and RB156-09/10 were both approved by the IRC-Building/Energy Committee. The Committee liked the simplified table of uplift loads and tabulated footnote adjustments supplied by RB156-09/10. At the same time, the Committee preferred the charging language in RB154-09/10 and asked it be merged with RB156-09/10. This public comment adopts the language from RB154-09/10 with a few enhancements. A pointer to the Climatic and Geographic Design Criteria table and the Basic Wind Speed Figure is added to the truss language. This emphasizes the need for the Truss Designer to correctly select the proper wind speed and other criteria in the software. This is to insure the Truss Design Drawings reflect the correct uplift reactions for the site in question, not those from a higher wind speed because the operator forgot or chose not to change the settings. This is important as the builder (and homeowner) should not be required to install extra (or larger) uplift connectors simply because the Truss Design Drawings reflect a conservative setting for the wind speed.

The original charging language of RB154 allowed the use of Table R802.11 for trusses "if applicable". It is unclear exactly what makes the table "applicable" for trusses. That requirement is replaced here with a reference to the requirements for an engineered truss design in R802.10.2. If a jurisdiction does not require signed and sealed truss drawings, it is logical to allow the builder to use the prescriptive table to select the uplift loads. In fact, it is when the Truss Design Drawings are not prepared under the supervision of an engineer that it is most likely for the software to be run with an overly conservative wind speed.

Finally, the factor for the high-slope roof condition is adjusted. The relative effect of the dead load in resisting the uplift reaction decreases as the span and wind speed increase. In order to achieve the goal of preserving conventional practice in low-hazard areas, the high-slope factor was originally selected based on a 90mph basic wind speed. However, the increase to a 230-lb trigger in this proposal, relative to the 200-lb trigger in RB154-09/10, achieves a similar intent. By implementing this modest increase (consistent with testing at the NAHB Research Center), the factor can be adjusted to the more conservative value.

Public Comment 2:

Randall Shackelford, Simpson Strong-Tie Company, requests Disapproval.

Commenter's Reason: During the Baltimore Code Development Hearings, both RB154 and RB156 were approved. Both of these changes are part of a larger process that has been undertaken in the last two code cycles to fix the wind resistance provisions of the IRC, so that the windspeed where the structural requirements of the IRC are permitted can be increased from 100 to 110 miles per hour.

Fixing the roof tiedown requirements was the last item needed for the wind resistance provisions to be corrected. Both RB154 and RB156 did the same thing. The primary difference is that RB154 set the trigger for roof tiedown at 100 plf, while RB156 set the trigger for roof tiedown at 115 plf.

Among the groups that had been working on this code change, 100 plf had generally been the agreed on trigger. In fact, this number was actually a compromise to get the many involved groups to agree to the code change.

If the capacity of the proposed nails is calculated according to the code referenced standard for calculating the capacity of nails, the AF&PA NDS-05, the code capacity would be as follows:

3-16d box nails: 147 lbs.
3-10d common nails: 138 lbs.

And that assumes that the toenails are properly installed.

The 100 plf in RB154 is a good compromise that allows small structures in low wind areas to be built without additional connections. The proponent did not offer any technical justification for increasing the trigger to 115 plf in RB156.

Further, RB156 proposes to also change the trigger for additional uplift connections in the wall bracing section (R602.10.1.2.1) to 115 plf. The ICC Ad Hoc Wall Bracing Committee put this requirement into the IRC in the last cycle with the agreed upon trigger of 100 plf, also as a compromise. For studs, the connection of the stud to the top and bottom plates has a calculated capacity of zero if end nails are used. Again, no justification was submitted to change the agreed-upon trigger from 100 to 115 plf.

Although both are a step in the right direction, approving RB 154 and RB156 creates a conflict that will be difficult to resolve.

We urge the membership to disapprove RB156, and if given the opportunity, support RB154.

Analysis: This proposal contains conflicts with RB154-09/10 as follows:

	RB154 -09/10	**RB156-09/10**
Section R802.11.1	Uplift force trigger of 200 pounds	Uplift force trigger of 230 pounds
Table R802.11	Contains uplift force values for High-slope roofs	Footnote allows adjustment and provides adjustment factors for uplift force for high-slope roofs

Final Action: AS AM AMPC____ D

RB157-09/10
R806.1, R806.2, R806.3 (New)

Proposed Change as Submitted

Proponent: Michael Fischer, The Kellen Company, representing the Roof Attic Ventilation Coalition

1. Revise as follows:

R806.1 Ventilation required. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than 1/4 inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth, or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Openings in roof framing members shall conform to the requirements of SectionR802.7. Required ventilation openings shall open directly to the outside air.

R806.2 Minimum area. The total net free ventilating area shall not be less than 1/150 of the area of the attic or rafter ~~space ventilated except that reduction of the total area to 1/300 is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents~~. As an alternative, the net free cross-ventilation area may be reduced to 1/300 when a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.

2. Add new text as follows:

R806.3 Cross-ventilation. At least 40 percent and not more than 50 percent of the required ventilating area shall be provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located no more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents.

> **Exception.** Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet below the ridge or highest point of the space shall be permitted.

Reason: The code sets minimum requirements for ventilated attics. This proposal establishes an appropriate requirement for cross-ventilation as the default condition instead of allowing a reduction in ventilation for what is the most commonly recommended practice for ventilated attics. An exception for conditions where framing might preclude cross-ventilation to the specific location required allows some design flexibility for non-typical roof/wall assemblies. The proposal further clarifies that ventilators open to outside air, as opposed to adjacent attic or rafter spaces or some other interior space.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FISCHER-RB-5-R806.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels there is no technical justification for this change. There are questions about the amount of ventilation needed. The committee would like to see this combined with RB159-09/10 and brought back.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael D. Fischer, The Kellen Company, representing The Roof Assembly Ventilation Coalition, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R806.2 Minimum area. The total net free ventilating area shall not be less than 1/150 of the area of the attic or rafter space.

Exceptions: As an alternative, the net free cross-ventilation area may be reduced to 1/300 when one or more of the following conditions are met:

1. A Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
2. At least 40 percent and not more than 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located no more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet below the ridge or highest point of the space shall be permitted.

~~**2. R806.3 Cross-ventilation.** At least 40 percent and not more than 50 percent of the required ventilating area shall be provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located no more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents.~~

~~**Exception.** Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet below the ridge or highest point of the space shall be permitted.~~

(Portions of proposal not shown remain unchanged)

Commenter Reason: This proposal as submitted contained two concepts- the first was removing the option for reduction in ventilator area based upon cross ventilation, and the other was the rewrite of the current confusing language. During debate, the committee objected to eliminating the reduction in area. This comment removes the reduction, but moves forward with the appropriate rewrite of the cross ventilation requirement. This part of the proposal received positive testimony from proponents and opponents alike.

Final Action: AS AM AMPC____ D

RB158-09/10
R806.2

Proposed Change as Submitted

Proponent: Joseph Lstiburek, Building Science Corporation

Revise as follows:

R806.2 Minimum area. The total net free ventilating area shall not be less than ~~1/150~~ 1/300 of the area of the space ventilated where ~~except that reduction of the total area to 1/300 is permitted provided that~~ at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. ~~As an alternative, the net free cross-ventilation area may be reduced to 1/300 when~~ In climate zones 5, 6, 7 and 8 a Class I or II vapor retarder ~~is~~ shall be installed on the warm-in-winter side of the ceiling.

Reason: This language is now more consistent with the IBC, which only allows one ventilation ratio. It also is consistent with the appropriate building science/physics.

The previous wording encouraged installing vapor retarders in ceilings in hot humid climates in order to reduce ventilation areas. That is very bad in terms of the governing physics. This wording fixes that.

Vapor retarders are required in cold climates regardless of ventilation area. This wording makes that clear as well.

Bottom line: if you choose to vent a roof this language says vent it according to the 1:300 ratio everywhere. In cold climates you need to add a vapor retarder. The language relating to vapor retarders is now consistent with the vapor retarder changes made to wall assemblies in the two previous code cycles.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: LSTIBUREK-RB-3-R806.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Based upon the proponent's request for disapproval. This change needs additional work and will be brought back.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Lstiburek, Building Science Corporation, representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

R806.2 Minimum <u>vent</u> area. ~~The total net free ventilating area shall not be less than 1/150 of the area of the space ventilated except that reduction of the total area to 1/300 is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. As an alternative, the net free cross-ventilation area may be reduced to 1/300 when a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.~~
<u>The minimum net free ventilating area shall be 1/150 of the area of the vented space.</u>

<u>**Exception:** The minimum net free ventilating area shall be 1/300 of the vented space provided the following conditions are met.</u>

1. <u>At least 50 percent and not more than 80 percent of the ventilating area is located at least 3 feet (914 mm) above the eave or cornice vents.</u>
2. <u>The balance of the required ventilation is provided by eave or cornice vents.</u>
3. <u>In climate zones 6, 7 and 8 a Class I or Class II vapor retarder is installed on the warm-in-winter side of the ceiling.</u>

Commenter's Reason: The first sentence of the existing section is eight lines long. This replaces the awkward code language with a series of clear statements.

The requirement for a vapor retarder is modified to limit it to northern climates, as a vapor retarder in southern climates can lead to moisture problems.

Final Action: AS AM AMPC____ D

RB160-09/10
R806.4 (New)

Proposed Change as Submitted

Proponent: Michael D. Fischer, The Kellen Company, representing the Roof-Attic Ventilation Coalition

Add new text as follows:

<u>**R806.4 Installation and weather protection.** Ventilators shall be installed in accordance with manufacturer's installation instructions. Installation of ventilators in roof systems shall be in accordance with the requirements of R903. Installation of ventilators in wall systems shall be in accordance with the requirements of Section R703.1.</u>

(Renumber subsequent sections)

Reason: The code sets minimum requirements for ventilated attics. This proposal requires that ventilators be installed in accordance with the manufacturers' installation instructions. This requirement is essential if ventilation systems are to provide proper cross-ventilation and perform as intended. The proposal further clarifies that the weather protection requirements applicable for roof and wall penetrations, including flashing requirements, are considered.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: FISCHER-RB-4-R806.4

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee feels this additional text is unnecessary as it is already addressed in the code. Also, this would require ventilators to be provided.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael D. Fischer, The Kellen Company, representing The Roof Assembly Ventilation Coalition, requests Approval as Submitted.

Commenter's Reason: Wall and Roof ventilators are subject to code requirements for structural loading as elements of components and cladding. These products often bear labels to demonstrate compliance with the applicable code requirements. One example of an ICC-ES report includes the following language:

> *Installation of the ridge vents described in this report must comply with this report, the manufacturers published installation instructions and the requirements of the applicable code. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.*

This is important to ensure that the selected vent is appropriate for the specific roof or wall covering material.
The proposal includes a requirement that the ventilators be installed with these instructions, and also includes reference to the applicable weathering section of the code.

Final Action: AS AM AMPC____ D

RB162-09/10
R903.2.1

Proposed Change as Submitted

Proponent: Mike Rice, Maplewood, MN, representing the Association of Minnesota Building Officials

Revise as follows:

R903.2.1 Locations. Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. <u>Kick out flashing shall be installed where the lower portion of a sloped roof stops within the plane of an intersecting wall cladding in such a manner as to divert or kick out water away from the assembly.</u> Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet).

Reason: This would be consistent with the code change proposal of R703.8. This change would also complement the current code addressing wall and roof intersections and prevent water from entering the wall cavity or penetrating to the structural building components. Step flashing at wall and roof intersections is incomplete without the kick out flashing, where the lower portion of a sloped roof stops within the plane of an intersecting wall. The water must be diverted away or it will find a way behind the water-resistive barrier and the siding or in some cases, it will go through the siding. The benefit of adding the kick out flashing would far exceed the cost, as the cost would be little.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: RICE-RB-1-R903.2.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the committee's previous action on RB146-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment 1:

Scott Dornfeld, City of Delano, representing Association of Minnesota Building Officials, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R903.2.1 Locations. Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. ~~Kick out flashing shall be installed where the lower portion of a sloped roof stops within the plane of an intersecting wall cladding in such a manner as to divert or kick out the water away from the assembly.~~ A flashing shall be installed to divert the water away from where the eave of a sloped roof intersects a vertical sidewall. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No.26 galvanized sheet).

Commenter's Reason: When this was brought forward in Baltimore the thought of adding this flashing was a good idea, but the committee needed the language cleaned up. Removing the phrases that the committee needed definitions for and going to language that was reader friendly and by moving this change to below the current language it put the change in location that helps clarify the need for the flashing. We have seen for years the damage that water does to the structural frame over time. Flashing will help remove the water damage that goes behind the exterior wall finish at the roof slope bottom edge at an intersecting a wall.

Public Comment 2:

Theresa A. Weston, PhD, DePont Building Innovations, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

KICK OUT FLASHING. Corrosion resistant flashing used to divert or kick out water away from the lower portion of a sloped roof assembly with an intersecting wall cladding.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This comment is submitted to respond to the committee's reason for disapproval. The committee's reason for disapproval of RB162 was *"based on the committee's previous action on RB146-09/10"*. This references the committee's reason for disapproval of RB146 which was *"The committee feels this needs to be addressed but it belongs in Chapter 9. The proponent needs to rework and bring this back. This needs a detail or definition of "kick out flashing".*

I am commenting on RB162 rather than RB146 because is covers the appropriate section in Chapter 9 as directed in the committee's reason for disapproval. Also in response to the committee's request a definition for "kick-out flashing" has been added.

Final Action: AS AM AMPC____ D

RB164-09/10
R905.1

Proposed Change as Submitted

Proponent: W. Harvey Cappel, PE, Racelectric Engineering

Revise as follows:

R905.1 Roof covering application. Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless ~~otherwise specified in this section,~~ specifically waived by a listed exception in the appropriate code section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

Reason: The term "otherwise specified" without a definition basically means "anything specified" which makes this Section R905.1 meaningless and basically void. The original intent here is to require roof coverings to be installed to resist specific wind loads. With this undefined "otherwise specified" loophole the intent of R905.1 is cancelled. We want roof coverings to be installed to resist the wind loads so let's be clear about what we want.

Cost Impact: There will be no cost impact (as compared to the original intent of the Code) related to this proposed code change.

ICCFILENAME: CAPPEL-RB-3-R905.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels the existing language is clear and the new text is not needed and is confusing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

W. Harvey Cappel, PE. representing himself, requests Approval as Submitted

Commenter's Reason: The problem with the wording in IRC Article R905.1 (Roof covering application) is that it is being interpreted wrongly. "Otherwise specified" is being taken as anything stated and therefore the requirement to be installed to resist the component and cladding loads is being completely ignored. For example: R905.2.6 Attachment (of composite shingles) then becomes 1) Perform an adhesive test per ASTM D-3161 or ASTM D-7158 (neither one test fasteners) and 2) Follow manufacturer's installation instructions. Composite shingle manufacturer's installation instructions typically do not address the wind speed, structure mean roof height and exposure considerations required for adequate fastener design. This is a particularly significant problem in the hurricane prone regions of Texas along the Gulf Coast where, because of this misinterpretation, shingles are being installed inadequately. The wrongly installed shingles experienced failure rates in excess of 50% as everyone could see by counting the blue FEMA roof tarps after hurricanes Rita and Ike. Making the true meaning of this code article clearer can help to solve this very serious cost and safety problem. Shingles that were replaced after hurricane Rita failed at about the same rate during hurricane Ike (only four years later) as they did during hurricane Rita.

Final Action: AS AM AMPC____ D

RB165-09/10
R905.2.4.1

Proposed Change as Submitted

Proponent: W. Harvey Cappel, PE, Racelectric Engineering

Revise as follows:

R905.2.4.1 Wind resistance of asphalt ~~shingles~~ adhesive strips. Asphalt shingles shall be tested for wind resistance of the adhesive strips (required to secure the shingle tabs) in accordance with ASTM D 7158. Asphalt shingles shall meet the classification requirements of Table R905.2.4.1 (1) for the appropriate maximum basic wind speed. Asphalt shingle packaging shall bear a label to indicate compliance with ASTM D 7158 and the required classification in Table R905.2.4.1 (1).

> **Exception:** Asphalt shingles not included in the scope of ASTM D 7158 shall be tested and labeled to indicate compliance with ASTM D 3161 and the required classification in Table R905.2.4.1 (2).

Reason: The referenced test standards test the adhesive and its resistance to failure due to wind loads (test simulated) on the upwind side of the roof. These tests do not test fasteners or the resistance of fasteners to withdrawal from the wood deck. The tests aren't even (test simulated) on the correct side of the roof (downwind) required for testing the fasteners. Mr. Mike Noone, Chairman of ASTM Subcommittee D08-02 (the authors of ASTM D 3161 and similar test codes) will confirm this. The problem with the current wording is that it is misleading causing some to believe that use of the manufactures' nail standard during this test is a test of the nails and therefore the standard nailing required, for these shingles, on any roof for winds up to the test standard wind speeds. This is not true. For high wind areas (110 mph or greater) the fasteners must be designed for the wind speed, mean roof height and exposure. Fasteners are not tested nor do they need to be. Sufficient data is already available to Engineers for the design of fastener systems.

Cost Impact: The only impact this code change proposal will have on cost is to those that have been wrongly interpreting the intent of the Code. In this case the cost of only a few more nails per shingle will be insignificant especially as compared to the cost of a failed shingle system cause by inadequate nailing.

ICCFILENAME: CAPPEL-RB-1-R905.2.4.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The shingle, not the adhesive strip, is what is required to be wind resistant. Shingle rigidity is a factor in wind resistant. The term "adhesive strips" implies more than one is required. This would exclude interlocking shingles.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

W. Harvey Cappel, PE., representing self, requests Approval as submitted.

Commenter's Reason: The problem with the wording in IRC Article R905.2.4.1 (Wind resistance of asphalt shingles) is that it is being interpreted wrongly.

The adhesive testing performed by ASTM D3161 and ASTM D 7158 is just that adhesive test. The test simulation is on the wrong side of the roof (upwind) to even test fasteners. Fastener testing into structural elements is not even required. Fastener test data is readily available to Engineers for fastener design. This wrong interpretation leads some to believe that fastener design is not required; just simply follow manufacturer's installation instructions. This is simply not true. Composite shingle manufacturer's installation instructions typically do not address the wind speed, structure mean roof height and exposure considerations required for adequate fastener design. This is a particularly significant problem in the hurricane prone regions of Texas along the Gulf Coast where, because of this misinterpretation, shingles are being installed inadequately. The wrongly installed shingles experienced failure rates in excess of 50% as everyone could see by counting the blue FEMA roof tarps after hurricanes Rita and Ike. Making the true meaning of this code article clearer can help to solve this very serious cost and safety problem. Shingles that were replaced after hurricane Rita failed at about the same rate during hurricane Ike (only four years later) as they did during hurricane Rita.

Final Action: AS AM AMPC____ D

RB166-09/10
R905.2.5

Proposed Change as Submitted

Proponent: W. Harvey Cappel, PE, Racelectric Engineering

Revise as follows:

R905.2.5 Fasteners. Fasteners for asphalt shingles shall be galvanized steel, stainless steel, aluminum or copper roofing nails, minimum <u>11 gage (0.1205 (3mm)</u> ~~12 gage (0.105 inch (3mm))~~ shank with a minimum 3/8-inch (10 mm) diameter head, ASTM F 1667, of a length to penetrate through the roofing materials and <u>penetrate through the minimum required roof sheathing or penetrate to an equivalent embedment into the thicker than minimum required roof sheathing.</u> ~~a minimum of ¾ inch (19 mm) into the roof sheathing. Where the roof sheathing is less than ¾ inch (19mm) thick, the fasteners shall penetrate through the sheathing.~~ Fasteners shall comply with ASTM F 1667.

Reason: 1) The 12 gage nails are rarely if ever used anymore and in many cases inadequate. The outdated standard is copied from the typical manufacturer's installation instructions (also outdated). The minimum standard needs to be updated.

2) The current Section wording is outdated (copied from the typical shingle manufacturer's installation instructions, also outdated) and ambiguous. It implies an either or standard with the in between not in compliance with the Code. This is ridiculous. If a 3/8 inch penetration is in compliance with the Code then all greater penetrations and embedment's up to and including the other Code required ¾ inch penetration are also in compliance with the Code. The problem with this incorrect wording is that it is being used as evidence of non compliance, which is senseless.

Cost Impact: 1) Probably no cost impact at all to go to the new 11 gage nail since the 12 gage nail isn't normally being used anyway, but even where it is, the cost impact will be minimal.

2) There will be no cost impact related to this proposed Code change; only less confusion and potentially a cost savings.

ICCFILENAME: CAPPEL-RB-2-R905.2.5

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There is no technical data justifying this change and it exceeds the tested manufacturer's specification.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

W. Harvey Cappel PE representing self, requests Approval as submitted.

Commenter's Reason: The problem with the wording in IRC Article R905.2.5 (Fasteners) is that it is being interpreted wrongly. One would expect that if a 3/8-inch penetration thru a wood sheathing would be acceptable that all other deeper penetrations either thru or into the same wood sheathing would also be acceptable, actually better. Not so by the current wording. By the current wording if the wood sheathing is not at least ¾-inch thick then the fastener penetrations must be thru the sheathing. This is ridiculous. The National Design Specification For Wood Construction (NDS) Table 11.2C Nail and Spike Withdrawal Values makes no distinction (including no footnotes) between penetration thru or into wood sheathing. This antiquated wording needs to be changed to reflect true engineering of fastener design.

Final Action: AS AM AMPC____ D

RB167-09/10
R905.2.6

Proposed Change as Submitted

Proponent: W. Harvey Cappel, PE, Racelectric Engineering

Revise as follows:

R905.2.6 Attachment. Asphalt shingles shall have the minimum number of fasteners required by the manufacturer, but not less than four fasteners per strip shingle or two fasteners per individual shingle. Where the roof slope exceeds 21 units vertical in 12 units horizontal (21:12, 175 percent slope), <u>or where the basic wind speed is equal to or exceeds100 mph </u>shingles shall be installed as required by the manufacturer<u>, but with not less than six nails per shingle and as required to comply with Section R905.1.</u>

Reason: The current code is being misinterpreted (mainly because of a misunderstanding of the ASTM D 3161 test [it only tests adhesives] requirement for high wind areas) regarding the fastening requirements to resist wind loads. This proposed change will help reinforce the known requirement that additional fasteners are required in high wind areas. The shingle manufacturers cannot be relied on for this requirement since they cannot and do not take responsibility for fastening design or fastening installation in high wind areas. Their wind related limit of warranty and responsibility typically stops with assurance against manufacturer's defects and compliance with one of the ASTM adhesive tests standards. Knowing that four nails per shingle are typically inadequate in high wind areas, here is an opportunity to set a minimum standard for high wind areas. The extreme number of shingle failures as a result of recent hurricanes Rita and Ike with wind speeds well below the typical coastal design standards, should be sufficient motivation to make a change in our shingle installation codes. What we have in force now, (basically four nails per shingle everywhere) is not working.

Cost Impact: There will be no cost impact (as compared to the original intent of the Code) related to this proposed Code change. Even if this change causes some construction projects to use six nails per shingle instead of the incorrect four nails per shingle, the additional cost will be minimal, especially as compared to the cost of an inadequate and failed shingle installation.

ICCFILENAME: CAPPEL-RB-4-R905.2.6

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This change is not necessary. Additional fasteners are not the controlling factor for shingle blow off, the shingle is. Improvement in the shingle and ASTM D 7158 has improved the wind resistance of shingles.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

W. Harvey Cappel, PE., representing self, requests Approval as submitted.

Commenter's Reason: The problem with the wording in IRC Article R905.2.6 (Attachment) is that it leaves the fastener design to the shingle manufacturer. Shingle manufacturers do not design fastening (into structural sheathing) systems, cannot control the field application of same and therefore do not even warrant fastener design. Composite shingle manufacturer's installation instructions typically do not address the wind speed, structure mean roof height and exposure considerations required for adequate fastener design. Also the testing performed by ASTM D-3161 and or ASTM D-7158 is only a test of the tab adhesive. These tests do not test fasteners; the wind test simulation isn't even on the correct side of the roof. The test is on the upwind side of the roof which does not load the fasteners. Shingle fastener testing is not required. Fastener design data is readily available to Engineers for design purposes. The wording here leads one to believe wrongly that the only requirement for shingle fastener design is what it says on a shingle package. This is devastatingly wrong. This is a particularly significant problem in the hurricane prone regions of Texas along the Gulf Coast where, because of this misinterpretation, shingles are being installed inadequately. The wrongly installed shingles experienced failure rates in excess of 50% as everyone could see by counting the blue FEMA roof tarps after hurricanes Rita and Ike. Making the true meaning of this code article clearer can help to solve this very serious cost and safety problem. Shingles that were replaced after hurricane Rita failed at about the same rate during hurricane Ike (only four years later) as they did during hurricane Rita.

Final Action: AS AM AMPC____ D

RB168-09/10
R905.2.8.3

Proposed Change as Submitted

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

Revise as follows:

R905.2.8.3 Sidewall flashing. Flashing against a vertical sidewall shall be ~~by the step-flashing method. The flashing shall be~~ a minimum of 4 inches (102 mm) high and 4 inches (102 mm) wide~~. At the end of the vertical sidewall the step flashing shall be turned out in a manner that~~ <u>and shall</u> direct~~s~~ water away from the <u>vertical side</u>wall ~~and~~ onto the roof and/or <u>into the</u> gutter. <u>Where siding is provided on the vertical sidewall, the vertical leg of the flashing shall be continuous under the siding.</u>

Reason: The purpose of this proposal is to clarify the requirements for the use of flashing at a vertical wall-to-roof intersection. The use of "step flashing" is fine for masonry wall construction; but to use it where siding is provided is incorrect. Walls with siding should be provided with continuous "J"-shaped sections of flashing, with the vertical leg continuous under the siding. A "J" turn back lip on the horizontal leg of the siding controls the water and directs it down the roof to the gutter. Step flashing does not have the return lip. "J"-shaped flashing sections are continuous, requiring fewer joints, look much better, and also reduce the opportunity for water to have multiple points of possible entry.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EHRLICH-RB-11-R905.2.8.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the proponent's request for disapproval. The language is unclear and too restrictive. The proponent will work with industry and submit a public comment for Final Action.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, PE, National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R905.2.8.3 Sidewall flashing. Base flashing ~~Flashing~~ against a vertical sidewall shall be continuous or step flashing and shall be a minimum of 4 inches (102 mm) in height ~~high~~ and 4 inches (102 mm) in width ~~wide~~ and shall direct water away from the vertical sidewall onto the roof and/or into the gutter. Where siding is provided on the vertical sidewall, the vertical leg of the flashing shall be continuous under the siding. Where anchored masonry veneer is provided on the vertical sidewall, the base flashing shall be provided in accordance with this section and counterflashing shall be provided in accordance with Section R703.7.2.2. Where exterior plaster or adhered masonry veneer is provided on the vertical sidewall, the base flashing shall be provided in accordance with this section and Section R703.6.3.

Commenter's Reason: The purpose of this public comment is to address issues raised by ARMA, BIA, and others at the public hearings. First, it is clarified that both continuous flashing and step flashing are considered acceptable methods for the base flashing at the sidewall. This allows the builder, in conjunction with the roofer and roofing manufacturer, to select the appropriate flashing method for the site conditions and the project schedule. Second, a reference is provided to the counterflashing requirements for anchored masonry veneer in Chapter 7. The counterflashing needs to be step flashing so it can be inserted into the mortar joints of the veneer. The base flashing can be continuous if desired. Finally, a reference is provided to Section R703.6.3 for exterior plaster (stucco) and adhered masonry veneer. That section calls for installing the vertical leg of the flashing between the two layers of water-resistant barrier required behind the stucco or veneer.

Final Action: AS AM AMPC____ D

RB170-09/10
R905.2.8.5 (New)

Proposed Change as Submitted

Proponent: Logan G. Sauter, Salt Lake City Corporation, representing the Utah Chapter of ICC

Add new text as follows:

R905.2.8.5 Drip Edge. Provide drip edge at eaves and gables of shingle roofs. Overlap to be a minimum of 2 inches (51 mm). Eave drip edges shall extend 0.25 inch (6.4 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edges shall be mechanically fastened a maximum of 12 inches (305 mm) o.c.

Reason: Unlike the IBC, the IRC does not include drip edge requirements for shingle roofs. This new text brings the IRC into uniformity with the IBC, reflects manufacturers' requirements for shingle roof installations, and uses identical wording and placement as found in IBC 1507.2.9.3.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: SAUTER-RB-1-R905.2.8.5

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This is a good change that will provide protection of the shingles and gives rigidity to the shingle edges. This is consistent with the IBC.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment 1:

Rick Davidson, City of Maple Grove, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R905.2.8.5 Drip Edge. ~~Provide drip~~ Drip edge shall be provided at eaves and gables of shingle roofs. ~~Overlap to be~~ Adjacent pieces of drip edge shall be overlapped a minimum of 2 inches (51 mm). ~~Eave drip~~ Drip edges shall extend a minimum of 0.25 inch (6.4 mm) below the roof sheathing and ~~extend back on~~ extend up the roof deck a minimum of 2 inches (51 mm). Drip edges shall be mechanically fastened to the roof deck at a maximum of 12 inches (305 mm) o.c. with fasteners as specified in Section R905.2.5. Underlayment shall be installed over the drip edge along eaves and under the underlayment on gables. Unless specified differently by the shingle manufacturer, shingles are permitted to be flush with the drip edge.

Commenter's Reason: While we would disagree with the suggestion that the proposal reflects manufacturer's requirements for drip edge (R905.1 requires roofing be installed according to manufacturer's installation instructions so if they require it, it need not be repeated in the code), if such regulation must be in the code, better direction must be included for a proper installation. The direction provided in this modification comes from the Asphalt Roofing Manufacturer's Association.

Public Comment 2:

Gary Ehrlich, National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R905.2.8.5 Drip Edge. ~~Provide~~ A drip edge shall be provided at rake edges and at the upper and lower eaves ~~and gables~~ of shingle roofs. The horizontal leg of the drip edge shall ~~O~~ overlap ~~to be~~ roof sheathing a minimum of 2 inches (51 mm). The vertical leg of the ~~Eave~~ drip edge~~s~~ shall extend 0.25 inch (6.4 mm) minimum below the bottom of the roof sheathing and shall be offset 0.25 inches (6.4mm) minimum from the edge of the roof sheathing or fascia board ~~extend back on the roof a minimum of 2 inches (51 mm)~~. Drip edges shall be mechanically fastened a maximum of 12 inches (305 mm) o.c. Where an ice barrier or other roof underlayment is provided at rake edges, the drip edge shall be installed over the underlayment. Where an ice barrier or other roof underlayment is provided along an eave, the underlayment shall be installed over the drip edge. Where a gutter is provided, the drip edge shall be installed to direct water into the gutter.

Commenter's Reason: The purpose of this public comment is to revise and clarify the drip edge provisions that were approved at the Public Hearings in Baltimore. The provisions are vague, use incorrect terminology, and are not written in proper code language. The following changes are proposed:

1. The approved language requires a drip edge at "gables of shingle roofs". The proper term for this location is the "rake edge".
2. The language is revised to clarify the horizontal overlap of the drip edge with the roof sheathing.
3. The language is revised to specify the proper length and location of the vertical leg of the drip edge. The ¼" offset is critical to insure water is directed away from the fascia board.
4. Additional language is added to insure the installation of the drip edge is properly coordinated with the installation of ice barriers or other roof underlayment and with the installation of gutters.

These changes are critical to insure that the drip edge is installed correctly. If this public comment is not approved, it is possible that incorrect installations will occur and cause the exact moisture problems that the drip edges are supposed to protect against.

Final Action: AS AM AMPC____ D

RB177-09/10-PART I
AG106.2 (New), AG108 (New), Chapter 44 (New)

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing the Pool Safety Council

PART I – IRC BUILDING/ENERGY

1. Add new text as follows:

<u>**AG106.2 Vacuum relief system required.** All pool and spa single- or multiple-outlet circulation systems that incorporate submerged suction outlet fittings shall be equipped with an approved or engineered vacuum relief system as follows:</u>

1. <u>Safety vacuum release systems conforming to ASME A112.19.17 or ASTM F 2387; or</u>
2. <u>An approved gravity drainage system.</u>

2. Add new standards to Chapter 44 and AG108 as follows:

ANSI/ASME
<u>A112.19.17-02</u> <u>Manufactured Safety Vacuum Release Systems (SVRS) For Residential and Commercial Swimming Pool, Spa, Hot Tub and Wading Pool Suction Systems</u>

ASTM
<u>F 2387-04</u> <u>Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) For Swimming Pools, pas, Hot Tubs</u>

Reason: This code change provides a final layer of protection against potential entrapments. While the APSP-7 provides partial protection against entrapment, it does not protect swimmers or waders in the event that problems occur with improperly designed pools, some types of blocked drains, etc. These events can and do occur and when they occur, this proposal provides a mechanism to help prevent entrapment.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, ANSI/ASME A112.19.17 and ASTM F 2387, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: BEITEL-RB-2-APDX G-IBC-G-1- 3109.5.1

Public Hearing Results

Analysis: Review of proposed new standards indicated that, in the opinion of ICC Staff, the standards did comply with ICC standards criteria.

PART I - IRC
Committee Action: **Disapproved**

Committee Reason: The committee feels that this change is not needed at this time. The Federal Law will cover this and we have an approved ANSI/APSP-7 Standard. ICC is developing a Swimming Pool Code and this issue should be considered within that process.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jesse J. Beitel, Hughes Associates, Inc., representing Pool Safety Council, requests Approval as Submitted.

Commenter's Reason: Commenter's Reason: The Pool Safety Council as well as others, continue to believe that the proposed code change provides the best solution to prevent entrapments. This proposal provides the final layer of protection that is in the best safety interest for everyone who uses pools, spas, etc.

The Federal Law does require entrapment safety, and the proposed changes provide additional requirements so as to bring the IRC and the IBC into compliance with the Federal Law.

Final Action: AS AM AMPC____ D

RB177-09/10-PART II

3109.5.1 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing the Pool Safety Council

PART II – IBC GENERAL

1. Add new text as follows:

<u>**3109.5.1 Vacuum relief system required.** All pool and spa single- or multiple-outlet circulation systems that incorporate submerged suction outlet fittings shall be equipped with an approved or engineered vacuum relief system as follows:</u>

1. <u>Safety vacuum release systems conforming to ASME A112.19.17 or ASTM F 2387; or</u>
2. <u>An approved gravity drainage system.</u>

2. Add new standards to Chapter 35 as follows:

ANSI/ASME

<u>A112.19.17-02</u> <u>Manufactured Safety Vacuum Release Systems (SVRS) For Residential and Commercial Swimming Pool, Spa, Hot Tub and Wading Pool Suction Systems</u>

ASTM

<u>F 2387-04</u> <u>Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) For Swimming Pools, Spas, Hot Tubs</u>

Reason: This code change provides a final layer of protection against potential entrapments. While the APSP-7 provides partial protection against entrapment, it does not protect swimmers or waders in the event that problems occur with improperly designed pools, some types of blocked drains, etc. These events can and do occur and when they occur, this proposal provides a mechanism to help prevent entrapment.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, ANSI/ASME A112.19.17 and ASTM F 2387, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: BEITEL-RB-2-APDX G-IBC-G-1- 3109.5.1

Public Hearing Results

Analysis: Review of proposed new standards indicated that, in the opinion of ICC Staff, the standards did comply with ICC standards criteria.

PART II - IBC
Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved consistent with the action taken on Part I and at the proponent's request. ICC has begun the process of developing a swimming pool code. The development process for the new code will provide a better forum to resolve the various contentious issues related to this proposal and similar proposals heard by the IRC – Building and Energy Code Development Committee.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jesse J. Beitel, Hughes Associates, Inc., representing Pool Safety Council, requests Approval as Submitted.

Commenter's Reason: See RB177-09/10, Part I

Final Action: AS AM AMPC____ D

RB184-09/10
R302.1, Table R302.1(1), Table R302.1(2) (New), R309.5 (New)

Proposed Change as Submitted

Proponent: Tom Lariviere, Chairman - Joint Fire Service Review Committee

1. Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1(1); or for *dwellings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

Exceptions:

1. Walls, projections, openings, or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same lot.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(1)
EXTERIOR WALLS

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	(Fire-resistance rated)	1 hour-tested in accordance with ASTM E 119 or UL 263 with exposure from both sides	<5 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet to 5 feet
	(Not fire-resistance rated)	0 hours	5 feet
Openings in walls	Not allowed	N/A	<3 feet
	25% Maximum of Wall Area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R317.3	<5 feet
		None required	5 feet

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable

TABLE R302.1(2)
EXTERIOR WALLS – DWELLINGS WITH FIRE SPRINKLERS

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	(Fire-resistance rated)	1 hour-tested in accordance with ASTM E 119 or UL 263 with exposure from the outside	0 feet
	(Not fire-resistance rated)	0 hours	3 feet[a]
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet[a]
	(Not fire-resistance rated)	0 hours	3 feet
Openings in walls	Not allowed	N/A	<3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R317.3	<3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable
a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with Section P2904, the fire separation distance for non-rated exterior walls and rated projections shall be permitted to be reduced to zero feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

2. Add new text as follows:

R309.5 Fire Sprinklers. Private garages shall be protected by fire sprinklers where the garage wall has been designed based on Table R302.1(2), Footnote a. Sprinklers in garages shall be connected to an automatic sprinkler system that complies with Section P2904. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft^2. Garage doors shall not be considered obstructions with respect to sprinkler placement.

Reason: In the last code cycle, Proposal RB67-07/08 (which was withdrawn at the Final Action Hearings) provided as one of its sprinkler alternatives a reduction in exterior wall fire ratings that we believe still is a reasonable and justifiable sprinkler incentive. This proposal will provide a reasonable sprinkler alternative in the IRC when residential sprinkler systems are installed.

This proposal provides a significant financial and design incentive for residential sprinklers. From a financial perspective, the proposal permits cost reductions related to exterior wall construction and, in the case of a planned community, could result in more developable lots. From a design advantage perspective, the proposal permits homes to have larger footprints without triggering fire-rated exterior walls and permits more flexible use of windows on walls facing property lines.

From a fire safety perspective, the proposed requirements under new Table R302.1(2) generally put the code back where it was in 2000 and 2003, so there is essentially no concession compared to how homes have been built under the IRC since the code was first published in 2000. In 2006, the IRC's fire separation distances for non-rated exterior walls were increased from 3 feet to 5 feet for the purpose of coordinating the IRC's residential separation distances with those in the IBC (Code Change G128-03/04). History shows that residential sprinklers reliably limit fire spread to the room of origin, and with such protection, allowing the code to revert to a 3-foot separation distance provides a reasonable compensation for sprinklers. Certainly, the probability of a favorable outcome in the event of a fire is much better for a sprinklered building with a 3-foot separation versus a nonsprinklered building with a 5-foot separation, so encouraging sprinklers is a preferred approach.

The proposed garage requirement for R309.5 provides a limitation on the application of new Table R302.1(2) by only allowing use of sprinkler incentives in areas where sprinklers are provided. Normally, garages aren't required to have sprinklers; however, where a designer chooses to take advantage of reduced separation requirements for a garage wall, it is appropriate for the garage to be provided with sprinklers as a means of property protection. Proposed design criteria for sprinklers were derived from NFPA 13R Section 6.8.3.3, which addresses sprinkler protection for garages in buildings protected by NFPA 13R sprinkler systems. Often, garage protection is provided by dry pendent or dry sidewall sprinklers connected to a wet pipe sprinkler system.

The original Table R302.1(1) has been retained for jurisdictions that may adopt this edition of the Code without the mandatory sprinkler requirements that are presently in the 2009 IRC and for cases where there are additions or modifications to an existing non-sprinklered property.

Cost Impact: This code change proposal will decrease the cost of construction.

ICCFILENAME: LARIVIERE-RB2-R302.1

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee feels that sprinklers inside one house will not protect the adjacent house that may or may not be sprinklered. The footnote to the table invokes entire subdivisions and conditions that may or may not exist and this is way outside the scope of the IRC.

Assembly Action: Approved as Submitted

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action and a public comment was submitted. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.

Public Comment:

Rick Thornberry, The Code Consortium, Inc, representing Cellulose Insulation Manufacturers Association (CIMA), requests Disapproval.

Commenter's Reason: We are submitting this Public Comment to oppose the assembly action for approved as submitted of this Code Change Proposal in order to support the International Residential Code Building/Energy Code Development Committee's recommendation for disapproval. We certainly agree with the Committee's reason for disapproval in that there will be many cases where a new dwelling unit will be constructed next to an existing dwelling unit where the new dwelling unit may be sprinklered but the existing dwelling unit may not. So it would not be prudent to allow for these reduced fire separation distances for requirements invoking 1-hour rated exterior walls or projections, limitations on unprotected openings in exterior walls, and protection of penetrations.

Also the proposed new Table R302.1(2) Exterior Walls – Dwellings with Fire Sprinklers is somewhat confusing regarding the minimum fire separation distances specified. For example, for exterior walls where a 1-hour rating is required, the minimum fire separation distance specified is zero (0) feet. What happens if the minimum fire separation distance is greater than zero (0) feet but less than 3 feet? Similarly, for projections required to be 1-hour fire-resistance rated on the underside where the minimum fire separation distance is specified as 2 feet, what happens if the minimum fire separation distance is greater than 2 feet but less than 3 feet? It should also be noted that this new table will allow unlimited unprotected openings in a nonrated exterior wall where the fire separation distance is at least 3 feet. This compares to the current code that would only allow 25% of the exterior wall area to have unprotected openings where the fire separation distance is between 3 feet and 5 feet. This is significant in that a fire in one building which breaks out of the unprotected opening can expose the adjacent building not only by radiant heat, but also by convected heat in the form of a flame plume which may project as much as 5 to 6 feet beyond the face of the building.

These trade-offs all presume that the automatic sprinkler system will perform as designed and prevent the fire from breaking out an exterior window and burning on the exterior so as to expose an adjacent dwelling. But what if the fire occurs in the attic where there are no sprinklers and breaks out of a vent in the side wall?

The IRC will allow an NFPA 13D or equivalent sprinkler system to be used for these trade-offs. As we all know, an NFPA 13D sprinkler system is primarily a life safety system and not a full property protection system. This is clearly stated in Section 1.2 Purpose of NFPA 13D as follows:

1.2.1 The purpose of this standard shall be to provide a sprinkler system that aids in the detection and control of residential fires and thus provides improved protection against injury and life loss.

1.2.2 A sprinkler system designed and installed in accordance with this standard shall be expected to prevent flashover (total involvement) in the room of fire origin, where sprinklered, and to improve the chance for occupants to escape or be evacuated.

These trade-offs rely on the owners of the adjacent buildings to maintain their automatic sprinkler systems in an operative condition at all times. Unfortunately, there is no supervision required for these systems and no fire department connection is provided for the fire department to boost the sprinkler system water supply as is typical of an NFPA 13 sprinkler system. Furthermore, the water supply to the system could be shut off for repairs and not turned back on since no supervision of the control valve supplying the water supply to the sprinkler system is required if the valve is locked open. Obviously, the owner of the townhouse would have the key to the lock on the valve so there would be nothing to prevent the owner from unlocking the lock and closing the valve for whatever reason. And it is not uncommon for the valve to remain closed since there is no supervisory reminder that the valve remains closed. It could easily be forgotten after the repairs have been made to the system.

There is also the question of the reliability of the sprinkler system water supply. Will it be available at all times when there is the possibility of a fire occurring? This is especially important in high seismic activity areas where fires often start soon after an earthquake and the water supplies in many cases are out of service due to main breaks and loss of power for extended periods of time.

We also have a concern with the proposed new Section R309.5 Fire Sprinklers which requires private garages to be protected by fire sprinklers where the garage has been designed to have exterior walls protected in accordance with Table R302.1(2), Footnote a. In our opinion, this will actually provide a lesser degree of protection in cold weather climates where the sprinkler system in the garage may be subject to freezing. It is very difficult to prevent the sprinkler piping from freezing where it passes through attics of residential dwellings in these cold climate areas, but that problem is significantly increased where sprinklers are required in private garages as an extension of the sprinkler system in the adjacent dwelling. So if the garage sprinkler freezes, it could damage and rupture the piping, thus, causing failure of the sprinkler system in the dwelling that it is adjacent to by draining the water from the sprinkler system. This would be especially critical in a case where the sprinkler system is supplied by a fixed storage tank rather than a municipal water supply system. So the sprinkler water supply system could be totally drained due to the rupture caused in the frozen piping of the garage sprinkler system.

In conclusion, we believe it is unwise to allow for these automatic sprinkler system trade-offs based on sprinkler systems designed in accordance with NFPA 13D which are not as reliable, nor as effective in providing property protection, as an NFPA 13 sprinkler system. Therefore, we urge the Class A voting members to support the Committee's recommendation for disapproval of this code change.

Final Action: AS AM AMPC____ D

INTERNATIONAL EXISTING BUILDING CODE

EB10-09/10, Part I

IEBC 605.1, 705.2, 706.1, 805.4 (New), 805.4.1 (New), 912.4.1, 912.4.2, 912.8.2, 1004.1(New), 1005.1, 1103.3, 1105.6; IBC 3411.4, 3411.4.1, 3411.4.2, 3411.5, 3411.6, 3411.8(New), 3411.8.1(New), 3411.9; (IEBC [B] 310.4, 310.4.1, 310.4.2, 310.5, 310.6, 310.8(New), 310.8.1 (New), 310.9), 1007.1 (IFC [B] 1007.1)

Proposed Change as Submitted

Proponent: Gene Boecker, Code Consultants, Inc.

PART I – IEBC

CHAPTER 5
REPAIRS

SECTION 504
MEANS OF EGRESS

504.1 General. Repairs shall be done in a manner that maintains the level of protection provided for the means of egress.

SECTION 505
ACCESSIBILITY

505.1 General. Repairs shall be done in a manner that maintains the level of accessibility provided.

CHAPTER 6
ALTERATIONS—LEVEL 1

SECTION 604
MEANS OF EGRESS

604.1 General. Repairs shall be done in a manner that maintains the level of protection provided for the means of egress.

SECTION 605
ACCESSIBILITY

605.1 General. A building, facility or element that is altered shall comply with the applicable provisions in Sections 605.1.1 through 605.1.14, Chapter 11 of the International Building Code and ICC A117.1 unless it is technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent that is technically feasible.

A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

Exceptions:

1. The altered element or space is not required to be on an accessible route unless required by Section 605.2.
2. ~~Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in existing buildings and facilities.~~ The altered element or space is not required to provide accessible means of egress, unless required by Section 805.4.

3. Type B dwelling or sleeping units required by Section 1107 of the *International Building Code* are not required to be provided in existing buildings and facilities.
4. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provisions for Type B dwelling units and shall comply with the applicable provisions in Chapter 11 of the *International Building Code* and ICC A117.1.

605.2 Alterations affecting an area containing a primary function. Where an *alteration* affects the accessibility to, or contains an area of *primary function*, the route to the *primary function* area shall be *accessible*. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.
2. This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of an existing building, facility or element.

CHAPTER 7
ALTERATIONS—LEVEL 2

SECTION 705
MEANS OF EGRESS

705.1 Scope. The requirements of this section shall be limited to work areas that include exits or corridors shared by more than one tenant within the work area in which Level 2 alterations are being performed, and where specified they shall apply throughout the floor on which the work areas are located or otherwise beyond the work area.

705.2 General. The means of egress shall comply with the requirements of this section.

Exceptions:

1. Where the work area and the means of egress serving it complies with NFPA 101.
2. Means of egress conforming to the requirements of the building code under which the building was constructed shall be considered compliant means of egress if, in the opinion of the code official, they do not constitute a distinct hazard to life.
3. <u>The altered element or space is not required to provide accessible means of egress, unless required by Section 805.4.</u>

705.3 Number of exits. The number of exits shall be in accordance with Sections 705.3.1 through 705.3.3.

705.3.1 Minimum number. Every story utilized for human occupancy on which there is a work area that includes exits or corridors shared by more than one tenant within the work area shall be provided with the minimum number of exits based on the occupancy and the occupant load in accordance with the *International Building Code*. In addition, the exits shall comply with Sections 705.3.1.1 and 705.3.1.2.

SECTION 706
ACCESSIBILITY

706.1 General. A building, facility, or element that is altered shall comply with Section 605 <u>and 706</u>.

706.2 Stairs and escalators in existing buildings. In alterations where an escalator or stair is added where none existed previously, an accessible route shall be provided in accordance with Sections 1104.4 and 1104.5 of the *International Building Code*.

706.3 Accessible dwelling units and sleeping units. Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 of the *International Building Code* for accessible units and Chapter 9 of the *International Building Code* for visible alarms apply only to the quantity of spaces being added.

706.4 Type A dwelling or sleeping units. Where more than 20 Group R-2 dwelling or sleeping units are being added, the requirements of Section 1107 of the International Building Code for Type A units and Chapter 9 of the International *Building Code* for visible alarms apply only to the quantity of the spaces being added.

706.5 Type B dwelling or sleeping units. Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 of the *International Building Code* for Type B units and Chapter 9 of the *International Building Code* for visible alarms apply only to the quantity of the spaces being added.

CHAPTER 8
ALTERATIONS—LEVEL 3

SECTION 805
MEANS OF EGRESS

805.1 General. The means of egress shall comply with the requirements of Section 705 except as specifically required in Sections 805.2 and 805.3.

805.2 Means-of-egress lighting. Means of egress from the highest work area floor to the floor of exit discharge shall be provided with artificial lighting within the exit enclosure in accordance with the requirements of the *International Building Code*.

805.3 Exit signs. Means of egress from the highest work area floor to the floor of exit discharge shall be provided with exit signs in accordance with the requirements of the *International Building Code*.

805.4 Accessible means of egress. Additions and buildings or portions thereof undergoing a change of occupancy or alterations shall provide accessible means of egress in accordance with Section 805.4.1 and Section 1007 of the *International Building Code*.

Exceptions:

1. Accessible means of egress is not required in existing buildings where the alterations are less than Level 3.
2. Accessible means of egress is not required in existing building undergoing a change of occupancy where the change or occupancy is in conjunction with alterations that are less than Level 3.

805.4.1 Means of egress through the existing building. Where the accessible means of egress from any portion of a building being altered, undergoing a change of occupancy or addition requires occupants to egress through portions of the existing building, compliance with Section 1007 of the *International Building Code* is required, unless technically infeasible. Where compliance with this provision is *technically infeasible*, the accessible means of egress through the existing building shall provide access to the maximum extent technically feasible.

SECTION 806
ACCESSIBILITY

806.1 General. A building, facility or element that is altered shall comply with Sections 605 and 706.

CHAPTER 9
CHANGE OF OCCUPANCY

SECTION 905
MEANS OF EGRESS

905.1 General. Means of egress in portions of buildings undergoing a change of occupancy classification shall comply with Section 912.

SECTION 906
ACCESSIBILITY

906.1 General. Accessibility in portions of buildings undergoing a change of occupancy classification shall comply with Section 912.8.

SECTION 912
CHANGE OF OCCUPANCY CLASSIFICATION

912.4 Means of egress, general. Hazard categories in regard to life safety and means of egress shall be in accordance with Table 912.4.

TABLE 912.4
MEANS OF EGRESS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	H
2	I-2, I-3, I-4
3	A, E, I-1, M, R-1, R-2, R-4
4	B, F-1, R-3, S-1
5 (Lowest Hazard)	F-2, S-2, U

912.4.1 Means of egress for change to higher hazard category. When a change of occupancy classification is made to a higher hazard category (lower number) as shown in Table 912.4, the means of egress shall comply with the requirements of Chapter 10 of the *International Building Code*.

Exceptions:

1. Stairways shall be enclosed in compliance with the applicable provisions of Section 803.1.
2. Existing stairways including handrails and guards complying with the requirements of Chapter 8 shall be permitted for continued use subject to approval of the code official.
3. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.
4. Existing corridor walls constructed of wood lath and plaster in good condition or 1/ 2-inch-thick (12.7 mm) gypsum wallboard shall be permitted. Such walls shall either terminate at the underside of a ceiling of equivalent construction or extend to the underside of the floor or roof next above.
5. Existing corridor doorways, transoms and other corridor openings shall comply with the requirements in Sections 705.5.1, 705.5.2 and 705.5.3.
6. Existing dead-end corridors shall comply with the requirements in Section 705.6.
7. An existing operable window with clear opening area no less than 4 square feet (0.38 m^2) and minimum opening height and width of 22 inches (559 mm) and 20 inches (508 mm), respectively, shall be accepted as an emergency escape and rescue opening.
8. Accessible means of egress is not required for areas undergoing a change of occupancy unless required by Section 805.4.

912.4.2 Means of egress for change of use to equal or lower hazard category. When a change of occupancy classification is made to an equal or lesser hazard category (higher number) as shown in Table 912.4, existing elements of the means of egress shall comply with the requirements of Section 805 for the new occupancy classification. Newly constructed or configured means of egress shall comply with the requirements of Chapter 10 of the *International Building Code*.

Exceptions:

1. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.
2. Accessible means of egress is not required for areas undergoing a change of occupancy unless required by Section 805.4.

912.4.3 Egress capacity. Egress capacity shall meet or exceed the occupant load as specified in the *International Building Code* for the new occupancy.

912.4.4 Handrails. Existing stairways shall comply with the handrail requirements of Section 705.9 in the area of the change of occupancy classification.

912.4.5 Guards. Existing guards shall comply with the requirements in Section 705.10 in the area of the change of occupancy classification.

912.8 Accessibility. Existing buildings that undergo a change of group or occupancy classification shall comply with this section.

912.8.1 Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification, any alterations shall comply with Sections 605 and 706, as applicable.

912.8.2 Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 912.8.1 and shall have all of the following accessible features unless technically infeasible. Where compliance with this provision is technically infeasible, provide access to the maximum extent technically feasible.

1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1110 of the *International Building Code*.
4. Accessible parking, where parking is provided.
5. At least one accessible passenger loading zone, where loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

CHAPTER 10
ADDITIONS

SECTION 1004
MEANS OF EGRESS

1004.1 General. The means of egress shall comply with the requirements of Chapter 10 of the *International Building Code*.

Exception: Accessible means of egress is not required for additions unless required by Section 805.4.

SECTION 1005
ACCESSIBILITY

1005.1 Minimum requirements. Accessibility provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, primary function shall comply with the requirements of Sections 605, ~~and~~ 706 and 806, as applicable.

CHAPTER 11
HISTORIC BUILDINGS

SECTION 1103
FIRE SAFETY

1103.1 Scope. Historic buildings undergoing alterations, changes of occupancy, or that are moved shall comply with Section 1103.

1103.2 General. Every historic building that does not conform to the construction requirements specified in this code for the occupancy or use and that constitutes a distinct fire hazard as defined herein shall be provided with an approved automatic fire-extinguishing system as determined appropriate by the code official. However, an automatic fire-extinguishing system shall not be used to substitute for, or act as an alternative to, the required number of exits from any facility.

1103.3 Means of egress. Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the means of egress. When approved by the code official, the front or main exit doors need not swing in the direction of the path of exit travel, provided that other approved means of egress having sufficient capacity to serve the total occupant load are provided.

Exception: Accessible means of egress are not required in historic buildings being altered or undergoing a change of occupancy.

SECTION 1104
ALTERATIONS

1104.1 Accessibility requirements. The provisions of 605 and 706, as applicable, shall apply to buildings and facilities designated as historic structures that undergo alterations, unless technically infeasible. Where compliance with the requirements for accessible routes, entrances or toilet facilities would threaten or destroy the historic significance of the building or facility, as determined by the code official, the alternative requirements of Sections 1104.1.1 through 1104.1.4 for that element shall be permitted.

1104.1.1 Site arrival points. At least one main entrance shall be accessible.

1104.1.2 Multilevel buildings and facilities. An accessible route from an accessible entrance to public spaces on the level of the accessible entrance shall be provided.

1104.1.3 Entrances. At least one main entrance shall be accessible.

Exceptions:

1. If a main entrance cannot be made accessible, an accessible nonpublic entrance that is unlocked while the building is occupied shall be provided; or
2. If a main entrance cannot be made accessible, a locked accessible entrance with a notification system or remote monitoring shall be provided.

1104.1.4 Toilet and bathing facilities. Where toilet rooms are provided, at least one accessible family or assisted-use toilet room complying with Section 1109.2.1 of the *International Building Code* shall be provided.

SECTION 1105
CHANGE OF OCCUPANCY

1105.6 Means of egress. Existing door openings and corridor and stairway widths less than those that would be acceptable for nonhistoric buildings under these provisions shall be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the exit and that the capacity of the exit system is adequate for the occupant load, or where other operational controls to limit occupancy are approved by the code official.

Exception: Accessible means of egress are not required in historic buildings undergoing a change of occupancy.

1105.15 Accessibility requirements. The provisions of Section 912.8 shall apply to buildings and facilities designated as historic structures that undergo a change of occupancy, unless technically infeasible. Where compliance with the requirements for accessible routes, ramps, entrances, or toilet facilities would threaten or destroy the historic significance of the building or facility, as determined by the authority having jurisdiction, the alternative requirements of Sections 1104.1.1 through 1104.1.5 for those elements shall be permitted.

Reason: The interplay between an existing building and additions or alterations is not well defined. While the text is clear that the addition is required to meet the accessibility provisions it is not clear how the addition will impact the accessibility requirements for the existing building. Similarly, although the statement exists that alterations do not require a retroactive requirement for accessible means of egress, this statement negates the scope of the alteration. Federal Accessibility regulations and common sense dictate that where major changes occur consideration for the accessible means of egress should also occur. Additionally, the simple idea that accessibility should be intentionally denied to a segment of the population does not seem appropriate. The proposal seeks to finesse some of these issues.

It is important to remember that the requirements in the IBC only require a maximum of two accessible means of egress (based on travel distance limitations) as noted in Section 1007.1. And, an elevator can be counted as being one of the accessible means of egress. Thus, it may be easier in some cases to provide an accessible means of egress than one that fully complies with the requirements for new construction.

Some sections shown do not contain changes, but were shown for context and appropriate referencing.

IEBC:

In addition to the items noted above which relate to only Chapter 3, specific direction is provided for each condition as elaborated in the various chapters of the IEBC. Chapter 3 of the IEBC parallels Chapter 34 in the IBC. However, the IEBC also contains provisions that are more in depth than the prescriptive methods described.

The existing language is maintained that requires repairs to not reduce the level of current accessibility; but there is no additional requirement for accessibility in Chapter 5.

605.1, exception #2: Rather than refer to the IBC, specific provisions are being added to the IEBC. The wording is changed to reflect that.

705.2, exception #3: Similar to 605.1, reference to the accessible means of egress is added to allow the code user to understand where the scope of changes will require work in this area. Without this exception, it is unclear whether the reference to making the means of egress comply is intended to include the accessible means of egress as well as other aspects of egress design.

706.1: A reflective reference is added which was lacking. Compliance with another section was mandated but not the section itself.

805.4: The language and intent is the same as noted above for IEBC Section 310.8 and its two exceptions. The exceptions in this case use the language of the IEBC which define the level of work in more definitive terms – using Levels to describe the threshold rather than percentages of work.

805.4.1: This language is replicating that noted above from Section 310.8.1 relative to egress through an existing building.

912.4.1, exception #8: The added exception continues the scoping by including with the Change of Occupancy Chapter a reference back to the main section addressing when accessible means of egress must be provided – 805.4.

912.4.2, exception #2: A new exception is added to this section so that it is clear that whether the change in occupancy is to a higher category or lower category, the requirement to provide accessible means of egress is found in Section 805.4.

912.8.2: This added language does not address accessible means of egress. It addresses the consistent recognition of technical infeasibility. The language informs the code user of this application as it relates to changes in occupancy.

1004.1: Chapter 10 (Additions) does not address means of egress specifically. A reference to compliance with the means of egress provisions in Chapter 10 of the IBC is included. This is consistent with the first sentence in Section 302.1. The added language in inserted before the accessibility section in like manner to other chapters.

1004.1, exception: The exception is consistent with the other changes noted above that refer to Section 805.4 for the thresholds for compliance with the accessible means of egress requirements.

1005.1: Reference is currently provided to the sections relative to accessibility in Chapter 6 and 7 but not 8. The proposal corrects that.

1105.6: Similar to the language in 3411.10 in the IBC, this clearly indicates that accessible means of egress is not required for historic buildings.

<u>IBC/IEBC</u>:

1007.1: The section is changed to indicate that existing building provisions are noted in Chapter 34. This is the proper scoping location for issues dealing with existing buildings – not Chapter 10.

3411.4/310.4: A cross reference is added to direct the code user to the central location for issues relative to existing buildings and accessible means of egress; the proposed 3411.8.

3411.4.2/310.4.2: The paragraph following the text already mentions what happens when the effort is "technically infeasible" but there is no language that states that these items are limited to conditions where technical infeasibility is not a problem. The added language clarifies the intent with respect to technical infeasibility.

3411.5/310.5: A cross reference to the section addressing accessible means of egress is added.

3411.6/310.6: Where accessible means of egress are required, it is necessary to direct the code user to the proper section. The reference to 1007 does that.

3411.6/310.6, exception #2: The exception seems to imply that nothing is required for the existing building relative to accessible means of egress. However, since the addition is impacting the existing building, the egress through the existing building is more similar to an alteration of the existing egress system. The revised text points to the central section addressing what must be done.

3411.8/310.8: A new section is added to specifically address the accessible means of egress. Rather than the blanket statement in Section 1007.1 of the building code, this section will address the scope and extent of work necessary to address accessible means of egress. It directs the code user to Section 1007 for the technical requirements when an accessible means of egress is necessary as well as clearly delineate that when a change of occupancy or alteration occurs, the accessible means of egress must be provided. This is no different than the general requirements in 3404.1/303.1 and 3408.1/307.1 which require alterations and changes in occupancy to meet "new code."

3411.8/310.8, exception #1: Alterations with some magnitude should address accessible means of egress, if the alteration is relatively small then there is reason to limit the requirement. The threshold of 50% of the building area is intended to delineate the difference between IEBC Alterations – Level 2 and Alterations – Level 3

3411.8/310.8, exception #2: Similarly, if the change in occupancy is only to a portion of the building, full compliance with the accessible means of egress is not required. The position should be that if the occupancy is totally changed then the building should be made to comply with the new requirements. For "regular" egress this may mean that the occupant load changes resulting in wider or additional stairways. The least that should be done is to make an effort to provide accessible means of egress.

3411.8.1/310.8.1: If an addition is designed such that the means of egress must enter the existing building then the egress design must meet the requirements for the addition as it passes through the existing building. As this relates to egress design, it includes a continuation of the design in the addition for egress width, corridor protection, panic hardware (as applicable) and similar concerns. The same should be true for the design of the accessible means of egress. If one of the accessible egress paths leads through the existing building, it too needs to meet/continue the level of protection as designed in the addition. The limitation to this is if the effort to make the existing means of egress accessible is "technically infeasible" then work should be done to what is possible. One example of this may be making sure that the slopes along the path in the existing building's corridor are proper even if the width cannot be altered to allow the proper approach to the exit door.

3411.10: The language requires compliance with the accessible means of egress as written with the only defense being the "technically infeasible" option. The exception makes it clear that for historic buildings undergoing major alterations of a change in occupancy an accessible means of egress is not required.

A companion change is being proposed for the IEBC so that the changes here a reflected in that code as well.

While more can always be done if possible, the code identifies the minimums necessary for life safety. The proposed changes identify what is appropriate so that the disabled community has similar levels of life safety to the general public and still sets reasonable thresholds based on the extent of work for the project. The standard of "technical Infeasible" is identified clearly in new sections where it may have been interpreted previously as not applying. The "20% of the cost" criteria identified in 3411.7, exception #1 of the IBC (605.2, exception #1 of the IEBC) relative to alterations affecting the primary function is also maintained.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: BOECKER-E5-1007.1

Public Hearing Results

PART I - IEBC
Committee Action: **Disapproved**

Committee Reason: The committee felt that exception 8 to Section 912.4.1 was confusing in its reference back to 805.4 where it discussed changes of occupancy in a chapter about alterations. Further, Section 805.4 does not contain the current 20 percent cost limitation. Without this limit the costs will get unreasonable.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gene Boecker, representing Code Consultants, Inc., requests Approval as Submitted.

Commenter's Reason: The committee did not vote to disapprove based on the concept but on a misunderstanding of what the Existing Building Code already allows. The prime comment was the mention that 20 percent cost limitation was not included in the referenced Section 805.4. The reason is that it already exists. Section 805 of the Existing Building Code requires compliance with Section 605; and, Section 605 clearly already contains the 20 percent limitation provision. It isn't included in 805 because it isn't needed. One comment by the committee felt that the reference from 912.4.1 to 805.4 was confusing. I am not sure how that is confusing since the codes make reference to other sections all the time.

An additional comment was the question of cost to which there are two answers. First, there is the 20 percent rule which exists although the committee did not recognize that at the time. Second, there will be additional cost. That is not to be denied. The question is whether or not it is within the power of the ICC to make the accessible means of egress available in existing buildings. If the ICC is intent on Life Safety then it is important that the organization address the fact that there are currently only requirements for accessible means of egress in new construction while we acknowledge a potential loss of a portion of our population by ignoring accessible means of egress in existing buildings. I maintain that the ICC does care and that it is the proper place to address this deficiency in life safety needs.

Questions about whether this is in conflict with the federal guidelines are in error. The proposed language in the new ADA guidelines recognize the International Code Council as the expert in addressing means of egress, deferring to the ICC those decisions on how best to provide life safety in the form of means of egress to those individuals with disabilities. It is time we take a position to include at least some effort to address accessible means of egress in existing buildings. We strain over much greater minutia than this. I urge the membership to do the right thing and approve this proposal as submitted.

Final Action: AS AM AMPC____ D

EB10-09/10, Part II

IEBC 605.1, 705.2, 706.1, 805.4 (New), 805.4.1 (New), 912.4.1, 912.4.2, 912.8.2, 1004.1(New), 1005.1, 1103.3, 1105.6; IBC 3411.4, 3411.4.1, 3411.4.2, 3411.5, 3411.6, 3411.8(New), 3411.8.1(New), 3411.9; (IEBC [B] 310.4, 310.4.1, 310.4.2, 310.5, 310.6, 310.8(New), 310.8.1 (New), 310.9), 1007.1 (IFC [B] 1007.1)

Proponent: Gene Boecker, Code Consultants, Inc.

Proposed Change as Submitted

PART II – IBC GENERAL

3411.4 (IEBC [B] 310.4) Change of occupancy. Existing buildings that undergo a change of group or occupancy shall comply with this section. Accessible means of egress shall be provided in accordance with Section 3411.8.

3411.4.1 (IEBC [B] 310.4.1) Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification, any alterations shall comply with Sections 3411.6, 3411.7, ~~and~~ 3411.8 and 3411.9.

3411.4.2 (IEBC [B] 310.4.2) Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 3411.4.1 and shall have all the following accessible features unless *technically infeasible*. Where compliance with this provision is *technically infeasible*, provide access to the maximum extent technically feasible.

1. At least one accessible building entrance.

2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1110.
4. Accessible parking, where parking is provided.
5. At least one accessible passenger loading zone, when loading zones are provided.
6. At least on accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

3411.5 (IEBC [B] 310.5) Additions. Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section 3411.7 <u>and 3411.8</u>.
3411.6 (IEBC [B] 310.6) Alterations. A building, facility or element that is altered shall comply with the applicable provisions in <u>Section 1007,</u> Chapter 11 of this code and ICC A117.1, unless technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent technically feasible.

Exceptions:

1. The altered element or space is not required to be on an accessible route, unless required by Section 3411.7.
2. Accessible means of egress required by Chapter 10 are not required to be provided in existing buildings and facilities <u>being altered unless required by Section 3411.8</u>.
3. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provision for a Type B dwelling unit and shall comply with the applicable provisions in Chapter 11 and ICC A117.1.

3411.7 (IEBC [B] 310.7) Alterations affecting an area containing a primary function. Where an alteration affects the accessibility to, or contains an area of primary function, the route to the primary function area shall be accessible. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.
2. This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of an existing building, facility or element.

<u>**3411.8 (IEBC [B] 310.8) Accessible means of egress.** Additions and buildings or portions thereof undergoing a change of occupancy or alterations shall provide accessible means of egress in accordance with Sections 1007 and 3411.8.1.</u>

<u>**Exceptions:**</u>

1. <u>Accessible means of egress is not required in existing buildings where the alterations are less than 50 percent of the aggregate building area.</u>
2. <u>Accessible means of egress is not required in existing building undergoing a change of occupancy where the change or occupancy is in conjunction with alterations that are less than 50 percent of the aggregate building area.</u>

<u>**3411.8.1 (IEBC [B] 310.8.1) Means of egress through the existing building**. Where the accessible means of egress from any portion of a building being altered, undergoing a change of occupancy or addition requires occupants to egress through portions of the existing building, compliance with Section 1007 is required, unless technically infeasible. Where compliance with this provision is technically infeasible, the accessible means of egress through the existing building shall provide access to the maximum extent technically feasible.</u>

(Renumber subsequent sections)

~~3411.9~~ <u>3411.10</u> (IEBC [B] ~~310.9~~ <u>310.10</u>) Historic buildings. These provisions shall apply to buildings and facilities designated as historic structures that undergo alterations or a change of occupancy, unless *technically infeasible*. Where compliance with the requirements for *accessible* routes, entrances or toilet facilities would threaten or destroy the historic significance of the building or facility, as determined by the applicable governing authority, the alternative requirements of Sections ~~3411.9.1~~ 3411.10.1 through ~~3411.9.4~~ 3411.10.4 for that element shall be permitted.

Exception: Accessible means of egress are not required in historic buildings being altered or undergoing a change of occupancy.

(Renumber subsequent sections)

Reason: The interplay between an existing building and additions or alterations is not well defined. While the text is clear that the addition is required to meet the accessibility provisions it is not clear how the addition will impact the accessibility requirements for the existing building. Similarly, although the statement exists that alterations do not require a retroactive requirement for accessible means of egress, this statement negates the scope of the alteration. Federal Accessibility regulations and common sense dictate that where major changes occur consideration for the accessible means of egress should also occur. Additionally, the simple idea that accessibility should be intentionally denied to a segment of the population does not seem appropriate. The proposal seeks to finesse some of these issues.

It is important to remember that the requirements in the IBC only require a maximum of two accessible means of egress (based on travel distance limitations) as noted in Section 1007.1. And, an elevator can be counted as being one of the accessible means of egress. Thus, it may be easier in some cases to provide an accessible means of egress than one that fully complies with the requirements for new construction.

Some sections shown do not contain changes, but were shown for context and appropriate referencing.

IEBC:

In addition to the items noted above which relate to only Chapter 3, specific direction is provided for each condition as elaborated in the various chapters of the IEBC. Chapter 3 of the IEBC parallels Chapter 34 in the IBC. However, the IEBC also contains provisions that are more in depth than the prescriptive methods described.

The existing language is maintained that requires repairs to not reduce the level of current accessibility; but there is no additional requirement for accessibility in Chapter 5.

605.1, exception #2: Rather than refer to the IBC, specific provisions are being added to the IEBC. The wording is changed to reflect that.

705.2, exception #3: Similar to 605.1, reference to the accessible means of egress is added to allow the code user to understand where the scope of changes will require work in this area. Without this exception, it is unclear whether the reference to making the means of egress comply is intended to include the accessible means of egress as well as other aspects of egress design.

706.1: A reflective reference is added which was lacking. Compliance with another section was mandated but not the section itself.

805.4: The language and intent is the same as noted above for IEBC Section 310.8 and its two exceptions. The exceptions in this case use the language of the IEBC which define the level of work in more definitive terms – using Levels to describe the threshold rather than percentages of work.

805.4.1: This language is replicating that noted above from Section 310.8.1 relative to egress through an existing building.

912.4.1, exception #8: The added exception continues the scoping by including with the Change of Occupancy Chapter a reference back to the main section addressing when accessible means of egress must be provided – 805.4.

912.4.2, exception #2: A new exception is added to this section so that it is clear that whether the change in occupancy is to a higher category or lower category, the requirement to provide accessible means of egress is found in Section 805.4.

912.8.2: This added language does not address accessible means of egress. It addresses the consistent recognition of technical infeasibility. The language informs the code user of this application as it relates to changes in occupancy.

1004.1: Chapter 10 (Additions) does not address means of egress specifically. A reference to compliance with the means of egress provisions in Chapter 10 of the IBC is included. This is consistent with the first sentence in Section 302.1. The added language in inserted before the accessibility section in like manner to other chapters.

1004.1, exception: The exception is consistent with the other changes noted above that refer to Section 805.4 for the thresholds for compliance with the accessible means of egress requirements.

1005.1: Reference is currently provided to the sections relative to accessibility in Chapter 6 and 7 but not 8. The proposal corrects that.

1105.6: Similar to the language in 3411.10 in the IBC, this clearly indicates that accessible means of egress is not required for historic buildings.

IBC/IEBC:

1007.1: The section is changed to indicate that existing building provisions are noted in Chapter 34. This is the proper scoping location for issues dealing with existing buildings – not Chapter 10.

3411.4/310.4: A cross reference is added to direct the code user to the central location for issues relative to existing buildings and accessible means of egress; the proposed 3411.8.

3411.4.2/310.4.2: The paragraph following the text already mentions what happens when the effort is "technically infeasible" but there is no language that states that these items are limited to conditions where technical infeasibility is not a problem. The added language clarifies the intent with respect to technical infeasibility.

3411.5/310.5: A cross reference to the section addressing accessible means of egress is added.

3411.6/310.6: Where accessible means of egress are required, it is necessary to direct the code user to the proper section. The reference to 1007 does that.

3411.6/310.6, exception #2: The exception seems to imply that nothing is required for the existing building relative to accessible means of egress. However, since the addition is impacting the existing building, the egress through the existing building is more similar to an alteration of the existing egress system. The revised text points to the central section addressing what must be done.

3411.8/310.8: A new section is added to specifically address the accessible means of egress. Rather than the blanket statement in Section 1007.1 of the building code, this section will address the scope and extent of work necessary to address accessible means of egress. It directs the code user to Section 1007 for the technical requirements when an accessible means of egress is necessary as well as clearly delineate that when a change of occupancy or alteration occurs, the accessible means of egress must be provided. This is no different than the general requirements in 3404.1/303.1 and 3408.1/307.1 which require alterations and changes in occupancy to meet "new code."

3411.8/310.8, exception #1: Alterations with some magnitude should address accessible means of egress, if the alteration is relatively small then there is reason to limit the requirement. The threshold of 50% of the building area is intended to delineate the difference between IEBC Alterations – Level 2 and Alterations – Level 3

3411.8/310.8, exception #2: Similarly, if the change in occupancy is only to a portion of the building, full compliance with the accessible means of egress is not required. The position should be that if the occupancy is totally changed then the building should be made to comply with the new

requirements. For "regular" egress this may mean that the occupant load changes resulting in wider or additional stairways. The least that should be done is to make an effort to provide accessible means of egress.
3411.8.1/310.8.1: If an addition is designed such that the means of egress must enter the existing building then the egress design must meet the requirements for the addition as it passes through the existing building. As this relates to egress design, it includes a continuation of the design in the addition for egress width, corridor protection, panic hardware (as applicable) and similar concerns. The same should be true for the design of the accessible means of egress. If one of the accessible egress paths leads through the existing building, it too needs to meet/continue the level of protection as designed in the addition. The limitation to this is if the effort to make the existing means of egress accessible is "technically infeasible" then work should be done to what is possible. One example of this may be making sure that the slopes along the path in the existing building's corridor are proper even if the width cannot be altered to allow the proper approach to the exit door.
3411.10: The language requires compliance with the accessible means of egress as written with the only defense being the "technically infeasible" option. The exception makes it clear that for historic buildings undergoing major alterations of a change in occupancy an accessible means of egress is not required.

A companion change is being proposed for the IEBC so that the changes here a reflected in that code as well.

While more can always be done if possible, the code identifies the minimums necessary for life safety. The proposed changes identify what is appropriate so that the disabled community has similar levels of life safety to the general public and still sets reasonable thresholds based on the extent of work for the project. The standard of "technical Infeasible" is identified clearly in new sections where it may have been interpreted previously as not applying. The "20% of the cost" criteria identified in 3411.7, exception #1 of the IBC (605.2, exception #1 of the IEBC) relative to alterations affecting the primary function is also maintained.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: BOECKER-E5-1007.1

Public Hearing Results

PART II – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The committee felt that as with EB10-09/10 Part I this proposal does not adequately address costs involved with providing accessibility to existing buildings

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gene Boecker, representing Code Consultants, Inc., requests Approval as Submitted.

Commenter's Reason: See EB10-09/10, Part I

Final Action: AS AM AMPC____ D

EB10-09/10, Part III

IEBC 605.1, 705.2, 706.1, 805.4 (New), 805.4.1 (New), 912.4.1, 912.4.2, 912.8.2, 1004.1(New), 1005.1, 1103.3, 1105.6; IBC 3411.4, 3411.4.1, 3411.4.2, 3411.5, 3411.6, 3411.8(New), 3411.8.1(New), 3411.9; (IEBC [B] 310.4, 310.4.1, 310.4.2, 310.5, 310.6, 310.8(New), 310.8.1 (New), 310.9), 1007.1 (IFC [B] 1007.1)

Proposed Change as Submitted

Revise as follows:

1007.1 (IFC [B] 1007.1) Accessible means of egress required. Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress is required by Section 1015.1 or 1021.1 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. Accessible means of egress ~~are not required in alterations to~~ for existing buildings shall be provided as required in Section 3411.8.
2. One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1007.3, 1007.4 or 1007.5.
3. In assembly areas with sloped or stepped aisles, one accessible means of egress is permitted where the common path of travel is accessible and meets the requirements in Section 1028.8.

Reason: The interplay between an existing building and additions or alterations is not well defined. While the text is clear that the addition is required to meet the accessibility provisions it is not clear how the addition will impact the accessibility requirements for the existing building. Similarly, although the statement exists that alterations do not require a retroactive requirement for accessible means of egress, this statement negates the scope of the alteration. Federal Accessibility regulations and common sense dictate that where major changes occur consideration for the accessible means of egress should also occur. Additionally, the simple idea that accessibility should be intentionally denied to a segment of the population does not seem appropriate. The proposal seeks to finesse some of these issues.

It is important to remember that the requirements in the IBC only require a maximum of two accessible means of egress (based on travel distance limitations) as noted in Section 1007.1. And, an elevator can be counted as being one of the accessible means of egress. Thus, it may be easier in some cases to provide an accessible means of egress than one that fully complies with the requirements for new construction.

Some sections shown do not contain changes, but were shown for context and appropriate referencing.

IEBC:

In addition to the items noted above which relate to only Chapter 3, specific direction is provided for each condition as elaborated in the various chapters of the IEBC. Chapter 3 of the IEBC parallels Chapter 34 in the IBC. However, the IEBC also contains provisions that are more in depth than the prescriptive methods described.

The existing language is maintained that requires repairs to not reduce the level of current accessibility; but there is no additional requirement for accessibility in Chapter 5.

605.1, exception #2: Rather than refer to the IBC, specific provisions are being added to the IEBC. The wording is changed to reflect that.

705.2, exception #3: Similar to 605.1, reference to the accessible means of egress is added to allow the code user to understand where the scope of changes will require work in this area. Without this exception, it is unclear whether the reference to making the means of egress comply is intended to include the accessible means of egress as well as other aspects of egress design.

706.1: A reflective reference is added which was lacking. Compliance with another section was mandated but not the section itself.

805.4: The language and intent is the same as noted above for IEBC Section 310.8 and its two exceptions. The exceptions in this case use the language of the IEBC which define the level of work in more definitive terms – using Levels to describe the threshold rather than percentages of work.

805.4.1: This language is replicating that noted above from Section 310.8.1 relative to egress through an existing building.

912.4.1, exception #8: The added exception continues the scoping by including with the Change of Occupancy Chapter a reference back to the main section addressing when accessible means of egress must be provided – 805.4.

912.4.2, exception #2: A new exception is added to this section so that it is clear that whether the change in occupancy is to a higher category or lower category, the requirement to provide accessible means of egress is found in Section 805.4.

912.8.2: This added language does not address accessible means of egress. It addresses the consistent recognition of technical infeasibility. The language informs the code user of this application as it relates to changes in occupancy.

1004.1: Chapter 10 (Additions) does not address means of egress specifically. A reference to compliance with the means of egress provisions in Chapter 10 of the IBC is included. This is consistent with the first sentence in Section 302.1. The added language in inserted before the accessibility section in like manner to other chapters.

1004.1, exception: The exception is consistent with the other changes noted above that refer to Section 805.4 for the thresholds for compliance with the accessible means of egress requirements.

1005.1: Reference is currently provided to the sections relative to accessibility in Chapter 6 and 7 but not 8. The proposal corrects that.

1105.6: Similar to the language in 3411.10 in the IBC, this clearly indicates that accessible means of egress is not required for historic buildings.

IBC/IEBC:

1007.1: The section is changed to indicate that existing building provisions are noted in Chapter 34. This is the proper scoping location for issues dealing with existing buildings – not Chapter 10.

3411.4/310.4: A cross reference is added to direct the code user to the central location for issues relative to existing buildings and accessible means of egress; the proposed 3411.8.

3411.4.2/310.4.2: The paragraph following the text already mentions what happens when the effort is "technically infeasible" but there is no language that states that these items are limited to conditions where technical infeasibility is not a problem. The added language clarifies the intent with respect to technical infeasibility.

3411.5/310.5: A cross reference to the section addressing accessible means of egress is added.

3411.6/310.6: Where accessible means of egress are required, it is necessary to direct the code user to the proper section. The reference to 1007 does that.

3411.6/310.6, exception #2: The exception seems to imply that nothing is required for the existing building relative to accessible means of egress. However, since the addition is impacting the existing building, the egress through the existing building is more similar to an alteration of the existing egress system. The revised text points to the central section addressing what must be done.

3411.8/310.8: A new section is added to specifically address the accessible means of egress. Rather than the blanket statement in Section 1007.1 of the building code, this section will address the scope and extent of work necessary to address accessible means of egress. It directs the code user to Section 1007 for the technical requirements when an accessible means of egress is necessary as well as clearly delineate that when a change of occupancy or alteration occurs, the accessible means of egress must be provided. This is no different than the general requirements in 3404.1/303.1 and 3408.1/307.1 which require alterations and changes in occupancy to meet "new code."

3411.8/310.8, exception #1: Alterations with some magnitude should address accessible means of egress, if the alteration is relatively small then there is reason to limit the requirement. The threshold of 50% of the building area is intended to delineate the difference between IEBC Alterations – Level 2 and Alterations – Level 3

3411.8/310.8, exception #2: Similarly, if the change in occupancy is only to a portion of the building, full compliance with the accessible means of egress is not required. The position should be that if the occupancy is totally changed then the building should be made to comply with the new requirements. For "regular" egress this may mean that the occupant load changes resulting in wider or additional stairways. The least that should be done is to make an effort to provide accessible means of egress.
3411.8.1/310.8.1: If an addition is designed such that the means of egress must enter the existing building then the egress design must meet the requirements for the addition as it passes through the existing building. As this relates to egress design, it includes a continuation of the design in the addition for egress width, corridor protection, panic hardware (as applicable) and similar concerns. The same should be true for the design of the accessible means of egress. If one of the accessible egress paths leads through the existing building, it too needs to meet/continue the level of protection as designed in the addition. The limitation to this is if the effort to make the existing means of egress accessible is "technically infeasible" then work should be done to what is possible. One example of this may be making sure that the slopes along the path in the existing building's corridor are proper even if the width cannot be altered to allow the proper approach to the exit door.
3411.10: The language requires compliance with the accessible means of egress as written with the only defense being the "technically infeasible" option. The exception makes it clear that for historic buildings undergoing major alterations of a change in occupancy an accessible means of egress is not required.

A companion change is being proposed for the IEBC so that the changes here a reflected in that code as well.

While more can always be done if possible, the code identifies the minimums necessary for life safety. The proposed changes identify what is appropriate so that the disabled community has similar levels of life safety to the general public and still sets reasonable thresholds based on the extent of work for the project. The standard of "technical Infeasible" is identified clearly in new sections where it may have been interpreted previously as not applying. The "20% of the cost" criteria identified in 3411.7, exception #1 of the IBC (605.2, exception #1 of the IEBC) relative to alterations affecting the primary function is also maintained.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: BOECKER-E5-1007.1

Public Hearing Results

PART III – IBC MEANS OF EGRESS
Committee Action: **Disapproved**

Committee Reason: Based on the action the committee took on EB10-09/10 Part II, this would be an improper reference. Therefore, the committee recommended disapproval.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gene Boecker, representing Code Consultants, Inc., requests Approval as Submitted.

Commenter's Reason: See EB10-09/10, Part I

Final Action: AS AM AMPC____ D

EB14-09/10, Part I

IEBC 605.1, 605.2, 706.1, 806.1, 806.2, 912.8, 912.8.2, 1005.1, 1104.1, 1105.15; IBC 3411.1, 3411.4, 3411.4.2, 3411.6, 3411.7, 3411.8.8, 3411.8.9, 3411.9, 3412.2.5 (IEBC [B] 310.1, 310.4, 310.4.2, 310.6, 310.7, 310.8.8, 310.8.9, 310.9, 1301.2.5)

Proposed Change as Submitted

Proponent: Dominic Marinelli, United Spinal Association

PART I – IEBC

Revise as follows:

CHAPTER 6
ALTERATIONS—LEVEL 1

SECTION 605
ACCESSIBILITY

605.1 General. A building, facility or element that is altered shall comply with the applicable provisions in Sections 605.1.1 through 605.1.14, Chapter 11 of the International Building Code and ICC A117.1 unless it is technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent that is technically feasible.

A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

Exceptions:

1. The altered element or space is not required to be on an accessible route unless required by Section 605.2.
2. Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in existing buildings and facilities.
3. Type B dwelling or sleeping units required by Section 1107 of the International Building Code are not required to be provided in existing buildings and facilities undergoing less than a Level III alteration.
4. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provisions for Type B dwelling units and shall comply with the applicable provisions in Chapter 11 of the International Building Code and ICC A117.1.

605.1.8 Accessible dwelling or sleeping units. Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being altered, the requirements of Section 1107 of the International Building Code for accessible units and Chapter 9 of the International Building Code for visible alarms apply only to the quantity of the spaces being altered.

605.1.9 Type A dwelling or sleeping units. Where more than 20 Group R-2 dwelling or sleeping units are being altered, the requirements of Section 1107 of the International Building Code for Type A units and Chapter 9 of the International Building Code for visible alarms apply only to the quantity of the spaces being altered.

605.2 Alterations affecting an area containing a primary function. Where an alteration affects the accessibility to a, or contains an area of, primary function, the route to the primary function area shall be accessible. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.
2. This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of an existing building, facility or element.
5. This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

CHAPTER 7
ALTERATIONS—LEVEL 2

SECTION 706
ACCESSIBILITY

706.1 General. A building, facility, or element that is altered shall comply with this section and Section 605.

706.3 Accessible dwelling units and sleeping units. Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 of the International Building Code for accessible units and Chapter 9 of the International Building Code for visible alarms apply only to the quantity of spaces being added.

706.4 Type A dwelling or sleeping units. Where more than 20 Group R-2 dwelling or sleeping units are being added, the requirements of Section 1107 of the International Building Code for Type A units and Chapter 9 of the International Building Code for visible alarms apply only to the quantity of the spaces being added.

706.5 Type B dwelling or sleeping units. Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 of the International Building Code for Type B units and Chapter 9 of the International Building Code for visible alarms apply only to the quantity of the spaces being added.

CHAPTER 8
ALTERATIONS—LEVEL 3

SECTION 806
ACCESSIBILITY

806.1 General. A building, facility or element that is altered shall comply with this section and Sections 605 and 706.

806.2 Type B dwelling or sleeping units. Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being altered or added the requirements of Section 1107 of the International Building Code for Type B units and Chapter 9 of the International Building Code for visible alarms apply only to the quantity of the spaces being altered or added.

CHAPTER 9
CHANGE OF OCCUPANCY

912.8 Accessibility. Existing buildings that undergo a change of group or occupancy classification shall comply with this section.

> **Exception:** Type B dwelling or sleeping units required by Section 1107 of the International Building Code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with less than a Level III alteration.

912.8.1 Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification, any alterations shall comply with Sections 605, ~~and~~ 706 and 806, as applicable.

912.8.2 Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 912.8.1 and shall have all of the following accessible features:

1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1110 of the International Building Code.
4. Accessible parking, where parking is provided.
5. At least one accessible passenger loading zone, where loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

> **Exception:** The accessible features listed in Items 1 through 6 are not required for an accessible route to Type B units.

CHAPTER 10
ADDITIONS

SECTION 1005
ACCESSIBILITY

1005.1 Minimum requirements. Accessibility provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, primary function shall comply with the requirements of Sections 605, ~~and~~ 706 and 806, as applicable.

CHAPTER 11
HISTORIC BUILDINGS

SECTION 1104
ALTERATIONS

1104.1 Accessibility requirements. The provisions of 605<u>,</u> ~~and~~ 706 <u>and 806</u>, as applicable, shall apply to buildings and facilities designated as historic structures that undergo alterations, unless *technically infeasible*. Where compliance with the requirements for accessible routes, entrances or toilet facilities would threaten or destroy the historic significance of the building or facility, as determined by the *code official*, the alternative requirements of Sections 1104.1.1 through 1104.1.4 for that element shall be permitted.

> <u>**Exception:** Type B dwelling or sleeping units required by Section 1107 of the *International Building Code* are not required to be provided in historical buildings.</u>

SECTION 1105
CHANGE OF OCCUPANCY

1105.15 Accessibility requirements. The provisions of Section 912.8 shall apply to buildings and facilities designated as historic structures that undergo a *change of occupancy*, unless *technically infeasible*. Where compliance with the requirements for accessible routes, ramps, entrances, or toilet facilities would threaten or destroy the historic significance of the building or facility, as determined by the authority having jurisdiction, the alternative requirements of Sections 1104.1.1 through 1104.1.5 for those elements shall be permitted.

> <u>**Exception:** Type B dwelling or sleeping units required by Section 1107 of the *International Building Code* are not required to be provided in historical buildings.</u>

Reason: The intent of this proposal is to take a small step towards increasing the availability of housing with minimum accessibility requirements. With the fastest grouping group in the United States being people over 65 years old, there is a definite need. The last U.S. Census information indicated that 41% of people of 65 have some level of disability.

Type of units covered under the Fair Housing Act include apartments, condominiums, dormitories, fraternities, sororities, convents, monasteries, assisted living facilities, nursing homes, group homes, etc. The Fair Housing Act is applicable to building first occupied after March 1991. While the department of Housing and Urban Development has been active in enforcement of these regulations, there are a lot of existing buildings that were constructed since 1991 that did not comply with this federal law. The legacy building codes first started requiring Type B units in apartments and condominiums in 1996/1997. With code changes that added congregate living facilities and Institutional facilities, the IBC requirements for Type B units was declared a 'safe harbor' document by HUD in 2002. Reasonably, buildings in jurisdictions that have adopted 2003 or 2006 IBC meet FHA. United Spinal's concern is the buildings that were built before that.

There are a considerable number of existing buildings that should have complied with FHA and did not. When a major alteration is being performed, there is a prime opportunity to have those buildings move towards compliance. This will not only be a benefit for people that need that housing to live in, but will also help the building owners lessen or avoid complaints filed under FHA. Also, this is the most cost effective opportunity to make these revisions.

What this proposal is asking for, is that when buildings are undergoing a Level 3 alteration, or a change of occupancy that includes a Level 3 alteration, that whatever elements are altered, those elements are brought up to meet Type B requirements. If the element is not part of the alteration, it is not required to be altered. This is consistent with current building code philosophy for alterations. There are still the allowances for technically infeasible. The exceptions for non-elevator buildings, site limitations and flood zones currently indicated in Section 1107.7 are still applicable under *Extent of Application* (IBC 3409.3, IEBC 310.3, 605.1.14). Historical buildings, by their reference back to general provisions could be affected, therefore a general exception for Type B units is proposed for historical buildings.

In addition, when the area being altered is for Type B units, there is an exception for the additional route requirements currently in IBC Sections 3411.4.2 and 3411.7 and IEBC Section 310.4.2, 310.7, 605.2 and 912.8.2. United Spinal hopes that this address the concerns of site impracticality brought up during the last hearings by the Building Owners Managers Association, the National Association of Home Builders and the National Multi-Housing Council. This also reinforces the intent that this provision is not meant to require elevators when alterations are performed on upper floors in non-elevator buildings (see exceptions in Section 1107.7). These areas would have been exempted if built new under FHA and IBC, and should continue to be exempted.

The intent is that the same requirements for housing in existing buildings are included in IBC and IEBC. The wording is slightly different because IBC does not include a definition for Level 3 alterations. The terminology used – "work areas exceeds 50 percent of the aggregate area of the building" - can be found in IEBC 405.1. Some sections included in this proposal are not revised, but are included for context.

Cost Impact: The code change proposal will increase the cost of construction

ICCFILENAME: MARINELLI-EB1-605.2.DOC

Public Hearing Results

PART I- IEBC
Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved as it was felt that making the changes for Type B units were not that difficult. In addition this requirement would only apply for more substantial level III alterations and change of occupancy that involves level III alterations. There were some concerns expressed that approval of this proposal would exceed the fair housing requirements.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dominic Marinelli, representing United Spinal Association, requests Approval as Submitted.

Commenter's Reason: EB 14 requires existing residential buildings undergoing Level III alterations to comply with the requirements of the Federal Fair Housing Act Accessibility Guidelines and the Type B requirements of the A117.1 accessibility standard.

There is no trigger for compliance without significant work (50 percent of the aggregate area of the building) associated with a Level III alteration.

The requirement will also allow multiple dwellings that were originally required to comply with the Federal law but did not to take this opportunity to do so when significant work is being done anyways.

Exceptions dealing with existing conditions (i.e., site impracticality, technical infeasibility) are included to recognize hardships in providing an accessible route to an altered dwelling unit or achieving the clearances within the altered dwelling unit.

Public Comment 2:

Lawrence Brown, representing National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: The proposed change far exceeds the Federal Fair Housing Act (FHAct) requirements for accessibility and should be Disapproved. The I-Codes should be used for the purpose of providing construction requirements to address life-safety concerns, not as a vehicle to orchestrate social change. Of most importance is that the proposed Section 806.1, requiring compliance with IBC "Type B Units", is contrary to Federal law. First, the proposed change expands the Federal law that only multifamily "buildings" constructed for first occupancy after March 13, 1991 need to be constructed to the FHAct requirements. Second, this change would apply to ALL existing buildings converted to multifamily use, no matter when they were first constructed. But, Federal law does not require existing buildings to comply with the FHAct. Another problem is that this change seems to be an attempt to circumvent and nullify the FHAct and the rulings handed down by the Federal Courts. The FHAct Rules includes a two-year statute of limitations on bringing suit and making corrections to an existing non-compliant multifamily building, a statute of limitations being upheld by the Federal Circuit Courts of Appeals. There is also the aspect of Federal preemption. By adopting the proposed change the I-Codes will be contrary to Federal Law. As Federal Law will preempt any state or local law, there will be challenges to the adoption of this Code. There is no benefit for any state or local jurisdiction to have to fight a challenge in court if the adoption of the I-Codes contains this provision. It appears this proposal is an attempt by a department of the federal government to mandate social change without going through the Federal Administrative Procedure Act rulemaking process. If it is intended that HUD will be adding this type of provision to the requirements of the FHAct, then this type of requirement should not be included in the I-Codes until such time as they are enacted into Federal law.

Final Action: AS AM AMPC____ D

EB14-09/10, Part II

IEBC 605.1, 605.2, 706.1, 806.1, 806.2, 912.8, 912.8.2, 1005.1, 1104.1, 1105.15; IBC 3411.1, 3411.4, 3411.4.2, 3411.6, 3411.7, 3411.8.8, 3411.8.9, 3411.9, 3412.2.5 (IEBC [B] 310.1, 310.4, 310.4.2, 310.6, 310.7, 310.8.8, 310.8.9, 310.9, 1301.2.5)

Proposed Change as Submitted

PART II – IBC GENERAL

Revise as follows:

SECTION 3411 (IEBC [B] 310)
ACCESSIBILITY FOR EXISTING BUILDINGS

3411.1 (IEBC [B] 310.1) Scope. The provisions of Sections 3411.1 through 3411.9 apply to maintenance, change of occupancy, additions and alterations to existing buildings, including those identified as *historic buildings*.

> ~~**Exception:** Type B *dwelling* or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities being altered or undergoing a change of occupancy.~~

3411.4 (IEBC [B] 310.4) Change of occupancy. Existing buildings that undergo a change of group or occupancy shall comply with this section.

> **Exception:** Type B dwelling or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with alterations where the work area is 50 percent or less of the aggregate area of the building.

3411.4.1 (IEBC [B] 310.4.1) Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification, any alterations shall comply with Sections 3411.6, 3411.7 and 3411.8.

3411.4.2(IEBC [B] 310.4.2) Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 3411.4.1 and shall have all of the following accessible features:

1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1110.
4. Accessible parking, where parking is being provided.
5. At least one accessible passenger loading zone, when loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

> **Exception:** The accessible features listed in Items 1 through 6 are not required for an accessible route to Type B units.

3411.5 (IEBC [B] 310.5) Additions. Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section 3411.7.

3411.6 (IEBC [B] 310.6) Alterations. A building, facility or element that is altered shall comply with the applicable provisions in Chapter 11 of this code and ICC A117.1, unless technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent technically feasible.

Exceptions:

1. The altered element or space is not required to be on an accessible route, unless required by Section 3411.7.
2. Accessible means of egress required by Chapter 10 are not required to be provided in existing buildings and facilities.
3. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provision for a Type B dwelling unit and shall comply with the applicable provisions in Chapter 11 and ICC A117.1.
4. Type B dwelling or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with alterations where the work area is 50 percent or less of the aggregate area of the building.

3411.7 (IEBC [B] 310.7) Alterations affecting an area containing a primary function. Where an alteration affects the accessibility to, or contains an area of primary function, the route to the primary function area shall be accessible. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.
2. This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of an existing building, facility or element.
5. This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

3411.8 (IEBC [B] 310.8) Scoping for alterations. The provisions of Sections 3411.8.1 through 3411.8.12 shall apply to alterations to existing buildings and facilities.

3411.8.7 (IEBC [B] 310.8.7) Accessible dwelling or sleeping units. Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being altered or added, the requirements of Section 1107 for Accessible units apply only to the quantity of spaces being altered or added.

3411.8.8 (IEBC [B] 310.8.8) Type A dwelling or sleeping units. Where more than 20 Group R-2 dwelling or sleeping units are being altered or added, the requirements of Section 1107 for Type A units apply only to the quantity of the spaces being altered or added.

3411.8.9 (IEBC [B] 310.8.9) Type B dwelling or sleeping units. Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements Section 1107 for Type B units apply only to the quantity of the spaces being added. Where Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being altered and where the work area is greater than 50 percent of the aggregate area of the building, the requirements Section 1107 for Type B units apply only to the quantity of the spaces being altered.

3411.9 (IEBC [B] 310.9) Historic buildings. These provisions shall apply to buildings and facilities designated as historic structures that undergo alterations or a change of occupancy, unless technically infeasible. Where compliance with the requirements for accessible routes, entrances or toilet facilities would threaten or destroy the historic significance of the building or facility, as determined by the applicable governing authority, the alternative requirements of Sections 3411.9.1 through 3411.9.4 for that element shall be permitted.

Exception: Type B dwelling or sleeping units required by Section 1107 of the International *Building Code* are not required to be provided in historical buildings.

SECTION 3412 (IEBC [B] CHAPTER 13) COMPLIANCE ALTERNATIVES

3412.2.5 (IEBC [B] 1301.2.5) Accessibility requirements. All portions of the buildings proposed for *change of occupancy* shall conform to the accessibility provisions of Section 3411 (IEBC 308).

Reason: The intent of this proposal is to take a small step towards increasing the availability of housing with minimum accessibility requirements. With the fastest grouping group in the United States being people over 65 years old, there is a definite need. The last U.S. Census information indicated that 41% of people of 65 have some level of disability.

Type of units covered under the Fair Housing Act include apartments, condominiums, dormitories, fraternities, sororities, convents, monasteries, assisted living facilities, nursing homes, group homes, etc. The Fair Housing Act is applicable to building first occupied after March 1991. While the department of Housing and Urban Development has been active in enforcement of these regulations, there are a lot of existing buildings that were constructed since 1991 that did not comply with this federal law. The legacy building codes first started requiring Type B units in apartments and condominiums in 1996/1997. With code changes that added congregate living facilities and Institutional facilities, the IBC requirements for Type B units was declared a ‘safe harbor’ document by HUD in 2002. Reasonably, buildings in jurisdictions that have adopted 2003 or 2006 IBC meet FHA. United Spinal’s concern is the buildings that were built before that.

There are a considerable number of existing buildings that should have complied with FHA and did not. When a major alteration is being performed, there is a prime opportunity to have those buildings move towards compliance. This will not only be a benefit for people that need that housing to live in, but will also help the building owners lessen or avoid complaints filed under FHA. Also, this is the most cost effective opportunity to make these revisions.

What this proposal is asking for, is that when buildings are undergoing a Level 3 alteration, or a change of occupancy that includes a Level 3 alteration, that whatever elements are altered, those elements are brought up to meet Type B requirements. If the element is not part of the alteration, it is not required to be altered. This is consistent with current building code philosophy for alterations. There are still the allowances for technically infeasible. The exceptions for non-elevator buildings, site limitations and flood zones currently indicated in Section 1107.7 are still applicable under *Extent of Application* (IBC 3409.3, IEBC 310.3, 605.1.14). Historical buildings, by their reference back to general provisions could be affected, therefore a general exception for Type B units is proposed for historical buildings.

In addition, when the area being altered is for Type B units, there is an exception for the additional route requirements currently in IBC Sections 3411.4.2 and 3411.7 and IEBC Section 310.4.2, 310.7, 605.2 and 912.8.2. United Spinal hopes that this address the concerns of site impracticality brought up during the last hearings by the Building Owners Managers Association, the National Association of Home Builders and the National Multi-Housing Council. This also reinforces the intent that this provision is not meant to require elevators when alterations are performed on upper floors in non-elevator buildings (see exceptions in Section 1107.7). These areas would have been exempted if built new under FHA and IBC, and should continue to be exempted.

The intent is that the same requirements for housing in existing buildings are included in IBC and IEBC. The wording is slightly different because IBC does not include a definition for Level 3 alterations. The terminology used – "work areas exceeds 50 percent of the aggregate area of the building" - can be found in IEBC 405.1. Some sections included in this proposal are not revised, but are included for context.

Cost Impact: The code change proposal will increase the cost of construction

ICCFILENAME: MARINELLI-EB1-605.2.DOC

Public Hearing Results

PART II-IBC GENERAL
Committee Action: **Approved as Submitted**

Committee Reason: The committee approved Part II to be consistent with the action taken on Part I of the proposal.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dominic Marinelli, United Spinal Association, requests Approval as Submitted.

Commenter's Reason: See EB14-09/10, Part I

Public Comment 2:

Lawrence Brown, representing National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: See EB14-09/10, Part I

Final Action: AS AM AMPC____ D

EB17-09/10
606.3.2

Proposed Change as Submitted

Proponent: David Bonowitz, SE, National Council of Structural Engineers Associations, Code Advisory Committee, Existing Buildings Subcommittee (NCSEA EBS)

Revise as follows:

606.3.2 Roof diaphragms resisting wind loads in high-wind regions. Where roofing materials are removed from more than 50 percent of the roof diaphragm or section of a building located where the basic wind speed is greater than 90 mph or in a special wind region, as defined in Section 1609 of the *International Building Code*, roof diaphragms and connections that are part of the main wind-force resisting system shall be evaluated for the wind loads specified in the *International Building Code*, including wind uplift. If the diaphragms and connections in their current condition ~~do not comply with those wind provisions,~~ are not capable of resisting at least 75% of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in the *International Building Code*.

Reason: This proposal makes a reasonable allowance for "reduced" wind loads for certain triggered upgrades. Justifications and precedents include:

For the work triggered by Section 606.3.2, the major deficiencies – lack of basic load path elements or load path continuity – will still be caught if reduced wind loads are used.
Seismic evaluations typically use reduced loads, in part to avoid triggering upgrades to marginally overstressed elements. Wind provisions should reasonably do the same.
The seismic 75% factor is partly based on a reasonable "grandfathering" approach. Many existing buildings were designed with a (now obsolete) 1/3 overstress allowance for wind loads. Current ASCE 7 load combinations for strength design no longer make the same allowance, so even well-designed existing buildings would unreasonably be caught by a trigger that requires 100% of current loads.
FEMA (Disaster Assistance Policy 9527.4, available online) has stated a position that lateral force levels for new construction are generally considered unreasonable when applied to triggered repairs.
New designs are expected to remain elastic under 100% of current wind loads. A structure that can resist at least 75% of these loads can still reasonably be expected to perform acceptably, given the differences between minimum yield and expected ultimate strengths and due to the generally conservative nature of new design.
ASCE 7 requires a load factor of 1.6 for wind loads. Even at 75%, the effective load factor is still greater than 1.0.
Though not based on any quantified theory, observed performance, or a "grandfathering" strategy, the proposed 75% value is consistent with the factor used to reduce seismic loads.
The 75% value does not reach as low as past codes did when identifying dangerous conditions; buildings were deemed dangerous only if they could not resist 50% or 67% of design wind loads.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BONOWITZ-EB27-606.3.2-2.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change reduces the threshold for diaphragm and connections to 75 percent of the IBC wind load, before requiring an upgrade of these items to meet full code wind loads. There is a need to grandfather in existing buildings and this change allows the use of judgment for buildings that have been designed under previous codes.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

T. Eric Stafford, representing Institute for Business and Home Safety, requests Disapproval.

Commenter's Reason: Commenter's Reason: We are requesting Disapproval of EB17-09/10. The proponent draws correlations to the seismic 75% factor for basis for this proposed change. However, wind loads and seismic loads are based on different philosophies regarding structural design make this comparison weak. Arbitrarily applying a lower threshold for wind load retrofits just because the seismic provisions permit it is unsubstantiated and irrelevant to wind loads. The reference to the FEMA position that lateral force levels for new construction are generally unreasonable when applied to triggered repairs is misleading. This section of the IEBC applies to uplift as well as lateral loads as specifically stated in this section. The proponent argues in his reason statement that "Many existing buildings were designed with a (now obsolete) 1/3 overstress allowance for wind loads. Current ASCE 7 load combinations for strength design no longer make the same allowance…" ASCE 7 load combinations for strength design have never permitted a 1/3 overstress. The 1/3 stress increase was permitted for allowable stress design. While ASCE 7-98 and later do prohibit the use of the 1/3 stress increase when using the provisions, ASCE 7-98 and later editions also included an across-the-board 15% reduction in wind loads in the form of the directionality factor (K_d = 0.85 for buildings).

A general comparison reveals the flaws in the proposal. For buildings built prior to ASCE 7-98, wind loads for many buildings were essential reduced to 75% of the calculated loads by virtue of the 1/3 stress increase (1/1.33 = .75188). In ASCE 7-98 and later, these wind loads have essentially been reduced by 15%. By reducing the threshold for triggering retrofits an additional 25%, these elements would only be required to resist 64% of the loads the building was designed for. This effective threshold is much lower than what it appeared the proponent was hoping to obtain based on the testimony at the public hearing.

The proponent is seeking a trigger reduction on a part of buildings that are the most vulnerable to wind loads which is the roof and it's connections to the sheathing and the wall supporting the roof. If a building suffers damage for high winds, the majority of the time there is some form or roof related damage also associated with the event. This retrofit is triggered when roofing materials are removed 50% of the roof diaphragm, which is an ideal time to make needed retrofits.

The logic behind this proposal is flawed and we think it represents poor judgment. We urge your disapproval of this proposal.

Final Action: AS AM AMPC____ D

EB31-09/10
912.5.1

Proposed Change as Submitted

Proponents: Joseph A. McGrath, PE, RA, representing New York State Dep. of State, Division of Code Enforcement and Administration

Revise as follows:

912.5.1 Height and area change to higher hazard category. When a change of occupancy classification is made to a higher hazard category as shown in Table 912.5, heights and areas of buildings and structures shall comply with the requirements of Chapter 5 of the *International Building Code* for the new occupancy classification.

> **Exception**: In other than Groups H, F-1 and S-1, in lieu of fire walls, use of fire barriers <u>and horizontal assemblies</u> having a fire-resistance rating of not less than that specified in Table 706.4 of the *International Building Code*, constructed in accordance with Section<u>s</u> 707 <u>and 712</u> of the *International Building Code*, shall be permitted to meet the area limitations required for the new occupancy in buildings protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Fire Code*. <u>The maximum allowable area between fire barriers, horizontal assemblies or any combination thereof shall not exceed the tabular area specified in Table 503 of the *International Building Code* without any area increase allowed for an automatic sprinkler system in accordance with Section 506 of the *International Building Code*. Where horizontal assemblies are used to limit the maximum allowable area, the required fire-resistance rating of the horizontal assemblies shall be permitted to be reduced by 1-hour provided the height and number of stories increases allowed by Section 504.2 for an automatic sprinkler system are not used for the building.</u>

Reason: This proposal is a follow-up to code change EB33-06/07 that was approved as modified by Public Comment #1 submitted by the Alliance for Fire and Smoke Containment and Control (AFSCC) at the ICC Final Action Hearings in Rochester, New York in May, 2007. The reason for the original EB33 proposal is the need to reuse existing mill buildings that are sprinklered and the fact that the original code requirement for fire walls is not financially or physically practicable. This proposal will provide an additional measure of safety to the current requirements of this section.

At the 2007 hearings the AFSCC proposed that if fire barriers were used in lieu of fire walls, a significant reduction in allowable building and fire areas should occur. We agree, so this proposal reduces the allowable building area by allowing fire fighting access (open space) credits but not sprinklering credits. An example, to use the most probable application of this proposal, would be a Type IIIB construction mill building being converted from an F-1 (moderate hazard) occupancy to an R-2 (residential) occupancy. This change in occupancy would be considered a change to a higher hazard.

Under the proposed change, the mill building described above would be allowed to have a floor area of 28,000 square feet and a total maximum floor area for all stories of 84,000 square feet between fire barriers with a maximum 75% increase allowed for open space. Present requirements for a new building would allow 60,000 square feet for a single floor area and 180,000 square feet of total floor area with the additional increase allowed for an automatic sprinkler system.

The logic behind not allowing area increases for sprinklering is because under the circumstances of the substitution of fire barriers for fire walls in these buildings, the required sprinklers should not be given extra credit.

The concept of allowing horizontal assemblies to be used to subdivide the building presumes that the fire would be contained within the six sided box formed by the fire barrier walls and horizontal assemblies and/or exterior walls and roof which is limited to the area prescribed in this proposed code change. Thus, the volume of the building separated from the rest of the building by the required fire-resistance rated construction would be comparable.

The logic behind allowing a 1-hour reduction in the required fire-resistance rating for the horizontal assemblies is based on the fact that the automatic sprinkler system provided would not be used for a height increase both in number of stories and in total feet (1 story and 20 feet), yet the building will still be compartmented with fire-resistive horizontal assemblies having, in most cases, a minimum fire-resistance rating of 2-hours and, in some cases, as low as 1-hour but only 1 hour less than what would otherwise be required by Table 705.4 by this exception for the fire barriers. Thus, the sprinkler credit that would otherwise be given for the increase in height currently allowed by Chapter 5 of the International Building Code would be used for the reduction of 1-hour in the required fire- resistance rating of the horizontal assembly. We believe this provides a reasonable equivalent level of fire and life safety protection for existing buildings being converted under this exception as modified by this code change proposal.

Cost Impact: The code change proposal will result in added costs to construction if the building is over a specific size as to require more fire barriers than the present requirements. However, the cost and practicality of converting existing buildings is still greatly improved from the requirements in the 2003 IEBC.

ICCFILENAME: MCGRATH-EB1-912.5.1.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There was an agreement that horizontal assemblies should be acknowledged as a valid alternative for decreasing building area but it was felt that an increase for sprinklers should be allowed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, National Concrete Masonry Alliance (NCMA), representing Masonry Alliance for Codes and Standards (MACS), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

912.5.1 Height and area change to higher hazard category. When a change of occupancy classification is made to a higher category as shown in Table 912.5, heights and areas of buildings and structures shall comply with the requirements of Chapter 5 of the International Building Code for the new occupancy classification.

> ~~**Exception:** In other than Groups H, F-1 and S-1, in lieu of fire walls, use of fire barriers and horizontal assemblies having a fire-resistance rating of not less than that specified in Table 705.4 of the International Building Code, constructed in accordance with Section 706 and 711 of the International Building Code, shall be permitted to meet the area limitations required for the new occupancy in buildings protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the International Fire Code. The maximum allowable area between fire barriers, horizontal assemblies or any combination thereof shall not exceed the tabular area specified in Table 503 of the International Building Code without any area increase allowed for an automatic sprinkler system in accordance with Section 506 of the International Building Code. Where horizontal assemblies are used to limit the maximum allowable area, the required fire-resistance rating of the horizontal assemblies shall be permitted to be reduced by 1-hour provided the height and number of stories increases allowed by Section 504.2 for an automatic sprinkler system are not used for the building.~~

912.5.1.1 Fire wall alternative. In other than Group F-1, H and S-1, fire barriers and horizontal assemblies constructed in accordance with Sections 707 and 712, respectively, of the *International Building Code* shall be permitted to be used in lieu of fire walls to subdivide the building into separate buildings for the purpose of complying with the area limitations required for the new occupancy where all of the following conditions are met:

1. The buildings are protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Fire Code*.
2. The maximum allowable area between fire barriers, horizontal assemblies, or any combination thereof shall not exceed the maximum allowable area determined in accordance with Chapter 5 of the International Building Code without an increase allowed for an automatic sprinkler system in accordance with Section 506 of the *International Building Code*.
3. The fire-resistance rating of the fire barriers and horizontal assemblies shall not be less than that specified for fire walls in Table 706.4 of the *International Building Code*.

> **Exception:** Where horizontal assemblies are used to limit the maximum allowable area, the required fire-resistance rating of the horizontal assemblies shall be permitted to be reduced by 1-hour provided the height and number of stories increases allowed for an automatic sprinkler system by Section 504.2 of the *International Building Code* are not used for the buildings.

Commenter's Reason: We are submitting this Public Comment to revise the original Code Change Proposal in an effort to respond to the International Existing Building Code Development Committee's concerns expressed during the ICC Code Development Committee Hearings held in Baltimore, MD last year, as well as those testifying in opposition to this Code Change. We have discussed the revisions proposed in this Public Comment with the proponents of Code Change EB31-09/10 and they have indicated their approval.

It should be noted that the Committee agreed with the Code Change including horizontal assemblies as being allowed to substitute for fire walls in subdividing a building to determine its allowable height and area. However, the Committee felt that an increase for automatic sprinklers should be allowed. We would point out that the Code Change already allows for the automatic sprinkler system to be used to reduce the requirement for fire walls to separate the existing building to meet the allowable height and areas by allowing the use of fire barriers and horizontal assemblies. This is a significant sprinkler trade-off since fire walls create separate buildings, whereas fire barriers and horizontal assemblies compartmentize a building.

This Code Change also allows the sprinkler system to be used to either increase the building height and number of stories or to reduce the required fire-resistance ratings for the horizontal assemblies by 1-hour. The only thing that isn't allowed for the automatic sprinkler system is an area increase which we believe results in too much reliance on the automatic sprinkler system for this application. However, this Code Change still allows the open space perimeter increase calculations to be used to increase the base tabular areas in Table 503.

We believe that the judicious use of automatic sprinkler systems allowed by this Code Change recognizes the value that automatic sprinkler systems bring to the overall level of fire and life safety provided in the existing building, while also recognizing that certain minimum requirements for compartmentation should be maintained when changing the occupancy of existing buildings. To us, this is a "win-win" situation that will provide a great deal of flexibility in rehabilitating the existing building stock without violating the intent of the building code for providing a reasonable level of fire and life safety to the building and its occupants.

We have also reformatted this Code Change by deleting the very lengthy Exception. Instead, we have provided a new Subsection 912.5.1.1 Fire Wall Alternative. This section is formatted in a way to make it much more straightforward and easy to understand and apply the provisions that will allow the substitution of fire barriers and horizontal assemblies for fire walls to subdivide existing buildings for the purpose of determining the allowable height and area based upon the new occupancy classification caused by the change in occupancy(s) of the existing building.

For these reasons we respectfully request the Class A voting members overturn the International Existing Building Code Development Committee's recommendation for disapproval and approve this Public Comment for approval as revised of Code Change EB31-09/10.

Final Action: AS AM AMPC____ D

EB32-09/10, Part I

IEBC 912.8, 912.8.1, 912.8.2; IBC 3411.4, 3411.4.1, 3411.4.2 (IEBC [B] 310.4, 310.4.1, 310.4.2)

Proposed Change as Submitted

Proponent: Maureen Traxler, City of Seattle, WA, Seattle Dept of Planning & Development

PART I – IEBC

Revise as follows:

912.8 Accessibility. ~~Existing buildings that undergo a change of group or occupancy shall comply with this section.~~

~~**912.8.1 Partial change in occupancy.**~~ Where ~~a~~ all or any portion of ~~the~~ a building is changed to a new occupancy classification, any alterations shall comply with Sections 605 and 706, as applicable.

~~**912.8.2 Complete change of occupancy.** Where an entire building undergoes a change of occupancy, it shall comply with Section 3411.4.1 and shall have all of the following accessible features:~~

1. ~~At least one accessible building entrance.~~
2. ~~At least one accessible route from an accessible building entrance to primary function areas.~~
3. ~~Signage complying with Section 1110.~~
4. ~~Accessible parking, where parking is being provided.~~
5. ~~At least one accessible passenger loading zone, when loading zones are provided.~~
6. ~~At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.~~

~~Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.~~

Reason: When buildings are altered, required improvements in accessibility are limited to 20% of the cost of the alterations according to exception 1 to IBC Section 3411.7 and exception 1 to IEBC Section 605.2. According to the Access Board website [http://www.access-board.gov/ada%2Daba/adaag.cfm#a202], "Department of Justice ADA regulations state, 'Alterations made to provide an accessible path of travel to the altered area will be deemed disproportionate to the overall alteration when the cost exceeds 20% of the cost of the alteration to the primary function area.' (28 CFR 36.403 (f)(1)). See also Department of Transportation ADA regulations, which use similar concepts in the context of public sector transportation facilities (49 CFR 37.43 (e)(1))."

Changes of occupancy shouldn't be required to do more than alterations. Many changes of occupancy are accomplished with little or no construction work—a space may be refurnished and transformed from a Group M retail store to a Group B office. Any construction work that is done would be required to comply with IBC Section 3411.7 (IEBC Section 605.2), and would be subject to the 20% limitation.

The list of priority accessible features has been deleted because it is not necessary for correlation with the ADAAG, and because such a prescriptive requirement does not allow the flexibility to spend money improving the accessible route where it makes the most sense. It is our understanding that while the list was originally proposed for adoption in the new ADAAG, ultimately, it was decided to allow that flexibility, and the list does not appear in the updated ADAAG.

We think the proposal presented above is the most comprehensive and cleanest way to address our issues. However, if the Committee decides that keeping the priority list is a necessity, we would be open to a modification of the proposal that would retain all the existing language that is shown as being struck through in IBC Sections 3411.4, 3411.4.1, and 3411.4.2, but instead, just inserts an exception just after the list in Section 3411.4.2 as follows:

3411.4.2 Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 3411.4.1 and shall have all of the following *accessible* features:

1. At least one *accessible* building entrance.
2. At least one *accessible* route from an *accessible* building entrance to *primary function* areas.
3. Signage complying with Section 1110.
4. Accessible parking, where parking is being provided.
5. At least one *accessible* passenger loading zone, when loading zones are provided.
6. At least one *accessible* route connecting *accessible* parking and *accessible* passenger loading zones to an *accessible* entrance.

Exception: The costs of providing an *accessible* route or *accessible* features are not required to exceed 20 percent of the costs of the *alterations* affecting the area of *primary function*.

Where it is *technically infeasible* to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

The corresponding changes would have to be made to IEBC Section 912.8 if this alternative is chosen (i.e., retain struck-through text in 912.8, 912.8.1, and 912.8.2, and add the new exception to 912.8.2). This would still address the issue capping the required costs of accessibility upgrades, without affecting the priority list.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TRAXLER-G11-3411.4.2

Public Hearing Results

PART I- IEBC
Committee Action: Disapproved

Committee Reason: The proposal which would have only required accessible features when an alteration was required was disapproved as it was felt that a modification addressing an upper limit on cost at 20% instead of fully exempting changes of occupancy without alterations was more appropriate.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, representing the City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

Part I—IEBC

912.8 Accessibility. Existing buildings that undergo a change of group or occupancy shall comply with this section.
912.8.1 Partial change in occupancy. Where a portion of a building is changed to a new occupancy classification, any alterations shall comply with Sections 605 and 706, as applicable.
912.8.2 Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 912.8.1 and shall have all of the following accessible features:
1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1110 of the International Building Code.
4. Accessible parking, where parking is provided.
5. At least one accessible passenger loading zone, when loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Exception: The costs of providing an *accessible* route as required in items 1 through 6 are not required to exceed 20 percent of the costs of the *alterations* affecting the area of *primary function*.

Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

Commenter's Reason: This purpose of the original proposal and this comment is to apply the same accessibility requirements to changes of occupancy as apply to alterations. Existing code provisions for alterations limit the cost of accessibility improvements to 20% of the cost of the alterations. No such limit applies to changes of occupancy. This public comment retains the existing language in both the IBC and IEBC and adds an exception that applies the "20% rule" to changes of occupancy. The Code Development Committee expressed a preference for a modification similar to this, but while this text was included in our original reason statement, when we attempted to introduce it as a floor modification, it was ruled out of order as being too hard for the committee to easily understand in the short time available. The only changes to existing language proposed by this comment is to add the exception after Item 6 in both codes.

Final Action: AS AM AMPC____ D

EB32-09/10, Part II
IEBC 912.8, 912.8.1, 912.8.2; IBC 3411.4, 3411.4.1, 3411.4.2 (IEBC [B] 310.4, 310.4.1, 310.4.2)

Proposed Change as Submitted

Proponent: Maureen Traxler, City of Seattle, WA, Seattle Dept of Planning & Development

PART II – IBC GENERAL

Revise as follows:

3411.4 (IEBC [B] 310.4) Change of occupancy. ~~Existing buildings that undergo a change of group or occupancy shall comply with this section.~~

~~**3411.4.1 (IEBC [B] 310.4.1) Partial change in occupancy.**~~ Where ~~a~~ all or any portion of ~~the~~ a building is changed to a new occupancy classification, any alterations shall comply with Sections 3411.6, 3411.7 and 3411.8.

~~**3411.4.2 (IEBC [B] 310.4.2) Complete change of occupancy.** Where an entire building undergoes a change of occupancy, it shall comply with Section 3411.4.1 and shall have all of the following accessible features:~~

1. ~~At least one accessible building entrance.~~
2. ~~At least one accessible route from an accessible building entrance to primary function areas.~~
3. ~~Signage complying with Section 1110.~~
4. ~~Accessible parking, where parking is being provided.~~
5. ~~At least one accessible passenger loading zone, when loading zones are provided.~~
6. ~~At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.~~

~~Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.~~

Reason: When buildings are altered, required improvements in accessibility are limited to 20% of the cost of the alterations according to exception 1 to IBC Section 3411.7 and exception 1 to IEBC Section 605.2. According to the Access Board website [http://www.access-board.gov/ada%2Daba/adaag.cfm#a202], "Department of Justice ADA regulations state, 'Alterations made to provide an accessible path of travel to the altered area will be deemed disproportionate to the overall alteration when the cost exceeds 20% of the cost of the alteration to the primary function area.' (28 CFR 36.403 (f)(1)). See also Department of Transportation ADA regulations, which use similar concepts in the context of public sector transportation facilities (49 CFR 37.43 (e)(1))."

Changes of occupancy shouldn't be required to do more than alterations. Many changes of occupancy are accomplished with little or no construction work—a space may be refurnished and transformed from a Group M retail store to a Group B office. Any construction work that is done would be required to comply with IBC Section 3411.7 (IEBC Section 605.2), and would be subject to the 20% limitation.

The list of priority accessible features has been deleted because it is not necessary for correlation with the ADAAG, and because such a prescriptive requirement does not allow the flexibility to spend money improving the accessible route where it makes the most sense. It is our understanding that while the list was originally proposed for adoption in the new ADAAG, ultimately, it was decided to allow that flexibility, and the list does not appear in the updated ADAAG.

We think the proposal presented above is the most comprehensive and cleanest way to address our issues. However, if the Committee decides that keeping the priority list is a necessity, we would be open to a modification of the proposal that would retain all the existing language that is shown as being struck through in IBC Sections 3411.4, 3411.4.1, and 3411.4.2, but instead, just inserts an exception just after the list in Section 3411.4.2 as follows:

3411.4.2 Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 3411.4.1 and shall have all of the following *accessible* features:

1. At least one *accessible* building entrance.
2. At least one *accessible* route from an *accessible* building entrance to *primary function* areas.
3. Signage complying with Section 1110.
4. Accessible parking, where parking is being provided.
5. At least one *accessible* passenger loading zone, when loading zones are provided.
6. At least one *accessible* route connecting *accessible* parking and *accessible* passenger loading zones to an *accessible* entrance.

Exception: The costs of providing an *accessible* route or *accessible* features are not required to exceed 20 percent of the costs of the *alterations* affecting the area of *primary function*.

Where it is *technically infeasible* to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

The corresponding changes would have to be made to IEBC Section 912.8 if this alternative is chosen (i.e., retain struck-through text in 912.8, 912.8.1, and 912.8.2, and add the new exception to 912.8.2). This would still address the issue capping the required costs of accessibility upgrades, without affecting the priority list.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: TRAXLER-G11-3411.4.2

Public Hearing Results

PART II-IBC GENERAL
Committee Action: Disapproved

Committee Reason: The code change was disapproved to be consistent with the action on Part I of the proposal.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, representing City of Seattle Dept. of Planning & Development, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3411.4 (IEBC [B] 310.4) Change of occupancy. Existing buildings that undergo a change of group or occupancy shall comply with this section.

3411.4.1 (IEBC [B] 310.4.1) Partial change in occupancy. Where a portion of a building is changed to a new occupancy classification, any alterations shall comply with Sections 3411.6, 3411.7 and 3411.8.

3411.4.2 Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 3411.4.1 and shall have all of the following *accessible* features:

1. At least one *accessible* building entrance.
2. At least one *accessible* route from an *accessible* building entrance to *primary function* areas.
3. Signage complying with Section 1110.
4. Accessible parking, where parking is ~~being~~ provided.
5. At least one *accessible* passenger loading zone, when loading zones are provided.
6. At least one *accessible* route connecting *accessible* parking and *accessible* passenger loading zones to an *accessible* entrance.

Exception: The costs of providing an *accessible* route as required in items 1 through 6 are not required to exceed 20 percent of the costs of the *alterations* affecting the area of *primary function*.

Where it is *technically infeasible* to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

Commenter's Reason: See EB32-09/10, Part I

Final Action: AS AM AMPC____ D

EB34-09/10
912.8.2

Proposed Change as Submitted

Proponent: Lawrence Brown, CBO, National Association of Home Builders (NAHB)

Revise as follows:

912.8.2 Complete change of occupancy. Where an entire building undergoes a *change of occupancy*, it shall comply with Section 912.8.1 and shall have all of the following accessible features:

1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to *primary function* areas.
3. Signage complying with Section 1110 of the *International Building Code*.
4. Accessible parking, where parking is provided.
5. At least one accessible passenger loading zone, where loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Where it is *technically infeasible* to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

<u>**Exception:** Type B dwelling or sleeping units required by Section 1107 of the *International Building Code* are not required to be provided in existing buildings and facilities.</u>

Reason: The purpose of this Proposal is to reinstate this Exception that was deleted during the 2007-08 Code Development Cycle. The deletion of the Exception is contrary to the U.S. Federal Law Fair Housing Act accessibility requirements. The Federal Fair Housing Act does not require existing buildings that are converted to residential use to comply with the Fair Housing Act accessibility requirements. The IBC does not require existing buildings with a change of occupancy to residential use to contain Type B units. In fact, with the deletion of this Exception caused an inconsistency between the IBC and the IEBC. Section 3411.1 of the IBC states:

3409.1 Scope. The provisions of Sections 3411.1 through 3411.9 apply to maintenance, change of occupancy, additions and alterations to existing buildings, including those identified as historic buildings.

Exception: Type B dwelling or sleeping units required by Section 1107 are not required to be provided in existing buildings and facilities.

Federal Law for the implementing the accessibility requirements of the Fair Housing Act only apply to new buildings as described in the HUD Fair Housing Act Design Manual as follows: *"The Fair Housing Act does not require any renovations to existing buildings. Its design requirements apply to new construction only – to covered <u>multifamily dwellings</u> that are built for <u>first occupancy</u> after March 13, 1991. <u>First occupancy is defined as "a building that has never before been used for any purpose</u>."*
As the Federal law states, any existing building that is converted to residential use, no matter when it was constructed, is NOT required to comply with the Fair Housing Act. It also needs to be understood that the I-Codes contain provisions The I-Codes should not contain requirements that are contrary to Federal public law.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BROWN-EB1-912.8.2.DOC

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved to be consistent with the action taken on EB14. There was also some concern that where the exception is proposed is awkward as it has no relationship to the list related to the accessible path features. Some members of the committee were concerned that without this proposed exception the FHA would be exceeded.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lawrence Brown, CBO, representing the National Association of Home Builders (NAHB), requests Approval as Submitted.

Commenter's Reason: The purpose of this Proposal is to reinstate this Exception that allowed the IBC to be in compliance with Federal Law. The Exception was deleted during the 2007-08 Code Development Cycle. By deleting the Exception the IBC exceeded the Federal Fair Housing (FHAct) Requirements for accessibility. Most importantly, that change had the effect of putting the IBC in conflict with the Federal Law - a law that only requires multifamily "buildings" constructed for first occupancy after March 13, 1991 to be constructed to the FHAct requirements. This change applies to ALL existing buildings converted to multifamily use, no matter when they were first constructed. The FHAct does not require any existing building that is converted to residential use to comply with the Fair Housing Act accessibility requirements.

The Federal Law for implementing the accessibility requirements of the Fair Housing Act only applies to new buildings as described in the HUD Fair Housing Act Design Manual as follows: *"The Fair Housing Act does not require any renovations to existing buildings. Its design requirements apply to new construction only – to covered <u>multifamily dwellings</u> that are built for <u>first occupancy</u> after March 13, 1991. <u>First occupancy is defined as "a building that has never before been used for any purpose</u>."*

As the Federal Law states, any existing building that is converted to residential use, no matter when it was constructed, is NOT required to comply with the Fair Housing Act. The I-Codes should be used for the purpose of providing construction requirements to address life-safety concerns, not as a vehicle to orchestrate social change. Another problem is that this change causes the IBC requirements to circumvent and nullify the FHAct and the rulings handed down by the Federal Courts, and the aspect of Federal preemption. From an enforcement standpoint, as Federal Law will preempt any state or local law, there will be challenges to the adoption of this Code. There is no benefit for any state or local jurisdiction to have to fight a challenge in court if the adoption of the I-Codes does not contain this Exception. It appears the deletion of the Exception was an attempt by a department of the Federal Government to mandate social change without going through the Federal Administrative Procedure Act rulemaking process. If it is intended that HUD will be adding this type of provision to the requirements of the FHAct, then this type of requirement should not be included in the I-Codes until such time as they are enacted into Federal Law.

Final Action: AS AM AMPC____ D

EB36-09/10
1101.2

Proposed Change as Submitted

Proponent: David Bonowitz, SE, National Council of Structural Engineers Associations, Code Advisory Committee, Existing Buildings Subcommittee (NCSEA EBS)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

1101.2 Report. A historic building undergoing repair, alteration, or change of occupancy shall be investigated and evaluated. If it is intended that the building meet the requirements of this chapter, a written report shall be prepared and filed with the code official by a registered design professional when such a report is necessary in the opinion of the code official. Such report shall be in accordance with Chapter 1 and shall identify each required safety feature that is in compliance with this chapter and where compliance with other chapters of these provisions would be damaging to the contributing historic features. For buildings assigned to Seismic Design Category D, E, or F, a structural evaluation describing, at a minimum, <u>the vertical and horizontal elements of the lateral force resisting system and any strengths or weaknesses therein</u> ~~a complete load path and other earthquake-resistant features~~ shall be prepared. Additionally, the report shall describe each feature that is not in compliance with these provisions and shall demonstrate how the intent of these provisions is complied with in providing an equivalent level of safety.

Reason: This is an editorial proposal. The current provision requires the engineer to describe a complete load path whether one is present or not. Further, the term “earthquake resistant features” is vague. This proposal clarifies that the provision’s intent is to require some description of the designed or *de facto* lateral system and to identify its salient features. The proposed language should be clearer, more enforceable, and more effective at producing a useful report.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BONOWITZ-EB22-1101.2.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change was approved as it provides a more precise definition of the lateral force-resisting system description that is required for the written report on a historic building.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, representing the City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1101.2 Report. A historic building undergoing repair, alteration, or change of occupancy shall be investigated and evaluated. If it is intended that the building meet the requirements of this chapter, a written report shall be prepared and filed with the code official by a registered design professional when such a report is necessary in the opinion of the code official. Such report shall be in accordance with Chapter 1 and shall identify each required safety feature that is in compliance with this chapter and where compliance with other chapters of these provisions would be damaging to the contributing historic features. For buildings assigned to Seismic Design Category D, E, or F, a structural evaluation describing, at a minimum, the ~~vertical and horizontal~~ elements of the lateral force resisting system and any strengths or weaknesses therein shall be prepared. Additionally, the report shall describe each feature that is not in compliance with these provisions and shall demonstrate how the intent of these provisions is complied with in providing an equivalent level of safety.

Commenter's Reason: This proposed modification is consistent with the proponent's intention to require the engineer to describe the lateral force resisting system. By limiting the requirement to vertical and horizontal elements, important diagonal bracing or other elements may be missed.

Final Action: AS AM AMPC____ D

EB39-09/10
1202.8 (New)

Proposed Change as Submitted

Proponent: Randall R. Dahmen, WI Registered PE, WI Licensed Commercial Building Inspector

Add new text as follows:

<u>**1202.8 Building envelope**. A relocated or moved building shall comply with the *International Energy Conservation Code* for building envelope requirements when the building is relocated or moved to a different climate zone.</u>

Reason: In order to create efficient building energy performance, this code change requires those buildings that change regions of climate where there are more restrictive building envelope requirements, to meet the more restrictive performance criteria of the IECC for the new location Buildings are many times relocated or moved from regions of the country which are typically warm, and which require minimal insulation at the time of original construction, to regions that are extremely cold, whose minimum requirements for building insulation are significantly greater.
Similarly, buildings that are relocated or moved from a cold climate to a warm climate may find that they may need to make changes to the existing glazing in order to comply with the Solar Heat Gain Coefficient (SHGC) requirements.

At present, there are no rules requiring that the relocated building install additional insulation to the building envelope assemblies. This seems inappropriate, since the original design was intended for the original building location, not the proposed relocation.
It is the opinion of this author that this proposal is an extension of the snow load requirements already addressed under IEBC 1202.5. Clearly, it has been established that when a building changes locations, it needs to be modified so as to appropriately accommodate the climatic conditions of the new site. This is a continuation of that thought process.

Cost Impact: Minimal. Exact costs would be dependent on the significance in the change in climate for the moved or relocated building.

ICCFILENAME: DAHMEN-EB2-1202.8.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it has no exception for historic buildings that are moved or relocated into a different climate zone.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Randall R. Dahmen, WI Registered PE, WI Licensed Commercial Building Inspector, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1207.8 Building envelope. A relocated or moved building shall comply with the *International Energy Conservation Code* for building envelope requirements when the building envelope requirements at the new location are more restrictive than those at the previous location.

Exception: Historic buildings complying with Chapter 11.

Commenter's Reason: The exception is requested to be added so as to address those buildings of historical significance. As originally worded, historical buildings which would be relocated or moved could be required to be altered in order to be insulated to current IECC requirements. The requirement to add insulation to historical buildings may cause modifications not indicative of the original building construction. Such action would take away a portion of the historical perspective of the building.

Note that the wording of the exception could be altered so as to be more consistent with other code provisions, as long as the intent of the exception is still met.

Final Action: AS AM AMPC____ D

EB55-09/10
A401.2

Proposed Change as Submitted

Proponent: Gary R. Searer, Wiss, Janney, Elstner Associates, Inc., representing National Council of Structural Engineers Association (NCSEA) Existing Buildings Subcommittee

Revise as follows:

A401.2 Scope. The provisions of this chapter shall apply to all existing Occupancy Group R-1 and R-2 buildings of wood construction or portions thereof where the structure has a soft, weak, or open-front wall line, and there exists one or more stories above. ~~:~~

1. ~~The ground floor portion of the wood-frame structure contains parking or other similar open floor space, which causes soft, weak or open-front wall lines as defined in this chapter, and there exists one or more stories above., or~~
2. ~~The walls of any story or basement of wood construction are laterally braced with nonconforming structural materials as defined in this chapter, a soft or weak wall line exists as defined in this chapter and there exist two or more stories above.~~
3. ~~The structure is assigned to Seismic Design Category C, D or E.~~

Reason: This proposal clarifies the scope by removing inapplicable and unnecessary language. Of the three conditions in the current provision, only Condition 1 is appropriate for a clear and limited scope. The proposed wording of Condition 1 removes the reference to parking and open floor space, as well as the requirement that the open floor space be on the ground floor. While these are common conditions, they are not the only ones to which this chapter is meant to apply. The descriptors proposed for removal are better suited for commentary.

Current Condition 2 recognizes the possibility of a weak or soft story condition without an open front wall line, but with the revision to Condition 1, it is no longer necessary, as soft and weak conditions are already covered.

Current Condition 3 indicates the original intent of this chapter to apply to voluntary retrofits in areas of relatively high seismicity. While the provisions were not written originally for SWOF buildings in areas of lower seismicity, they may be used for those buildings. Further, the limitation to SDC C-E no longer applies now that this chapter is referenced from the body of the IEBC as an option for buildings in any seismic design category.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: SEARER-EB8-A401.2.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved as it cleans up the scope of Appendix A4 by removing extraneous language.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, PE, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

A401.2 Scope. The provisions of this chapter shall apply to all existing Occupancy Group R-1 and R-2 buildings in Seismic Design Category C, D or E of wood construction or portions thereof where the structure has a soft, weak, or open-front wall line, and there exists one or more stories above.

Commenter's Reason: The purpose of this public comment is to restore the scope of Appendix A4 to moderate- and high-seismic regions. Light-frame wood structures in Seismic Design Category A and B are typically governed by wind loads, not seismic loads. Soft or weak-story, and open-front wall behaviors are unique to seismic events. Where failures of light-frame structures in wind events have occurred, it is due either to a lack of sufficient code-compliant shear walls to resist the basic wind forces, or due to failure of an opening (such as a garage door or plate glass window) that results in an internal pressurization failure.

We note the ASCE 7 seismic provisions for horizontal and vertical irregularities only limit soft-story and weak-story conditions in Seismic Design Categories D through F. The provisions do limit extreme weak-story conditions in Seismic Design Category B and C. However, the limitation is waived if the seismic forces are increased for the purposes of the design. But, as noted above, in Seismic Design Category B wind forces will govern the design. Therefore, there is no need to specially address a condition for a building in low-seismic regions that would never cause a failure of that building.

To avoid any possibility the provisions of this Appendix could be required for a light-frame structure in Seismic Design Category B, the original scope limiting the use of these provisions in Seismic Design Categories C, D, and E should be restored.

Final Action: AS AM AMPC____ D

EB56-09/10
A402

Proposed Change as Submitted

Proponent: David Bonowitz, SE, National Council of Structural Engineers Associations, Code Advisory Committee, Existing Buildings Subcommittee (NCSEA EBS)

Revise definition as follows:

A402
DEFINITIONS

EXPANSION ANCHOR. ~~An approved mechanical fastener placed in hardened concrete that is designed to expand in a self-drilled or pre-drilled hole of a specified size and engage the sides of the hole in one or more locations to develop shear and/or tension resistance to applied loads without grout, adhesive, or drypack.~~ An approved post-installed anchor, inserted into a pre-drilled hole in existing concrete or masonry, that transfers loads to or from the concrete or masonry by direct bearing or friction or both.

Reason: This proposal is editorial. The proposed definition is consistent with that now used in ACI 318 Appendix D and other ICC-ES resources.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: BONOWITZ-EB12- A402-EXPANSION ANCHOR.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved as it revises the definition of "Expansion anchor" in Appendix A4 to be consistent with ACI 318, Appendix D. This is also consistent with the committee's action on EB 50-09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David Bonowitz, SE, representing the National Council of Structural Engineers Associations, Code Advisory Committee, Existing Buildings Subcommittee (NCSEA EBS) requests Disapproval.

Commenter's Reason: NCSEA EBS recommends disapproval of this well-intentioned proposal for the following reasons: We are the proponent of EB56. As discussed at the hearings in Baltimore, EB65 is the preferred proposal. Both EB56 and EB65 were approved as submitted. To avoid confusion, EB56 should now be disapproved so that EB65 can be implemented.

Final Action: AS AM AMPC____ D

EB72-09/10
Appendix C (New)

Proposed Change as Submitted

Proponent: T. Eric Stafford, PE, Institute for Business and Home Safety

Add a new appendix as follows:

APPENDIX C
GUIDELINES FOR WIND RETROFIT OF EXISTING BUILDINGS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

CHAPTER C1
GABLE END RETROFIT FOR HIGH WIND AREAS

SECTION C101
GENERAL

C101.1 Intent and purpose. The provisions of this chapter provide prescriptive methods for selected structural retrofitting of existing buildings. Compliance with these provisions will not always meet the requirements for new construction in the *International Building Code* or the *International Residential Code*. The provisions of this chapter are intended to provide methods for strengthening existing buildings to increase the building's resistance to wind loads.

C101.2 Scope. The following prescriptive methods are intended for applications where the gable end wall framing is provided by a wood gable end wall truss or a conventionally framed rafter system. The retrofits are appropriate for wall studs oriented with the wide face parallel to or perpendicular to the gable end surface. Gable ends to be strengthened shall be permitted to be retrofitted using methods prescribed by this chapter.

SECTION C102
DEFINITIONS

ANCHOR BLOCK. A piece of lumber secured to horizontal braces and filling the gap between existing framing members for the purpose of restraining horizontal braces from movement perpendicular to the framing members.

COMPRESSION BLOCK. A piece of lumber used to restrain in the compression mode (force directed towards the interior of the attic) an existing or retrofit stud. It is attached to a horizontal brace and bears directly against the existing or retrofit stud.

CONVENTIONALLY FRAMED GABLE END. A gable end framed with studs whose faces are perpendicular to the gable end wall.

HORIZONTAL BRACE. A piece of lumber used to restrain both compression and tension loads applied by a retrofit stud. It is typically installed horizontally on the top of attic floor framing members (truss bottom chords or ceiling joists) or on the bottom of pitched roof framing members (truss top chord or rafters).

HURRICANE TIES. Manufactured metal connectors designed to provide uplift and lateral restraint for roof framing members.
NAIL PLATE. A manufactured metal plate made of galvanized steel with factory punched holes for fasteners. A nail plate may have the geometry of a strap.

RETROFIT. The voluntary process of strengthening or improving buildings or structures, or individual components of buildings or structures for the purpose of making existing conditions better serve the purpose for which they were originally intended or the purpose that current building codes intend.

RETROFIT STUD. A lumber member used to structurally supplement an existing gable end wall stud.

RIGHT ANGLE BRACKET. A galvanized metal right angle bracket listed by the manufacturer for the material into which they will be attached, masonry (concrete or CMU) or wood.

STUD-TO-PLATE CONNECTOR. A manufactured metal connector designed to connect studs to plates.

TRUSS GABLE END. An engineered factory made truss or site built truss that incorporates factory installed or field installed vertical studs with their faces parallel to the plane of the truss

SECTION C103
MATERIALS OF CONSTRUCTION

C103.1 Existing materials. All existing wood materials that will be part of the retrofit work (trusses, rafters, ceiling joists, top plates, wall studs, etc.) shall be in sound condition and free from defects or damage that substantially reduces the load-carrying capacity of the member. Any wood materials found to be damaged or deteriorated shall be strengthened or replaced with new materials to provide a net dimension of sound wood equivalent to its undamaged original dimensions.

C103.2 New materials. All new materials shall comply with the requirements of the *International Building Code* or the *International Residential Code* as applicable.

C103.3. Material specifications for retrofits. Materials for retrofitting gable end walls shall comply with Sections C103.3.1 through C103.6

C103.3.1 Anchor blocks, compression blocks, and horizontal braces. Anchor blocks, compression blocks, and horizontal braces shall be lumber nominally 2 inch by at least 4 inch wide.

C103.3.2 Nail plate. Nail plates shall be of minimum 20 gauge thickness.

C103.3.3 Retrofit stud. Retrofit studs shall be made of nominal 2-inch lumber.

C103.3.4 Right angle bracket. Right angle brackets shall have a minimum capacity of 350 for uplift and lateral load conditions.

C103.3.5 Stud-to-plate connector. Stud-to-plate connectors shall have a minimum capacity of 500 pounds for uplift.

C103.3.6 Truss gable end. Gable end trusses shall be spaced no greater than 24-iches on center.

C103.4 Metal plate connectors, straps and anchors. Metal plate connectors, plates, straps and anchors shall be a product approved for connecting wood-to-wood or wood-to-concrete as appropriate. Straps and nail plates shall be manufactured from galvanized steel with a minimum thickness of 20 gauge. Nail plates shall have holes sized for a minimum of 8d nails.

C103.5 Twists in straps. Straps shall be permitted to be twisted or bent where they transition between framing members or connection points. Straps shall be bent only once at a given location though it is permissible that they be bent or twisted at multiple locations along their length.

C103.6 Fasteners. Fasteners shall meet the requirements of Sections C103.6.1 and Section C103.6.2, and shall be permitted to be screws or nails meeting the minimum length requirement shown in figures and specified in tables. Fastener spacing shall meet the requirements of Section C103.6.3.

C103.6.1 Screws. Screws shall be a minimum #8 size with head diameters no less than 0.28 inches. Screw lengths shall be no less than indicated in the Figures and in Tables. Permissible screws include deck screws and wood screws. Screws shall have at least 1 inch of thread. Fine threaded screws or drywall screws shall not be permitted. Screws shall be chosen with the appropriate diameter such that the shank adjacent to the head fits through the hole in the strap.

C103.6.2 Nails. Unless otherwise indicated in the provisions or drawings, where fastener lengths are indicated in Figures and Tables. as 1-¼ inches, 8d common nails with shank diameter 0.131 inches and head diameters no less than 0.28 inches shall be permitted. Unless otherwise indicated in the provisions or drawings, where fasteners lengths are indicated in Figures and Tables. as 3 inches, 10d common nails with shank diameter of 0.148 inches and head diameters no less than 0.28 inches shall be permitted.

C103.6.3 General fastener spacing. Fastener spacing for shear connections of lumber-to-lumber shall meet the requirements shown in Figure C103.6.3 and the following conditions.

C103.6.3.1 General fastener spacing. Fastener spacing shall meet the following conditions except as provided for in Section C103.6.3.3

The distance between fasteners and the edge of lumber that is less than 3-1/2 inches deep in the direction of the fastener length shall be a minimum of 3/4 inches.

1. The distance between fasteners and the edge of lumber that is more than 2 inches thick in the direction of the fastener length shall be a minimum of ½ inches.
2. The distance between a fastener and the end of lumber shall be a minimum of 2-½ inches.
3. The distance between fasteners parallel to the grain (center-to-center) shall be a minimum of 2-1/2 inches.
4. The distance between fasteners perpendicular to the grain (center-to-center) in lumber that is less than 3-1/2 inches deep in the direction of the fastener length shall be 1 inch.
5. The distance between fasteners perpendicular to the grain (center-to-center) in lumber that is more than 2 inches thick in the direction of the fastener length shall be ½ inch.

C103.6.3.2 Wood-to-wood connections of two members each 2 inch or less thick. Wood-to-wood connections fastener spacing shall meet the following conditions.

1. The distance between fasteners parallel to grain (center-to-center) shall be a minimum of 2-1/2 inches.
2. The distance between fasteners across grain (center-to-center) shall be a minimum of 1 inch.
3. For wood-to-wood connections of lumber at right angles, fasteners shall be spaced a minimum of 2-1/2 inches parallel to the grain and 1 inch perpendicular to the grain in any direction.

C103.6.3.3 Metal connectors to wood connections. Metal connectors to wood connections shall meet the following conditions.

1. Fastener spacing to edge or ends of lumber shall be as dictated by the prefabricated holes in the connectors and the connectors shall be installed in accordance with the manufacturer.
2. Fasteners in 1-1/4 inch wide metal straps that are installed on the 1-1/2 inch broad face of lumber shall be a minimum 1/4 inches from either edge of the lumber. Consistent with Section C103.6.3.1 fasteners shall be allowed to be spaced according to the fastener holes fabricated into the strap.
3. Fasteners in metal nail plates shall be spaced a minimum of ½ inches across wood grain and a minimum of 1-1/2 inches parallel to wood grain.

SECTION C104
RETROFITTING GABLE END WALLS TO ENHANCE WIND RESISTANCE

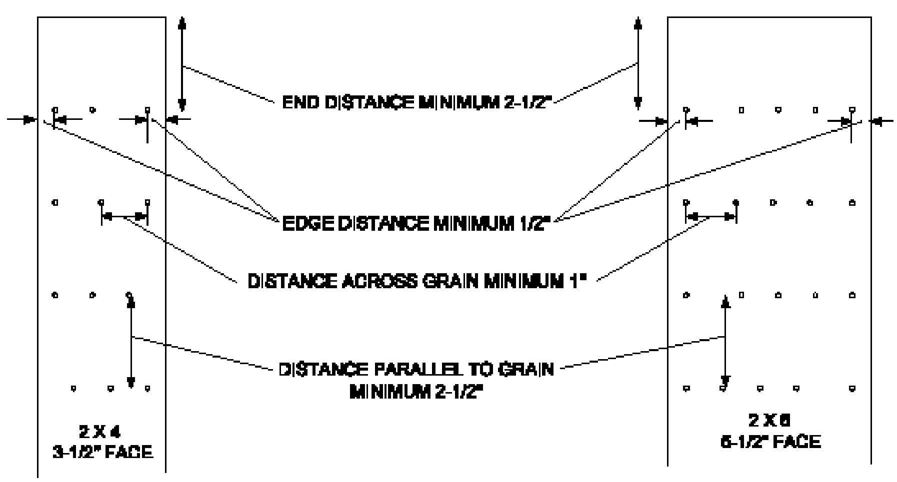
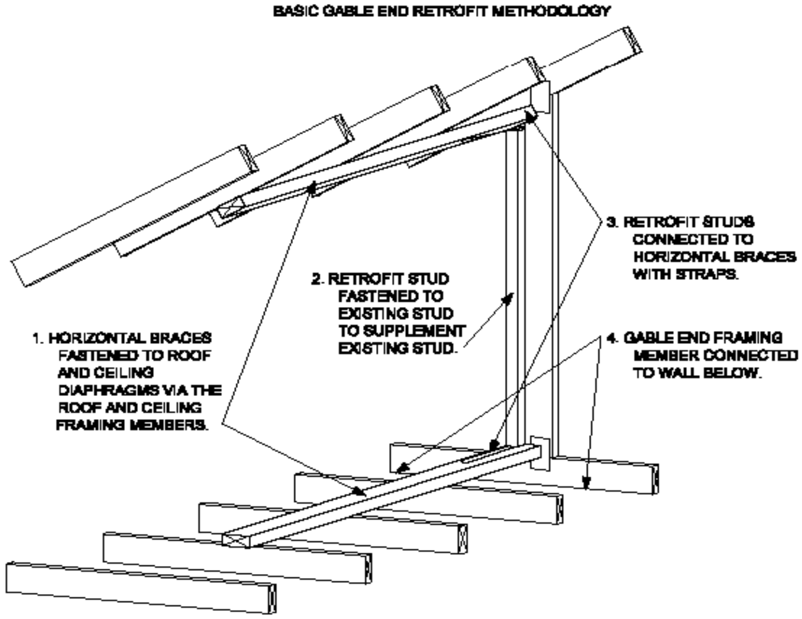


FIGURE C103.6.3
FASTENER SPACINGS FOR LUMBER TO LUMBER CONNECTIONS
OPERATING IN SHEAR PARALLEL TO GRAIN

SECTION C104
RETROFITTING GABLE END WALLS TO ENHANCE WIND RESISTANCE

C104.1 General. These prescriptive methods of retrofitting are intended to increase the resistance of existing gable end construction for out-of-plane wind loads resulting from high wind events. The ceiling diaphragm shall be comprised of minimum ½ inch thick drywall, minimum nominal 3/8 inch thick wood structural panels, or plaster. An overview isometric drawing of one kind of gable end retrofit to improve wind resistance is shown in Figure C104.1.1.

FIGURE C104.1.1
BASIC GABLE END RETROFIT METHODOLOGY



THIS FIGURE SHOWS A TRUSS GABLE END.
THE METHODOLOGY FOR A CONVENTIONALLY FRAMED GABLE END IS SIMILAR.
THE NUMBERS INDICATE A TYPICAL SEQUENCE OF INSTALLATION.
IN ORDER TO SHOW STRAPS COMPRESSION BLOCKS ARE NOT SHOWN.

C104.2 Horizontal braces. Horizontal braces shall be installed approximately perpendicular to the roof and ceiling framing members at the location of each existing gable end stud greater than 3 feet in length. Unless it is adjacent to an omitted horizontal brace location, horizontal braces shall be minimum 2x4 dimensional lumber as defined in Section C103.3. A single horizontal brace is required at the top and bottom of each gable end stud for Retrofit Configuration A, B, or C and two horizontal braces are required for Retrofit Configuration D. Maximum heights of gable end wall studs and associated retrofit studs for each Retrofit Configuration shall not exceed the values listed in Table C104.2. Horizontal braces shall be oriented with their broad faces across the roof or ceiling framing members, be fastened to a minimum of three framing members, and extend at least 6 feet measured perpendicularly from the gable end plus 2-1/2 inches beyond the last top chord or bottom chord member (rafter or ceiling joist) from the gable end as shown in Figure C104.2(1), Figure C104.2(2), Figure C104.2(3), and Figure C104.2(4).

TABLE C104.2
STUD LENGTH LIMITATIONS BASED ON EXPOSURE AND DESIGN WIND SPEED

Exposure Category	**Maximum 3-Sec Gust** Basic Wind Speed [a]	**Maximum Height of Gable End Retrofit Stud** [b]			
C	110	8'-0"	11'-3"	14'-9"	16'-0"
C	120	7'-6"	10'-6"	13'-6"	16'-0"
C	130	7'-0"	10'-0"	12'-3"	16'-0"
C	140	7'-0"	10'-0"	12'-3"	16'-0"
C	150	6'-6"	8"-9"	11'-0"	16'-0"
B	110	8'-0"	12'-3"	16'-0"	N/R [c.]
B	120	8'-0"	11'-3"	14'-9"	16'-0"
B	130	8'-0"	11'-3"	14'-9"	16'-0"
B	140	7'-6"	10'-6"	13'-6"	16'-0"
B	150	7'-0"	10'-0"	12'-3"	16'-0"
	Retrofit Configuration -->	A	B	C	D

For SI: 1 Inch = 25.4mm, 1 Foot = 304.8mm

a. Interpolation between given wind speeds not permitted.

b. Existing gable end studs less than or equal to 3'-0" in height shall not require retrofitting.

c. N/R = Not Required. Configuration C is acceptable to 16'-0" maximum height.

FIGURE C104.2 (1)
TRUSS FRAMED GABLE END: L-BENT STRAP

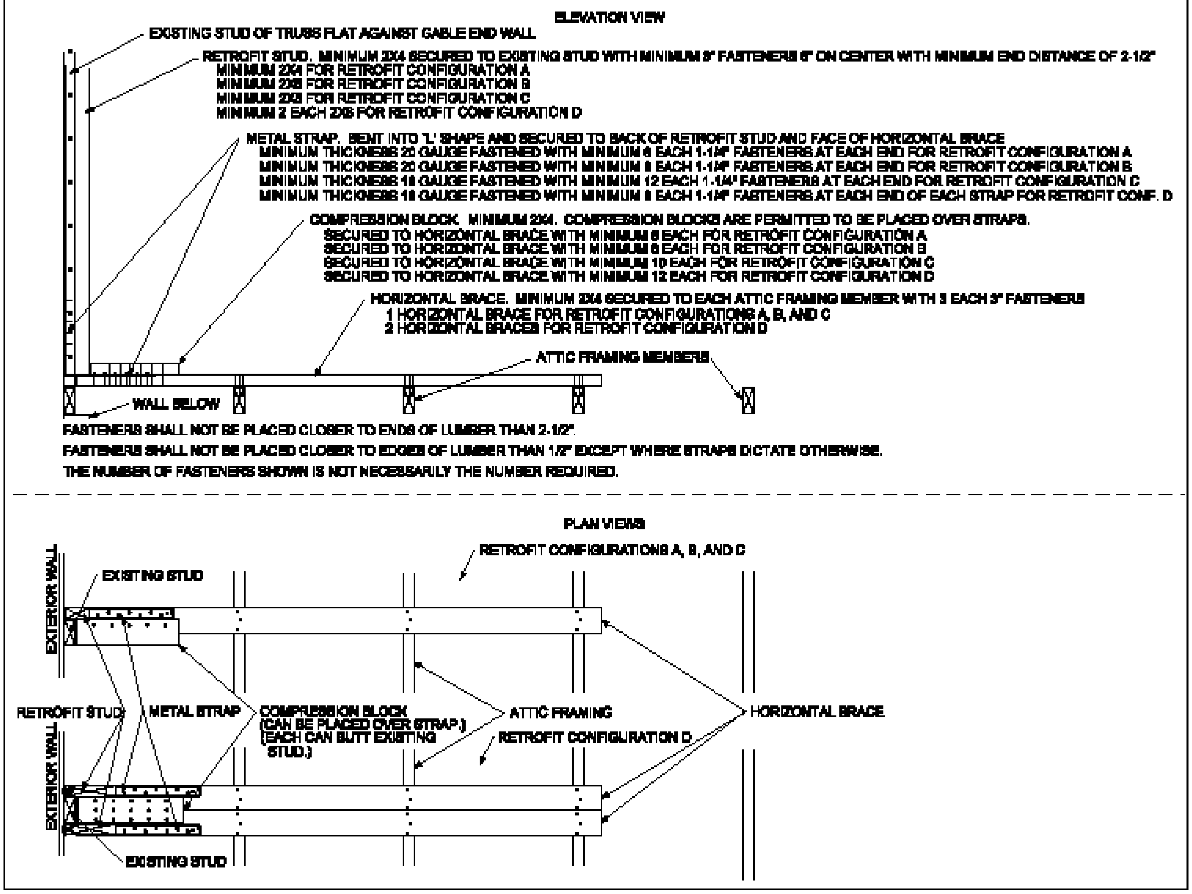


FIGURE C104.2 (2)
CONVENTIONALLY FRAMED GABLE END. L-BENT STRAP

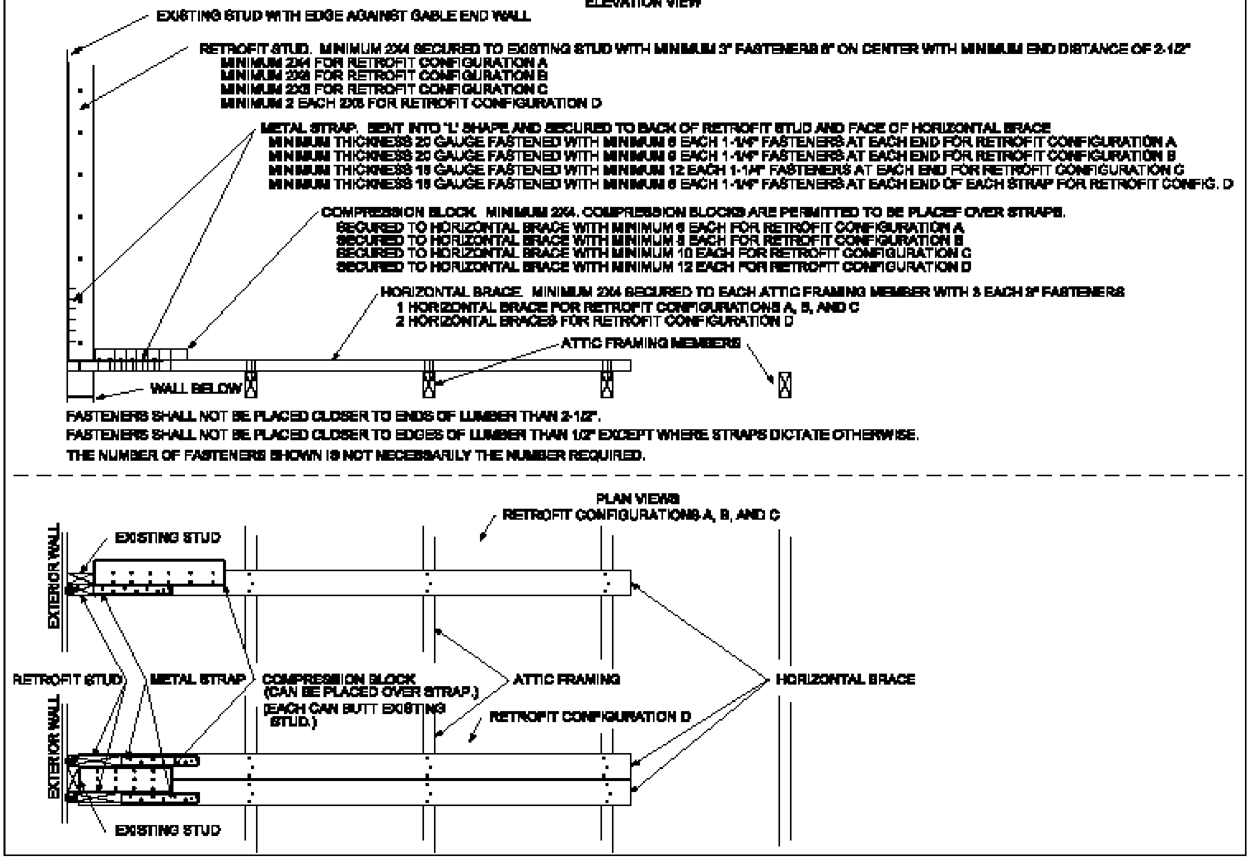
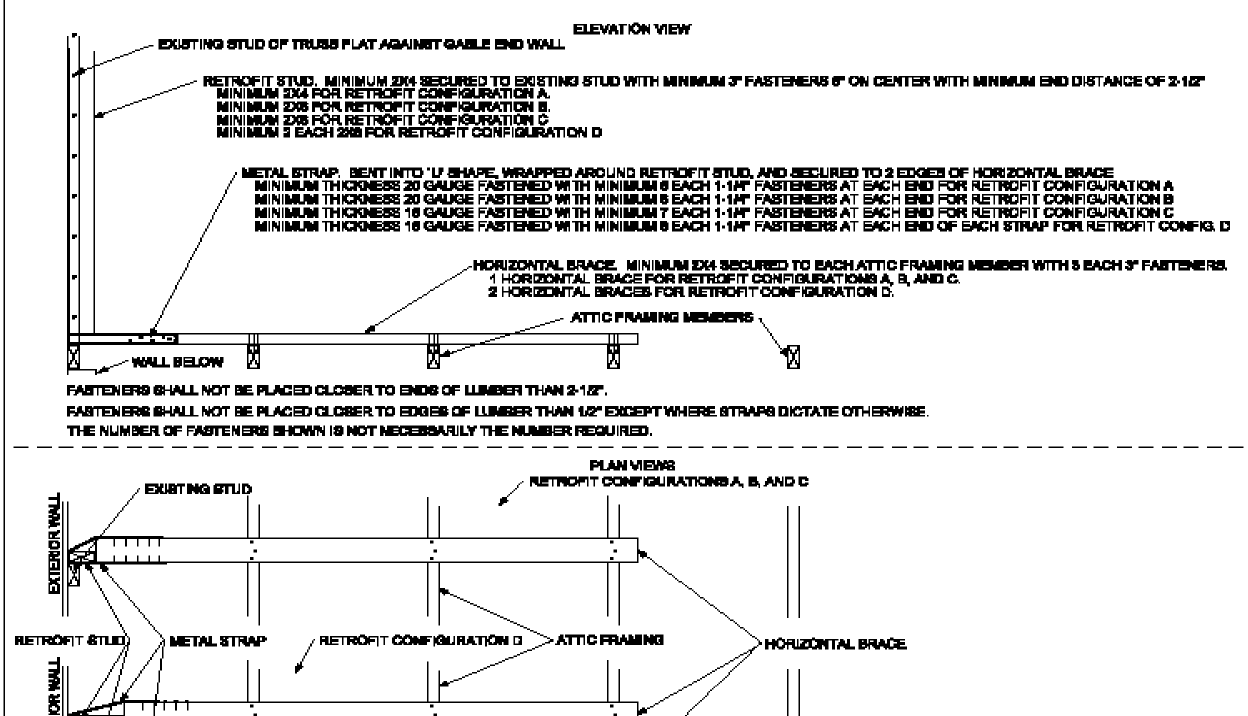


FIGURE C104.2 (3)
TRUSS FRAMED GABLE END. U-BENT STRAP



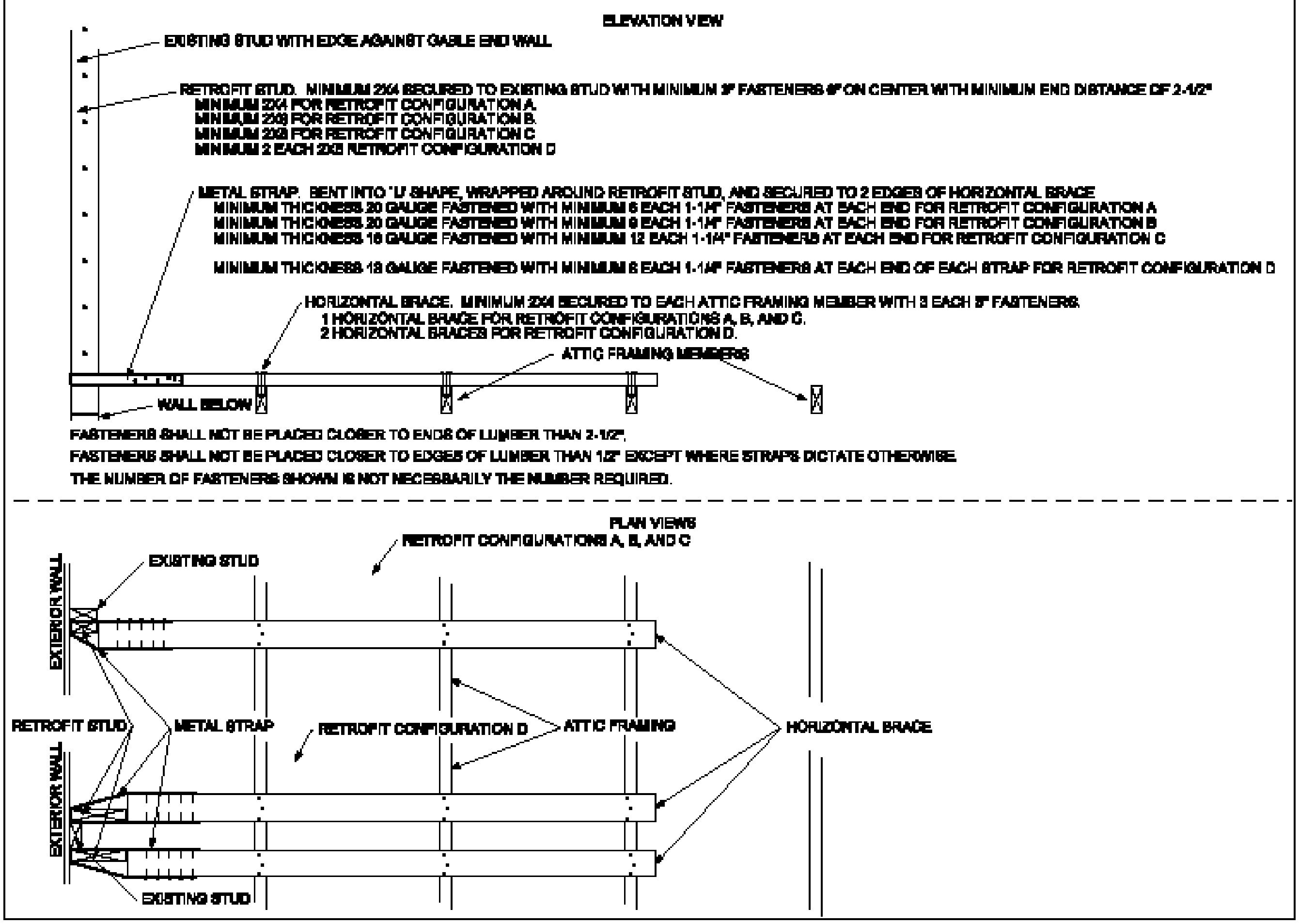


FIGURE C104.2 (4)
CONVENTIONALLY FRAMED GABLE END. U-BENT STRAP

C104.2.1 Existing gable end studs. If the spacing of existing vertical gable end studs in conventionally framed or the truss gable ends is greater than 24 inches, a new stud and corresponding horizontal braces shall be installed such that the maximum spacing between existing and added studs shall be no greater than 24 inches. Additional gable end wall studs shall not be required at locations where their length would be 3 feet or less. Each end of each required new stud shall be attached to the existing roof framing members (truss top chord or rafter and truss bottom chord or ceiling joist) using a minimum of two 3 inch toenail fasteners (#8 wood screws or 10d nails) and a metal connector with minimum uplift capacity of 175 pounds, or nail plates with a minimum of four 1-1/4 inch long fasteners (#8 wood screws or 8d nails).

C104.2.2 Main method of installation. Each horizontal brace shall be fastened to each existing roof or ceiling member that it crosses using three 3-inch long fasteners (#8 wood screws or 10d nails) as indicated in Figure C104.2(1) and Figure C104.2(3) for trusses and Figure C104.2(2) and Figure C104.2(4) for conventionally framed gable end walls. Alternative methods for providing horizontal bracing of the gable end studs as provided in Sections C104.2.3 through C104.2.9 shall be allowed in lieu of this primary installation method.

C104.2.3 Omitted horizontal brace. Where impediments, other permanently attached obstacles or conditions exist that prevent installation in accordance with Section C104.2.2 horizontal braces may be omitted for height limitations corresponding to Retrofit Configurations A and B as defined in Table C104.2 provided installation is as indicated in Figure C104.2.3 and provided all of the following conditions are met. This method is not allowed for Retrofit Configurations C or D.

1. There shall be at least two horizontal braces on each side of an omitted horizontal brace or at least one horizontal brace if it is the end horizontal brace. Omitted horizontal braces must be separated by at least two horizontal braces even if that location is comprised of two retrofit studs and two horizontal braces.

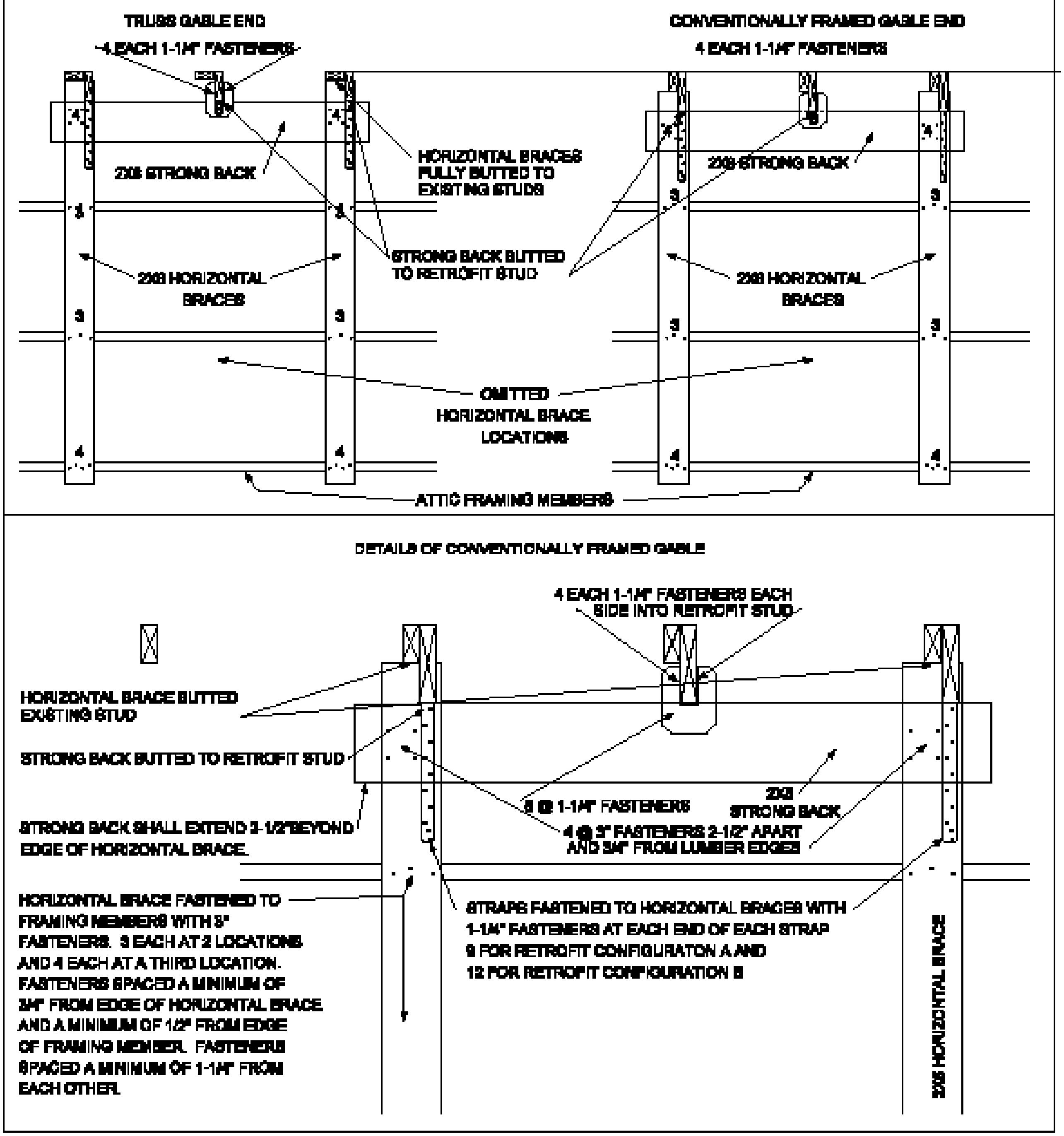
2. Horizontal braces adjacent to the omitted horizontal brace shall be 2x6 lumber, shall butt against the existing studs, and shall be fastened to each existing roof or ceiling member that it crosses using three 3-inch long fasteners (#8 wood screws or 10d nails). For Retrofit Configuration B, 4 fasteners shall be required on at least one of the connections between the horizontal brace and the existing roof and ceiling framing members. Fasteners shall be spaced a minimum of ¾" from the edges of the horizontal braces and a minimum of 1-3/4" from adjacent fasteners.
3. Where the existing studs on each side of an omitted horizontal brace have their broad face perpendicular to the gable end wall, the retrofit studs at those locations and the retrofit stud at the omitted horizontal brace locations shall be sized such that they protrude a minimum of 3-1/2 inches beyond the interior edge of the existing studs for both Retrofit Configurations A and B. The edges of the three retrofit studs facing towards the interior of the attic shall be aligned such that they are the same distance from the gable end wall.
4, Retrofit studs shall be fastened to existing studs in accordance with Section C104.3.
5. Retrofit studs adjacent to the omitted horizontal brace shall be fastened to the horizontal brace using straps in accordance with Table C104.4.1 consistent with the size of the retrofit stud. The method applicable to Table C104.4.2 is not allowed.
6. A strong back made of minimum of 2x8 lumber shall be placed parallel to the gable end and shall be located on and span between horizontal braces on the two sides of the omitted horizontal brace and shall extend beyond each horizontal braces by a minimum of 2-1/2 inches. The strong back shall be butted to the three retrofit studs. The strong back shall be attached to each of the horizontal braces on which it rests with 5 3 inch long fasteners (#8 screws or 8d nails). Those fasteners shall be spaced a minimum of 3/4 inch from any edge of lumber and shall be spaced a minimum of 2-1/2 inch from each other. Additional compression blocks shall not be required at locations where a strong back butts against a retrofit stud.
7. The retrofit stud at the location of the omitted horizontal braces shall be fastened to the strong back using a connector with minimum uplift capacity of 800 pounds and installed such that this capacity is oriented in the direction perpendicular to the gable end wall.
8. The use of shortened horizontal braces using the alternative method of Section C104.2.5 is not allowable for horizontal braces adjacent to the omitted horizontal braces.
9. Horizontal braces shall be permitted to be interrupted in accordance with Section C104.2.8.

FIGURE C104.2.3
OMITTED HORIZONTAL BRACE

OVERVIEW

PLAN VIEWS
RETROFIT CONFIGURATION A AND B ONLY
NOT ALLOWED FOR RETROFIT CONFIGURATION C OR D

UNIDENTIFIED NUMBERS INDICATE THE NUMBER OF FASTENERS.



C104.2.4 Omitted horizontal brace and retrofit stud. Where impediments, other permanently attached obstacles or conditions exist that prevent installation in accordance with Section C104.2.2 or Section C104.2.3 by not permitting installation of horizontal braces, then retrofit studs and horizontal brace shall be permitted to be omitted from those locations by installation of ladder assemblies for Retrofit Configurations A and B as defined in Table C104.2 provided all of the following conditions are met**.** This method is not allowed for Retrofit Configurations C or D.

1. No more than two ladder assemblies are permitted on a single gable end.
2. There shall be at least two retrofit studs and horizontal brace assemblies on either side of the locations where the retrofit studs and horizontal bracing members are omitted (no two ladder braces bearing on a single retrofit stud).
3. Where the existing studs on each side of an omitted horizontal brace have their broad face parallel to the gable end wall the retrofit studs at those locations and the retrofit stud at the omitted horizontal brace locations shall be 2x6 lumber for Retrofit Configuration A and 2x8 lumber for Retrofit Configuration B.
4, Horizontal braces adjacent to the omitted horizontal brace shall be 2x6 lumber and be fastened to each existing roof or ceiling member crossed using three 3-inch long fasteners (#8 wood screws or 10d nails) as indicated in Figure C104.2(1) and Figure C104.2(3) for trusses and Figure C104.2(2) and Figure C104.2(4) for conventionally framed gable end wall. For Retrofit Configuration B, 4 fasteners shall be required on at least one of the connections between the horizontal brace and the existing roof and ceiling framing members.
5. Ladder rungs /shall be provided across the location of the omitted retrofit studs as indicated in Figure C104.2.4(1) for trusses and Figure C104.2.4(2) for conventionally framed gable end walls.
6. Ladder rungs shall be made of at a minimum 2x4 lumber oriented with their broad face horizontal and spaced a maximum of 16-inches on center vertically.
7. Where ladder rungs cross structural members such as the existing stud at the omitted retrofit stud location or gable end vent framing they shall be connected to each other with a metal connector with a minimum capacity of 175 pounds in the direction perpendicular to the gable end wall.
8. Notching of the ladder rungs shall not be permitted unless the net depth of the framing member is a minimum of 3-1/2 inches.

C104.2.5 Short horizontal brace. Where impediments, other permanently attached obstacles or conditions exist that prevent installation in accordance with Sections C104.2.2, C104.2.3, or C104.2.4 by not permitting extension of horizontal braces across the existing framing members such that they can be fastened to a minimum of three framing members and extend at least 6-feet from the gable end wall plus 2-1/2 inches beyond the last roof or ceiling framing member, the horizontal braces may be shortened provided installation is as indicated in Figure C104.2.5 and provided that all of the following conditions are met.

1. The horizontal brace shall be installed across a minimum of two framing spaces, extend a minimum of 4-feet from the gable end wall plus 2-1/2 inches beyond the last roof or ceiling framing member, and be fastened to each existing framing member with three 3-inch long fasteners (#8 wood screws or 10d nails),
2. An anchor block shall be fastened to the side of the horizontal brace in the second framing space from the gable end wall as shown in Figure C104.2.5. The anchor block lumber shall have a minimum edge thickness of 1-1/2 inches and the depth shall be as a minimum the depth of the existing roof or ceiling framing member. Six 3-inch long fasteners (#8 wood screws or 10d nails) shall be used to fasten the anchor block to the side of the horizontal brace.
3. The anchor block shall extend into the space between the roof or ceiling framing members a minimum of one-half the depth of the existing framing members at the location where the anchor block is installed. The anchor block shall be installed tightly between the existing framing members such that the gap at either end shall not exceed $^1/_8$ inch.
4. The use of omitted horizontal braces using the method of Section C104.2.3 adjacent to a short horizontal brace as defined in this section is not permitted.

C104.2.6 Installation of horizontal braces onto webs or vertical members of trusses. Where existing conditions preclude installation of horizontal braces on truss top or bottom chords they shall be permitted to be installed on truss webs or vertical members of trusses provided all of the following conditions are met.

1. Horizontal braces shall be installed as close to the top or bottom chords as practical without altering the truss or any of its components and not more than three times the depth of the truss member to which it would ordinarily be attached.
2. A racking block, comprised of an anchor block meeting the definition of anchor block of Section C102 or comprised of minimum 15/32 inch plywood or 7/16 inch OSB, shall be fastened to the horizontal brace in the second framing space from the gable end wall. The racking block shall extend towards the diaphragm (roof or

ceiling as appropriate) so that the edge of the racking block closest to the diaphragm is within ½ the depth of the existing framing member from the diaphragm surface. They shall be attached to horizontal braces using six fasteners (#8 wood screws or 10d nails) of sufficient length to provide 1-1/2 inches of penetration into the horizontal brace.

3. Racking blocks can be fastened to any face or edge of horizontal braces between each web or truss vertical posts to which a horizontal brace is attached. Racking blocks can be on alternate sides of horizontal braces. Racking blocks shall be installed tightly between the lumber of truss members or truss plates such that the gap at either end shall be a maximum of 1/8 inch.

C104.2.7 Alternative method of installation of horizontal braces at truss ridges. Where impediments such as truss plates or access for installation of fasteners limits or restricts installation of horizontal braces near the peak of the roof, ridge ties may be added to provide support for the required horizontal brace. The top of added ridge tie members shall be installed a maximum of 16-inches below the existing ridge line or 4 inches below impediments. The added ridge tie members shall be installed across a minimum of three bays, but no less than 6-feet from the gable end wall plus 2-1/2 inches beyond the last roof or ceiling framing member to permit fastening of the horizontal brace. A minimum of a 2x4 member shall be used for each ridge tie and fastening shall consist of two 3-inch long wood screws, four 3 inch long 10d nails or two 3-1/2 inch long 16d nails driven through and clinched at each top chord or web member intersected by the ridge tie as illustrated in Figure C104.2.7.

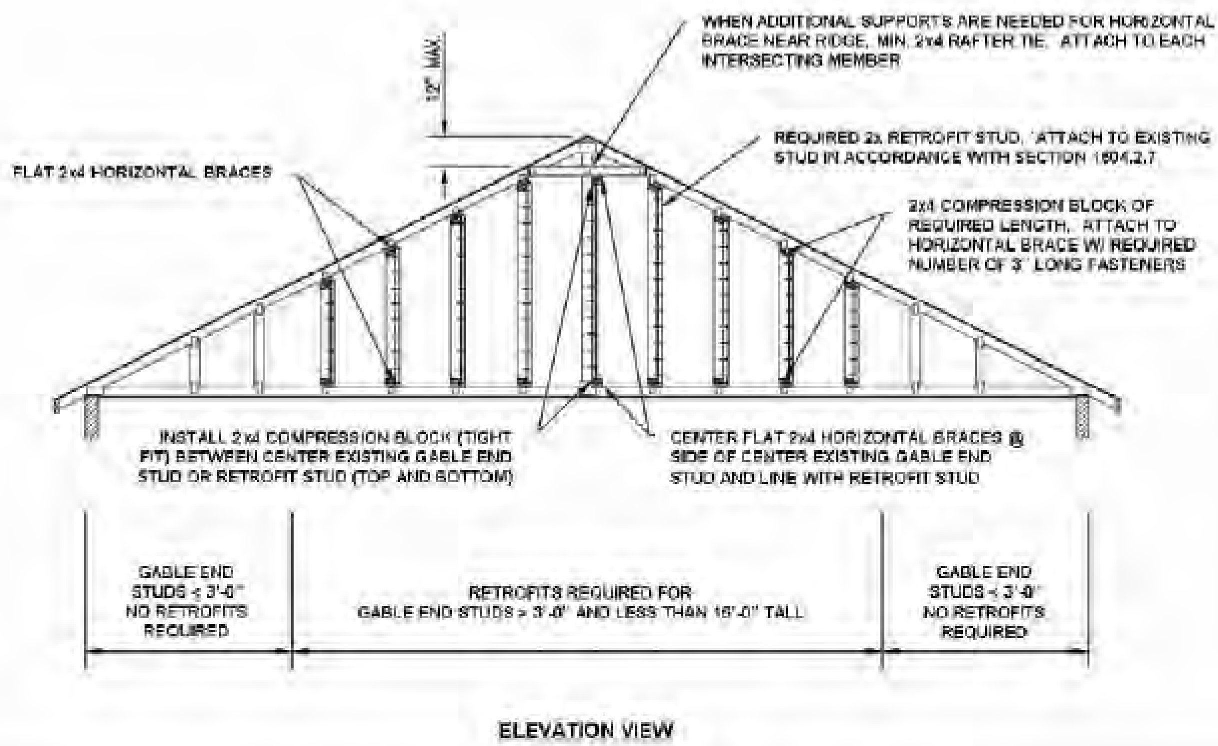


FIGURE C104.2.7 DETAIL OF RETROFIT TIE INSTALLATION

C104.2.8 Interrupted horizontal braces. Where impediments, other permanently attached obstacles or conditions exist that prevent installation of horizontal braces in accordance with Section C104.2.2 by preventing the installation of a single continuous horizontal braces then horizontal braces shall be permitted to be interrupted using the methods shown in Figure C104.2.8(1), Figure C104.2.8(2), and Figure C104.2.8(3). For interruptions that occur in the attic framing space closest to the gable end, nine 3 inch fasteners shall be used to connect each section of the interrupted horizontal braces. For interruptions that occur in the second attic space from the gable end, six 3 inch fasteners shall be used to connect each section of the interrupted horizontal braces. For interruptions that occur in the attic framing space farthest from the gable end, three 3 inch fasteners shall be used to connect each section of the interrupted horizontal braces. Horizontal braces shall be continued far enough to allow connections to three existing roof framing members as shown in Figure C104.2.8(1), Figure C104.2.8(2), or Figure C104.2.8(3). Fasteners shall be spaced in accordance with Section C103.6.3. Lumber members used to form horizontal braces shall be the same width and depth as required for an un-interrupted member.

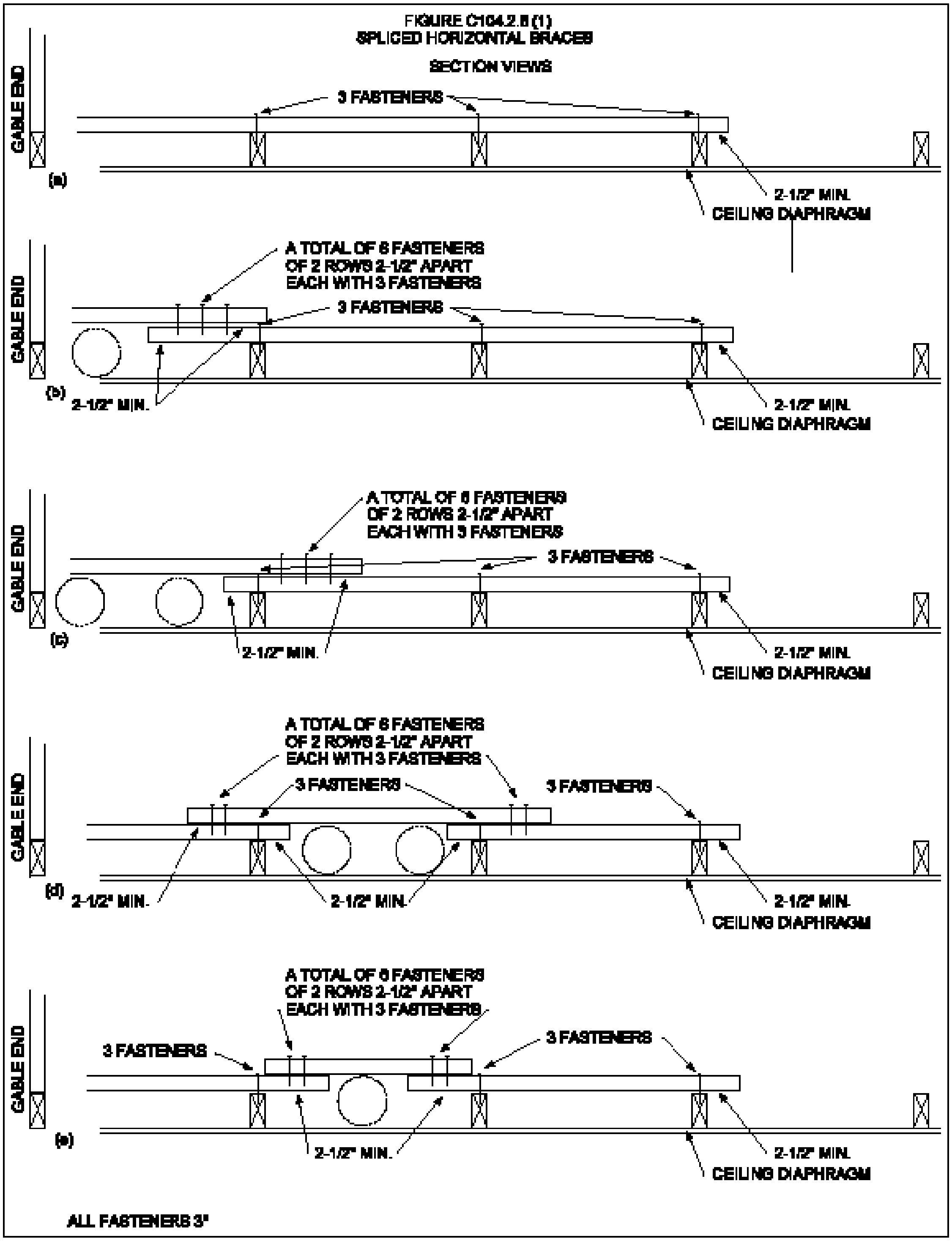
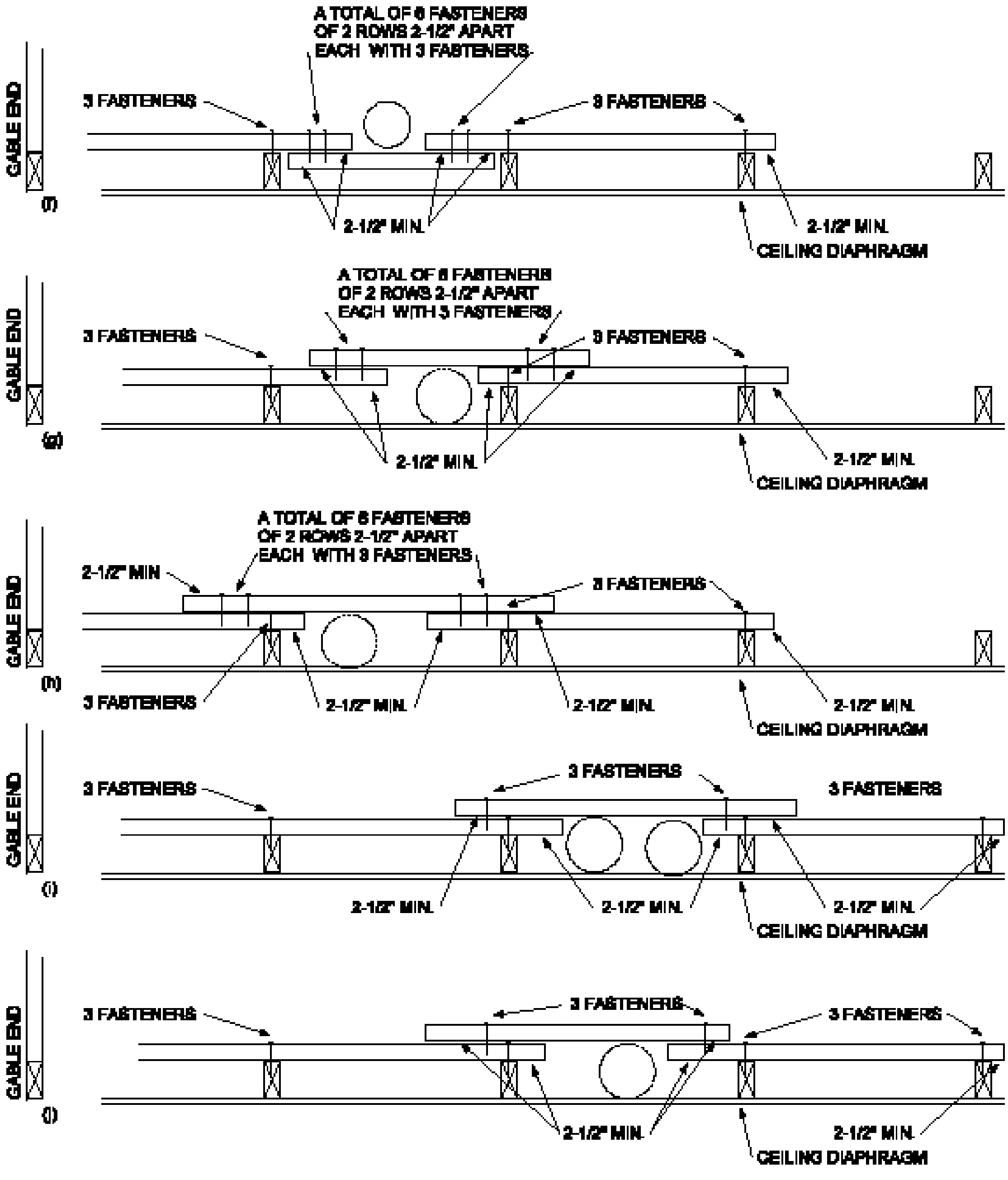


FIGURE C104.2.5 (1)
SPLICED HORIZONTAL BRACES
SECTION VIEWS
GABLE END
3 FASTENERS
(a)
2-1/2" MIN.
CEILING DIAPHRAGM
A TOTAL OF 6 FASTENERS
OF 2 ROWS 2-1/2" APART
EACH WITH 3 FASTENERS
(b)
(c)
(d)
(e)
ALL FASTENERS 3"

FIGURE C104.2.8 (2)
SPLICED HORIZONTAL BRACES

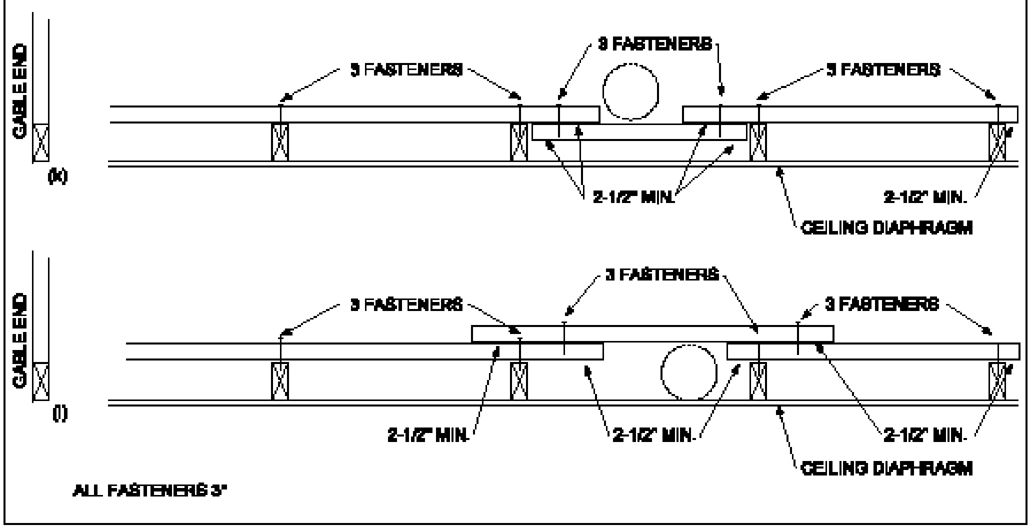
SECTION VIEWS



ALL FASTENERS 3"

FIGURE C104.2.8 (3)
SPLICED HORIZONTAL BRACES

SECTION VIEWS

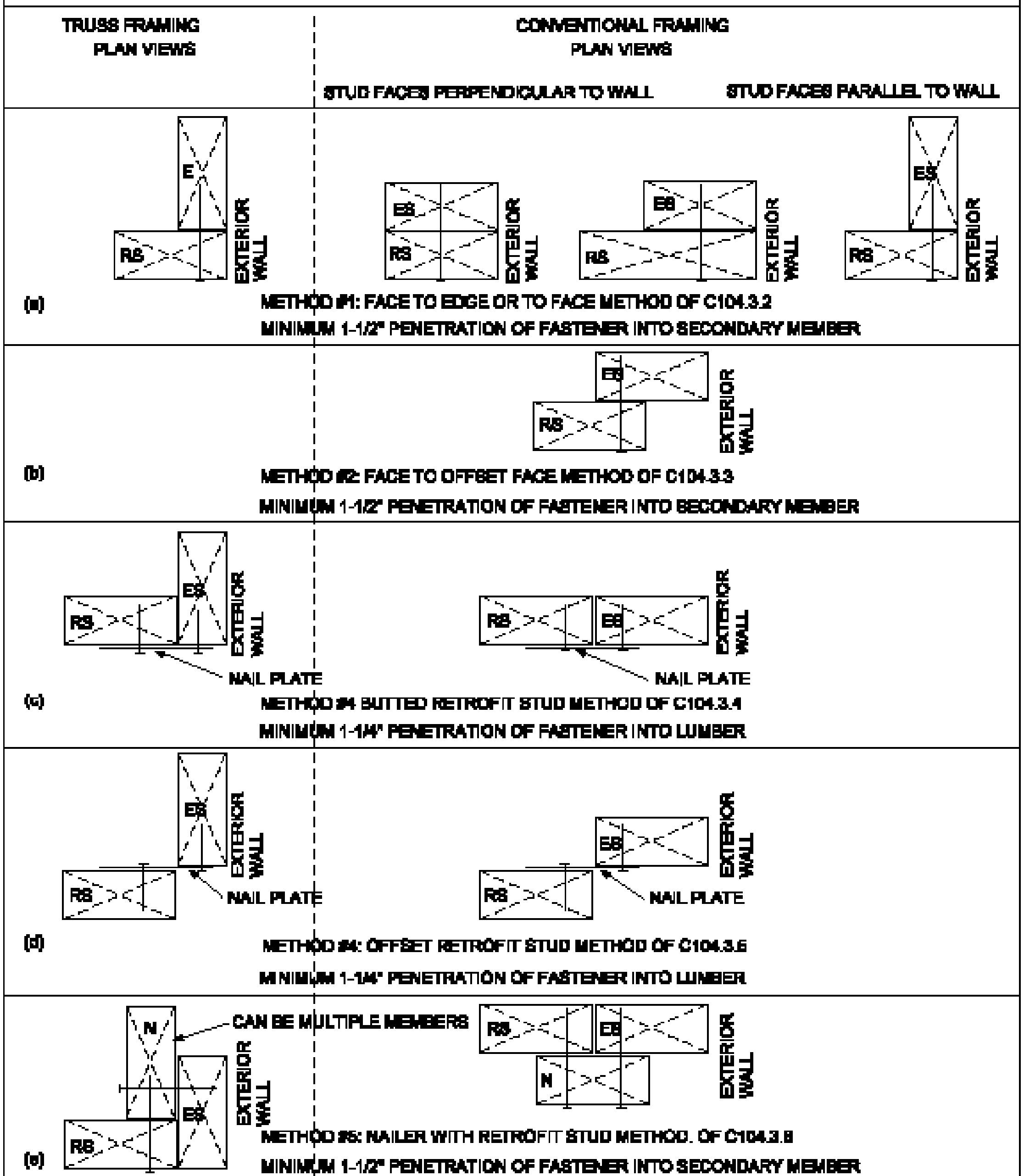


C104.2.9 Piggyback trusses. Piggyback trusses (trusses composed of two members one above the other) shall be permitted to be retrofitted if either of the following cases is true. 1. The existing studs in both the upper truss and the lower truss to which wall sheathing, panel siding, or other wall facade are attached are sufficiently in line that retrofit studs can be installed and connections made between the two with retrofit stud(s). 2. The same as condition 1 except the studs in the upper truss are not sufficiently in line with ones below and the existing studs in the upper truss are 3 feet or shorter. For condition 1 both the lower stud and the upper stud shall be retrofitted using the methods of Section C104.2. For condition two the retrofit stud shall be connected to the lower studs using the methods of Section C104.2 and be continuous from the bottom horizontal brace to the top horizontal brace. No connection is required between the retrofit stud and the upper stud. In both conditions the bottom chord of the piggy back truss section shall be fastened to each retrofit stud using a connector with minimum axial capacity of 175 pounds.

C104.3 Retrofit studs. Retrofit studs shall be installed in accordance with Section C104.3.1 and using one of the five methods of Sections C104.3.2, through C104.3.6 and as shown in Figure C104.3. For the Retrofit Configuration derived from Table C104.2 the size of retrofit studs shall be as indicated in Table C104.4.1 or Table C104.4.2. Retrofit studs shall extend from the top of the lower horizontal brace to the bottom of the upper horizontal brace except that a maximum gap of 1/8 inch is allowed at the bottom and ½ inch at the top. Where wall sheathing, panel siding, or other wall façade is fastened to gable end studs not manufactured into a truss, i.e. are field installed, retrofit studs shall be applied to those field installed studs in accordance with Section C104.2.1.

FIGURE C104.3

METHODS OF INSTALLING RETROFIT STUDS



THE FIGURES DO NOT REFLECT THE NUMBER OF REQUIRED FASTENERS OR SHOW HORIZONTAL BRACES OR STRAPS.
FASTENERS SHALL BE PLACED MAXIMUM 6" ON CENTER AND A MINIMUM OF 2-1/2" FROM ENDS.
3" FASTENERS CAN BE INSTALLED FROM EITHER SIDE OF LUMBER AS LONG AS THERE IS 1-1/2" FASTENER PENETRATION.
ES INDICATES AN EXISTING STUD. RS INDICATES A RETROFIT STUD. N INDICATES A NAILER.

C104.3.1 Fastening. Where nail plates are not used, retrofit studs shall be attached to existing studs using 3 inch fasteners at a maximum of 6 inches on center but no closer than 2-1/2 inches on center with fasteners no closer than 2-1/2 inches to the ends of members~~.~~

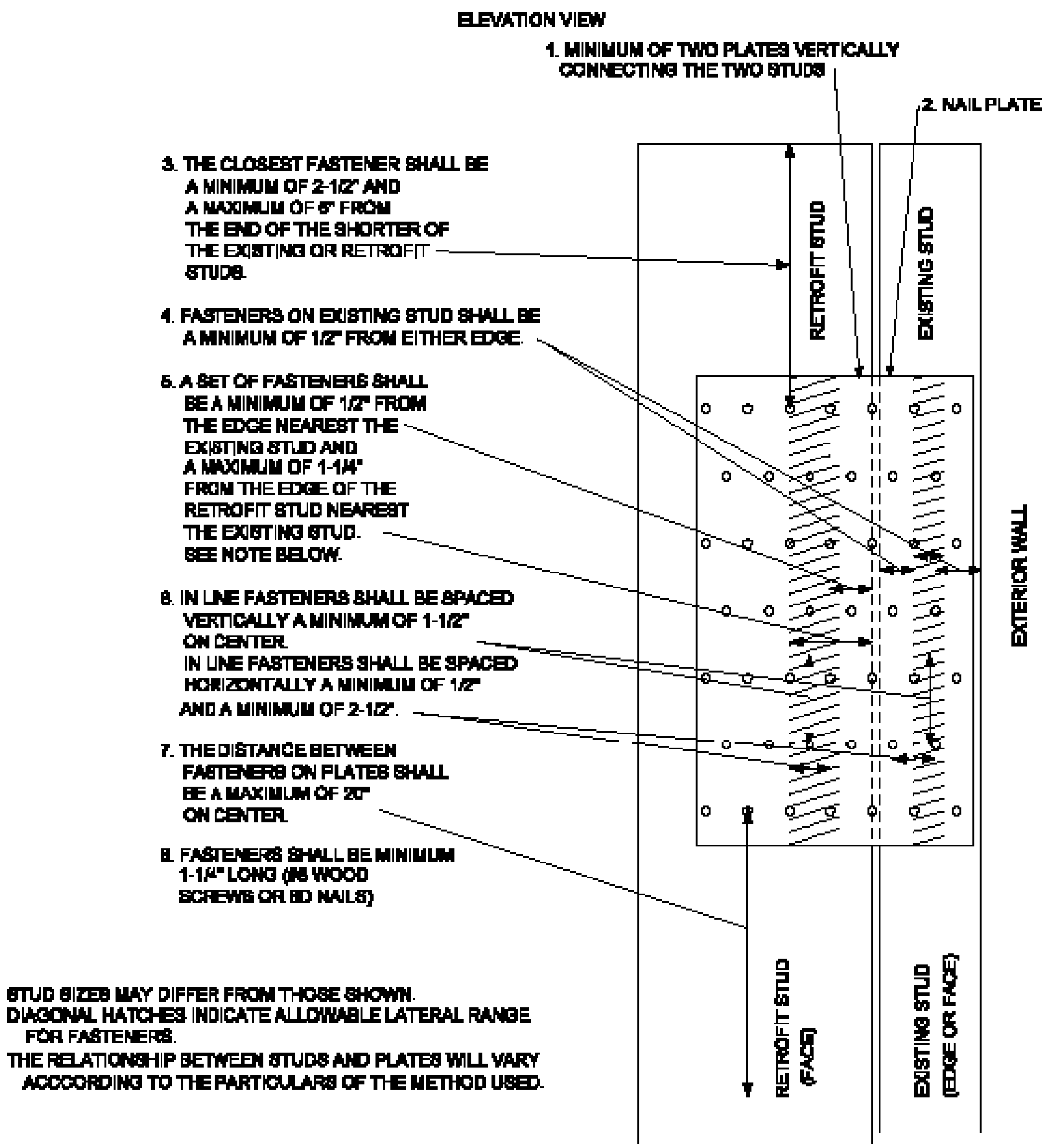
C104.3.2 Method #1: Face to edge or to face method. Retrofit studs shall be installed immediately adjacent to existing (Section C104.2) gable end wall studs as indicated in Figure C104.3(a). The retrofit studs shall overlap the edge or side of the existing stud by a minimum of 1-1/4 inches. Fasteners shall be installed as specified in Section C104.3.1.

C104.3.3 Method #2: Face to face offset method. Retrofit studs shall be installed against the face of existing studs as indicated in Figure C104.3(b) such that the faces overlap a minimum of 1-1/2 inch and the edge distance to fasteners is no less than ¾ inch. Fasteners shall be installed as specified in Section C104.3.1.

C104.3.4 Method #3: Butted retrofit stud method. Provided that all of the following fastening conditions are met retrofit studs shall be permitted to be butted by their edge or face to existing studs with the addition of nail plates as indicated in Figure C104.3(c) and Figure C104.3.4.

1. The 1-1/2 inch edge of retrofit studs shall be installed against the 1-1/2 inch or the broad face of existing studs.
2. A minimum of two nail plates shall be used.
3. Fasteners used to secure nail plates to studs shall be a minimum 1-1/4 inch long (#8 wood screws or 8d nails).
4. Fasteners placed in nail plates shall be a minimum of 2-1/2 inches along the length of lumber. A fastener shall be placed in nail plates a maximum of 6 inches from the ends of the shorter stud.
5. Fasteners shall be placed a minimum of a ½ inch from the edges of the studs. Fasteners shall be placed a maximum of 1-1/2 inches from the abutting vertical edges of existing studs and retrofit studs.
6. There shall be at least 3 fasteners through nail plates into all existing and retrofit studs to which it is attached.
7. Where there are 3 fasteners through nail plates onto a single existing or retrofit stud then nail plates shall be spaced a maximum of 15 inches on center.
8. Where there are more than 3 fasteners though nail plates onto a single existing or retrofit stud then nail plates shall be spaced a maximum of 20 inches on center.
9. In line fasteners used to secure nail plates shall be spaced vertically a minimum of 1-1/2 inches on center. Staggered fasteners used to secure nail plates shall be spaced horizontally a minimum of ½ inches.

FIGURE C104.3.4
NAIL PLATE FASTENING



C104.3.5 Method #4: Offset retrofit stud method. Where retrofit studs are placed as indicated in Figure C104.3(d) retrofit studs shall be permitted to be offset from existing studs by use of nail plates such that the vertical corner of a retrofit stud shall be placed at the vertical corner of an existing stud as indicated in Figure C104.3(d) and Figure C104.3.4 provided the fastening conditions of Section C104.3.4 are met.

C104.3.6 Method #5: Nailer with retrofit stud method. Retrofit studs and existing studs shall be permitted to be connected using non-continuous 2x4 nailers as indicated in Figure C104.3(e) provided the following conditions are met.

1. Both the existing stud and the retrofit stud shall be butted to nailers and both shall be fastened to the nailer with 3 inch long fasteners (#8 wood screws or 8d nails). Fasteners connecting each stud to the nailer shall be spaced 6 inches on center.
2. Fasteners into nailers from any direction shall be offset vertically by a minimum of 2-1/2 inches.
3. Fasteners into nailers shall be a minimum of 2-1/2 inches but not more than 6 inches from the end of the shorter of the existing stud and retrofit stud to which they are fastened.

C104.3.7 Reduced depth of retrofit studs. Retrofit studs may be reduced in depth by notching, tapering, or other methods at any number of locations along their length provided that all of the following conditions are met.

1. The retrofit stud to be reduced in depth shall be sized such that the remaining minimum depth of the member at the location of the notch (including cross cut kerfs) shall not be less than that required by Table C104.4.1 or Table C104.4.2.
2. The retrofit stud reduced in depth shall not be spliced within 12 inches of the location of notches. Splice members shall not be notched.
3. The vertical extent of notches shall not exceed 12 inches as measured at the depth of location of reduced depth.
4. A retrofit stud member reduced in depth shall be fastened to the side of the existing gable end wall studs in accordance with Section C104.3.1. Two additional 3 inch fasteners (#8 wood screws or 10d nails) shall be installed on each side of notches in addition to those required by Section C104.3.1.

C104.3.8 Retrofit stud splices. Retrofit studs greater than 8 feet in height may be field spliced in accordance with Figure C104.3.8.

C104.4 Connection between horizontal braces and retrofit studs. Connections between horizontal braces and retrofit studs shall comply with Section C104.4.1 or Section C104.4.2. Each retrofit stud shall be connected to the top and bottom horizontal brace members with a minimum of a 20 gauge 1-1/4 inch wide flat or coil metal strap with pre-punched holes for fasteners. Straps shall be fastened with 1-1/4 inch long fasteners (#8 wood screws or 8d nails) with the number of fasteners as indicated on Table C104.4.1 and Table C104.4.2. Fasteners shall be no closer to the end of lumber than 2-1/2 inches.

C104.4.1 L-bent strap method. Retrofit studs shall be connected to horizontal braces or to strong backs in accordance with Figure C104.2(1), Figure C104.2(2), or Figure C104.2.3, and shall comply with the following conditions.

1. A strap shall be applied to the edges of a retrofit stud nearest the gable end wall and to the face of horizontal braces using at each end of the strap the number of fasteners specified in Table C104.4.1. Straps shall be long enough so that each strap extends sufficient distance onto the vertical face of the retrofit stud that the fastener closest to the ends of the studs is a minimum of 2-1/2 inches from the end of the stud. Straps shall be allowed to be twisted to accommodate the transition between the tops of retrofit studs and horizontal bracings following roof pitches.
2. Compression blocks shall be installed on the horizontal braces directly against either the existing vertical gable end wall stud or the retrofit stud. Figure C104.2(1) (trusses) and Figure C104.2(2) (conventionally framed) show the installation of the compression block against the existing vertical gable end wall stud with the strap from the retrofit stud running beside the compression block. Compression blocks shall be allowed to be placed over straps. Compression blocks shall be fastened to the horizontal braces with at least the minimum number of 3 inch long fasteners (#8 wood screws or 10d nails) specified in Table C104.4.1. End and edge distances for fasteners shall be in accordance with Section C103.6.3.

TABLE C104.4.1
ELEMENT SIZING AND SPACING FOR L-BENT RETROFIT METHOD

	Retrofit Config.	Retrofit Config.	Retrofit Config.	Retrofit Config.
Retrofit Elements	A	B	C	D
Minimum size and number of Horizontal Braces	2x4	2x4	2x4	2 each 2x4
Minimum size and number of Retrofit Studs	2x4	2x6	2x8	2 each 2x8
Minimum number of fasteners connecting each end of straps to Retrofit Studs or to Horizontal Braces #8 screws or 10d nails 1-1/4" long	6	9	12	8 on each strap
Minimum number of fasteners to connect Compression Blocks to Horizontal Braces #8 screws or 10d nails 3" long	6	8	10	12

For SI: 1 Inch = 25.4mm, 1 Foot = 304.8mm

C104.4.2 U-bent strap method. Retrofit studs shall be connected to horizontal braces in accordance with Figure C104.2(3) or Figure C104.2(4), shall be limited to Retrofit Configurations A and B (Table C104.2), and shall comply with the following conditions.

1. Straps shall be of sufficient length to meet the requirements for the number of fasteners in accordance with Table C104.4.2 and to meet the end distance requirements of Section C103.6.3 shall be shaped around retrofit studs and fastened to the edges of horizontal braces. Straps shall wrap the back edge of the retrofit stud snuggly with a maximum gap of ¼ inches. Rounded bends of straps shall be allowed. One fastener shall be installed that connects each strap to the side of the associated retrofit stud.
2. The horizontal brace shall butt snugly against the retrofit stud with a maximum gap of ¼ inches.
3. Straps shall be allowed to be twisted to accommodate the transition between the tops of retrofit studs and horizontal braces that follow the roof pitch.

TABLE C104.4.2
ELEMENT SIZING AND SPACING FOR U-BENT RETROFIT METHOD

	Retrofit Config.	Retrofit Config.	Retrofit Config.	Retrofit Config.
Retrofit Elements	A	B	C	D
Minimum size and number of Horizontal Braces	2x4	2x4	2x4	2 each 2x4
Minimum size and number of Retrofit Studs	2x4	2x6	2x8	2 each 2x8
Minimum number of fasteners connecting Straps To each edge of Horizontal Braces #8 screws or 10d nails 1-1/4" long	6	7	7	6 on side of each strap

For SI: 1 Inch = 25.4mm, 1 Foot = 304.8mm

C104.5 Connection of gable end wall to wall below. The bottom chords or bottom members of wood framed gable end walls shall be attached to the wall below using one of the methods prescribed in Sections C104.5.1 or C104.5.2. The particular method chosen shall correspond to the framing system and type of wall construction encountered.

C104.5.1 Truss gable end wall. The bottom chords of the gable end wall in a truss gable shall be attached to the wall below using right angle brackets. A minimum of two fasteners shall be installed into the bottom chord. The right angle brackets shall be installed throughout the portion of the gable end where the gable end wall height is greater than 3 feet at the spacing specified in Table C104.5.1. Connection to the wall below shall be by one of the methods listed below:

1, For a wood frame wall below, a minimum of two fasteners shall be installed. The fasteners shall be of the same diameter and style specified by the bracket manufacturer and sufficient length to extend through the double top plate of the wall below.
2. For a concrete or masonry wall below without a sill plate, the type and number of fasteners into the wall shall be consistent with the bracket manufacturer's specifications for fasteners installed in concrete or masonry.
3. For a concrete or masonry wall below with a 2x sill plate, the fasteners into the wall below shall be of the diameter and style specified by the bracket manufacturer for concrete or masonry connections; but, long enough to pass through the wood sill plate and provide the required embedment into the concrete or masonry below. Alternatively, the bracket can be anchored to the sill plate using 4 each 1-1/2 inch long fasteners of the same type as specified by the bracket manufacturer for wood connections, provided that the sill plate is anchored to the wall on each side of the bracket by a 1/4-inch diameter masonry screw with a 2-3/4 inches of embedment into the concrete or masonry wall. A ¼ inch washer shall be placed under the heads of the masonry screws.

TABLE C104.5.1
SPACING OF RIGHT ANGLE BRACKETS

Exposure Category	Maximum 3-Sec. Gust Wind Speed – V Mph	Spacing of Right Angle Brackets [a.]
C	110	38-inches
C	120	32-inches
C	130	28-inches
C	140	24-inches
C	150	20-inches
B	110	48-inches
B	120	40-inches
B	130	36-inches
B	140	30-inches
B	150	26-inches

a. See Section C102 for definition of right angle bracket.

C104.5.2 Conventionally framed gable end wall. Each stud in a conventionally framed gable end wall, throughout the length of the gable end wall where the wall height is greater than 3 feet, shall be attached to the bottom or sill plate using a stud to plate connector with minimum uplift capacity of 175 pounds. The bottom or sill plate shall then be connected to the wall below using one of the methods listed below:

1. For a wood frame wall below, the sill or bottom plate shall be connected to the top plate of the wall below using ¼ inch diameter lag bolt fasteners of sufficient length to penetrate the bottom plate of the upper gable end wall and extend through the bottom top plate of the wall below. A washer sized for the diameter of the lag bolt shall be placed under the head of each lag bolt. The fasteners shall be installed at the spacing indicated in Table C104.5.2.
2. For a concrete or masonry wall below, the sill or bottom plate shall be connected to the concrete or masonry wall below using ¼ inch diameter concrete or masonry screws of sufficient length to provide 2-3/4 inches of embedment into the top of the concrete or masonry wall. A washer sized for the diameter of the lag bolt shall be placed under the head of each lag bolt. The fasteners shall be installed at the spacing indicated in Table C104.5.2.

TABLE C104.5.2
SPACING OF LAG OR MASONRY SCREWS USED TO
CONNECT SILL PLATE OF GABLE END WALL TO TOP OF THE WALL BELOW

Exposure Category	Maximum 3-Sec. Gust Wind Speed - V mph	Spacing of Lag Screws or Masonry Screws
C	110	19-inches
C	120	16-inches
C	130	14-inches
C	140	14-inches
C	150	10-inches
B	110	24-inches
B	120	20-inches
B	130	18-inches
B	140	15-inches
B	150	13-inches

Reason: This proposal, along with a similar proposal, is requesting the creation of a new set of Appendix chapters that are intended to provide guidance for retrofitting existing structures to strengthen their resistance to wind forces. These new proposed chapters are similar in scope to Appendix A which addresses seismic retrofits for existing buildings. We anticipate that, over time, additional retrofit methods will be provided in this Appendix chapter. These retrofits are voluntary, and as such may or may not meet the requirements of new construction. However, these voluntary measures will serve to better protect the public and reduce damage from high wind events.

The purpose of the proposed addition is to provide prescriptive means for retrofitting gable ends to resist high winds. This code addition will facilitate the retrofitting of gable ends without requiring site specific engineering for common applications, thus removing some of the obstacles that might impede this important retrofit in hurricane prone regions.

Reason for adding provisions for retrofitting gable ends

Gable end failures are one of the most common types of structural failures observed in hurricanes. They have been documented in most major hurricanes and in many weaker hurricanes.

The proposed code addition is intended to be a prescriptive approach to reduce retrofitting costs, facilitate retrofitting, minimize the need for engineering, and facilitate code review and inspection. The addition will provide standardized off the shelf methods that can be readily approved and easily inspected by building department personnel. Building departments can thus become creditable third party resources for authenticating retrofitting just as they do for other structural issues of buildings.

It should be recognized that almost no attempt to retrofit will actually weaken or compromise a building or subject surrounding buildings to risk, on the contrary all will benefit. The retrofitting is voluntary.

Reason for adding retrofit measures to the code

Because most America's buildings located in hurricane prone regions were not built to today's building codes standards, there is significant value added to the code if the retrofitting of buildings could be facilitated by the provision of prescriptive means. This would inherently reduce the cost of retrofitting. The need for structural retrofitting has been highlighted in the recent spate of hurricanes and the insurance crises that has developed in the coastal high wind areas of a number of states because of older buildings that do not meet current building code structural requirements. Clearly, it is in the public's health, welfare, and safety to facilitate retrofitting. Given the importance of retrofitting to the public, retrofitting of buildings should be encouraged and facilitated by removing as many impediments as possible. The code can actually facilitate and encourage retrofitting by providing prescriptive means. Such methods should encourage, facilitate, and reduce the cost of improving America's building stock.

Reason for location in code

The preferred approach is to add an appendix chapter that deals specifically with retrofitting of a voluntary nature. The advantage of this approach is that it easily allows for additional retrofit measures to be added without confusing code users by gable end retrofit being in the repair section and then changing its location to a separate chapter in a subsequent edition when more retrofit measures are added. Further by grouping retrofit measures into a separate chapter users will find them and perhaps even use the chapter as a catalog of potential retrofit measures. Additionally, grouping voluntary measures into a separate chapter, a chapter separate from mandatory measures, will make code administration less prone to confusion.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: STAFFORD-EB2-APP C-2.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal introduces guidelines for gable retrofits as an appendix. While no IEBC provision will send you to this appendix, jurisdictions will have it available to make that decision. This chapter addresses a recognized hazard and it has been utilized for a number of years in Florida's hurricane regions.

Assembly Action: **None**

Individual Consideration Agenda

These items are on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gary Ehrlich, representing the National Association of Home Builders, requests Approval as Modified.

Modify the proposal as follows:

C101.1 Intent and purpose. The provisions of this chapter provide prescriptive methods for selected structural retrofitting of existing buildings~~. Compliance with these provisions will not always meet the requirements for new construction in the *International Building Code* or the *International Residential Code*. The provisions of this chapter are intended to provide methods for strengthening existing buildings~~ to increase the building's resistance to wind loads. Except as provided herein, other structural provisions of the *International Building Code* or the *International Residential Code* shall apply, as required.

C101.2 Scope. The following prescriptive methods are intended for applications where the gable end wall framing is provided by a metal plate connected gable end ~~wall truss~~frame or a conventionally framed gable end~~rafter system~~. The retrofits are appropriate for wall studs or webs spaced 24 inches on center maximum and oriented with the wide face either parallel ~~to~~ or perpendicular to the surface of the gable end~~ surface~~. Gable ends to be strengthened shall be permitted to be retrofitted using methods prescribed by this chapter.

RETROFIT STUD. A lumber member used to structurally supplement an existing gable end wall stud or gable end frame web.

~~**RIGHT ANGLE BRACKET.** A galvanized metal right angle bracket listed by the manufacturer for the material into which they will be attached, masonry (concrete or CMU) or wood.~~

~~TRUSS~~ GABLE END FRAME. A~~n engineered~~ factory ~~made truss~~ or site-fabricated frame, installed as a complete assembly,~~ built truss~~ that incorporates~~ factory installed or field installed~~ vertical webs~~ studs~~ with their faces parallel to the plane of the frame.~~ truss~~

C103.3. Material specifications for retrofits. Materials for retrofitting gable end walls shall comply with Table C103.3.~~Sections C103.3.1 through C103.6~~

TABLE C103.3
MATERIAL SPECIFICATIONS FOR RETROFITS[a]

Component	Minimum Size or Thickness	Minimum Material Grade	Minimum Capacity
Anchor blocks, compression blocks, and horizontal braces	2x4 nominal lumber	#2 Spruce-Pine-Fir or better	N/A
Nail plates	20 gauge thickness 8d minimum nail holes	Galvanized sheet steel	N/A
Retrofit studs	2x4 nominal lumber	#2 Spruce-Pine-Fir or better	N/A
Gusset angle	14 gage thickness	Galvanized sheet steel	350 pounds uplift and lateral load
Stud-to-plate connector	20 gage thickness	Galvanized sheet steel	500 pounds uplift
Metal plate connectors, straps, and anchors	20 gage thickness	Galvanized sheet steel	

N/A = Not applicable

a. Metal plate connectors, nail plates, stud-to-plate connectors, straps and anchors shall be products *approved* for connecting wood-to-wood or wood-to-concrete as appropriate.

~~**C103.3.1 Anchor blocks, compression blocks, and horizontal braces.** Anchor blocks, compression blocks, and horizontal braces shall be lumber nominally 2 inch by at least 4 inch wide.~~

~~**C103.3.2 Nail plate**. Nail plates shall be of minimum 20 gauge thickness.~~

~~**C103.3.3 Retrofit stud.** Retrofit studs shall be made of nominal 2-inch lumber.~~

~~**C103.3.4 Right angle bracket**. Right angle brackets shall have a minimum capacity of 350 for uplift and lateral load conditions.~~

~~**C103.3.5 Stud-to-plate connector**. Stud-to-plate connectors shall have a minimum capacity of 500 pounds for uplift.~~

~~**C103.3.6 Truss gable end.** Gable end trusses shall be spaced no greater than 24-iches on center.~~

~~**C103.4 Metal plate connectors, straps and anchors.** Metal plate connectors, plates, straps and anchors shall be a product approved for connecting wood-to-wood or wood-to-concrete as appropriate. Straps and nail plates shall be manufactured from galvanized steel with a minimum thickness of 20 gauge. Nail plates shall have holes sized for a minimum of 8d nails.~~

C103.6 Fasteners. Fasteners shall meet the requirements of Table C103.6, Section~~s~~ C103.6.1 and Section C103.6.2, and shall be permitted to be screws or nails meeting the minimum length requirement shown in the figures and specified in the tables of this Appendix. Fastener spacing shall meet the requirements of Section C103.6.3.

TABLE C103.6
NAIL AND SCREW REQUIREMENTS

Fastener Type	Minimum Shank Diameter	Minimum Head Diameter	Minimum Fastener Length
#8 screws		0.28 inches	1-1/4 inches
8d common nails	0.131 inches	0.28 inches	2-1/2 inches
10d common nails	0.148 inches	0.28 inches	3 inches

C103.6.1 Screws. ~~Screws shall be a minimum #8 size with head diameters no less than 0.28 inches.~~ Unless otherwise indicated in this Appendix, s~~S~~crew sizes and lengths shall be~~ no less than indicated~~ in accordance with ~~the Figures and in~~ Table~~s~~ C103.6. Permissible screws include deck screws and wood screws. Screws shall have at least 1 inch of thread. Fine threaded screws or drywall screws shall not be permitted. Screws shall be chosen with the appropriate diameter such that the shank adjacent to the head fits through the hole in the strap.

C103.6.2 Nails. Unless otherwise indicated in this Appendix, nail sizes and lengths shall be in accordance with Table C103.6.~~the provisions or drawings, where fastener lengths are indicated in Figures and Tables. as 1-¼ inches, 8d common nails with shank diameter 0.131 inches and head diameters no less than 0.28 inches shall be permitted. Unless otherwise indicated in the provisions or drawings, where fasteners lengths are indicated in Figures and Tables. as 3 inches, 10d common nails with shank diameter of 0.148 inches and head diameters no less than 0.28 inches shall be permitted.~~

C104.2 Horizontal braces. Horizontal braces shall be installed~~ approximately~~ perpendicular to the roof and ceiling framing members at the location of each existing gable end stud greater than 3 feet in length. Unless it is adjacent to an omitted horizontal brace location, horizontal braces shall be minimum 2x4 dimensional lumber as defined in Section C103.3. A single horizontal brace is required at the top and bottom of each gable end stud for Retrofit Configuration A, B, or C. Two~~ and two~~ horizontal braces are required at the top and bottom of each gable end stud for Retrofit Configuration D. Maximum heights of gable end wall studs and associated retrofit studs for each Retrofit Configuration shall not exceed the values listed in Table C104.2. Horizontal braces shall be oriented with their broad faces across the roof or ceiling framing members, be fastened to a minimum of three framing members, and extend at least 6 feet measured perpendicularly from the gable end plus 2-1/2 inches beyond the last top chord or bottom chord member (rafter or ceiling joist) from the gable end as shown in Figure C104.2(1), Figure C104.2(2), Figure C104.2(3), and Figure C104.2(4).

C104.2.1 Existing gable end studs. If the spacing of existing vertical gable end studs~~ in conventionally framed or the truss gable ends~~ is greater than 24 inches, a new stud and corresponding horizontal braces shall be installed such that the maximum spacing between existing and added studs shall be no greater than 24 inches. Additional gable end wall studs shall not be required at locations where their length would be 3 feet or less. Each end of each required new stud shall be attached to the existing roof framing members (truss top chord or rafter and truss bottom chord or ceiling joist) using a minimum of two 3 inch toenail fasteners (#8 wood screws or 10d nails) and a metal connector with minimum uplift capacity of 175 pounds, or nail plates with a minimum of four 1-1/4 inch long fasteners (#8 wood screws or 8d nails).

C104.2.2 Main method of installation. Each horizontal brace shall be fastened to each existing roof or ceiling member that it crosses using three 3-inch long fasteners (#8 wood screws or 10d nails) as indicated in Figure C104.2(1) and Figure C104.2(3) for trusses and Figure C104.2(2) and Figure C104.2(4) for conventionally framed gable end walls. Alternative methods for providing horizontal bracing of the gable end studs as provided in Sections C104.2.3 through C104.2.9 shall be allowed~~ in lieu of this primary installation method~~.

C104.2.3 Omitted horizontal brace. Where~~ impediments, other permanently attached obstacles or~~ conditions exist that prevent installation in accordance with Section C104.2.2 horizontal braces shall be permitted to ~~may~~ be omitted for height limitations corresponding to Retrofit Configurations A and B as defined in Table C104.2 provided installation is as indicated in Figure C104.2.3 and provided all of the following conditions are met. This method is not allowed for Retrofit Configurations C or D.

1. *(No changes)*
2. Horizontal braces adjacent to the omitted horizontal brace shall be 2x6 lumber, shall butt against the existing studs, and shall be fastened to each existing roof or ceiling member~~ that it~~ crossed~~s~~ using three 3-inch long fasteners (#8 wood screws or 10d nails). For Retrofit Configuration B, four~~ 4~~ fasteners shall be required on at least one of the connections between the horizontal brace and the existing roof and ceiling framing members. Fasteners shall be spaced a minimum of ¾" from the edges of the horizontal braces and a minimum of 1-3/4" from adjacent fasteners.
3. Where the existing studs on each side of an omitted horizontal brace have their broad face perpendicular to the gable end wall, the retrofit studs at those locations and the retrofit stud at the omitted horizontal brace locations shall extend~~ be sized such that they protrude~~ a minimum of 3-1/2 inches beyond the interior edge of the existing studs for both Retrofit Configurations A and B. The edges of the three retrofit studs facing towards the interior of the attic shall be aligned such that they are the same distance from the gable end wall.
4. *(No changes)*
5. *(No changes)*
6. A strong~~-~~back made of minimum of 2x8 lumber shall be placed parallel to the gable end and shall be located on and span between horizontal braces on the two sides of the omitted horizontal brace and shall extend beyond each horizontal brace~~s~~ by a minimum of 2-1/2 inches. The strong back shall be butted to the three retrofit studs. The strong~~-~~back shall be attached to each of the horizontal braces on which it rests with five~~ 5~~ 3 inch long fasteners (#8 screws or 8d nails). The~~ Those~~ fasteners shall have~~ be spaced~~ a minimum~~ of~~ 3/4 inch ~~from any~~ edge distance~~ of lumber~~ and~~ shall be spaced~~ a minimum~~ of~~ 2-1/2 inch spacing between fasteners~~ from each other~~. Additional compression blocks shall not be required at locations where a strong-back butts against a retrofit stud.
7. *(No changes)*

8. *(No changes)*
9. *(No changes)*

C104.2.4 Omitted horizontal brace and retrofit stud. Where ~~impediments, other permanently attached obstacles or~~ conditions exist that prevent installation in accordance with Section C104.2.2 or Section C104.2.3 ~~by not permitting installation of horizontal braces~~, then retrofit studs and horizontal braces shall be permitted to be omitted from those locations by installation of ladder assemblies for Retrofit Configurations A and B as defined in Table C104.2 provided all of the following conditions are met**.** This method is not allowed for Retrofit Configurations C or D.

1. *(No changes)*
2. *(No changes)*
3. *(No changes)*
4. Horizontal braces adjacent to the omitted horizontal brace shall be 2x6 lumber and be fastened to each existing roof or ceiling member crossed using three 3-inch long fasteners (#8 wood screws or 10d nails) as indicated in Figure C104.2(1) and Figure C104.2(3) for gable end frames ~~trusses~~ and Figure C104.2(2) and Figure C104.2(4) for conventionally framed gable end walls. For Retrofit Configuration B, four ~~4~~ fasteners shall be required on at least one of the connections between the horizontal brace and the existing roof and ceiling framing members.
5. Ladder rungs ~~/~~shall be provided across the location of the omitted retrofit studs as indicated in Figure C104.2.4(1) for gable end frames~~trusses~~ and Figure C104.2.4(2) for conventionally framed gable end walls.
6. Ladder rungs shall be ~~made of at a~~ minimum 2x4 lumber oriented with their broad face horizontal and spaced a maximum of 16 ~~-~~inches on center vertically.
7. Where ladder rungs cross wall framing ~~structural~~ members ~~such as the existing stud at the omitted retrofit stud location or gable end vent framing~~ they shall be connected to the wall framing members ~~each other~~ with a metal connector with a minimum capacity of 175 pounds in the direction perpendicular to the gable end wall.
8. *(No changes)*

C104.2.5 Short horizontal brace. Where ~~impediments, other permanently attached obstacles or~~ conditions exist that prevent installation in accordance with Sections C104.2.2, C104.2.3, or C104.2.4 ~~by not permitting extension of horizontal braces across the existing framing members such that they can be fastened to a minimum of three framing members and extend at least 6-feet from the gable end wall plus 2-1/2 inches beyond the last roof or ceiling framing member~~, the horizontal braces shall be permitted to ~~may~~ be shortened provided installation is as indicated in Figure C104.2.5 and ~~provided that~~ all of the following conditions are met.

1. The horizontal brace shall be installed across a minimum of two framing spaces, extend a minimum of 4 ~~-~~feet from the gable end wall plus 2-1/2 inches beyond the farthest ~~last~~ roof or ceiling framing member from the gable end, and be fastened to each existing framing member with three 3-inch long fasteners (#8 wood screws or 10d nails),
2. *(No changes)*
3. *(No changes)*
4. *(No changes)*

C104.2.6 Installation of horizontal braces onto webs ~~or vertical members~~ of trusses. Where existing conditions preclude installation of horizontal braces on truss top or bottom chords they shall be permitted to be installed on truss webs ~~or vertical members of trusses~~ provided all of the following conditions are met.

1. Horizontal braces shall be installed as close to the top or bottom chords as practical without altering the truss or any of its components and not more than three times the depth of the truss member to which it would ordinarily be attached.
2. A racking block, comprised of an anchor block meeting the definition of anchor block of Section C102 or comprised of minimum 15/32 inch plywood or 7/16 inch OSB, shall be fastened to the horizontal brace in the second framing space from the gable end wall. The racking block shall extend towards the ~~diaphragm (~~roof or ceiling diaphragm ~~as appropriate)~~ so that the edge of the racking block closest to the diaphragm is within ½ the depth of the existing framing member from the diaphragm surface. The racking block ~~They~~ shall be attached to horizontal braces using six fasteners (#8 wood screws or 10d nails) of sufficient length to provide 1-1/2 inches of penetration into the horizontal brace.
3. Racking blocks shall be permitted to ~~can~~ be fastened to any face or edge of horizontal braces between each web or truss vertical posts to which a horizontal brace is attached. Racking blocks shall be permitted to ~~can~~ be on alternate sides of horizontal braces. Racking blocks shall be installed tightly between the lumber of truss members or truss plates such that the gap at either end shall be a maximum of 1/8 inch.

C104.2.7 Alternative method of installation of horizontal braces at truss ridges. Where conditions exist that ~~impediments such as truss plates or access for installation of fasteners~~ limit~~s~~ or restrict~~s~~ installation of horizontal braces near the peak of the roof, ridge ties shall ~~may~~ be added to provide support for the required horizontal brace. The top of added ridge tie members shall be installed a maximum of 12 inches~~16 inches~~ below the existing ridge line or 4 inches below impediments. ~~The added ridge tie members shall be installed across a minimum of three bays, but no less than 6-feet from the gable end wall plus 2-1/2 inches beyond the last roof or ceiling framing member to permit fastening of the horizontal brace.~~ A minimum ~~of a~~ 2x4 nominal member shall be used for each ridge tie and fastening shall consist of two 3-inch long wood screws, four 3 inch long 10d nails or two 3-1/2 inch long 16d nails driven through and clinched at each top chord or web member intersected by the ridge tie as illustrated in Figure C104.2.7.

C104.2.8 Interrupted horizontal braces. Where ~~impediments, other permanently attached obstacles or~~ conditions exist that prevent ~~installation of horizontal braces in accordance with Section C104.2.2 by preventing~~ the installation of a ~~single~~ continuous horizontal brace~~s~~ the~~n~~ horizontal brace~~s~~ shall be permitted to be interrupted using the methods shown in Figure C104.2.8(1), Figure C104.2.8(2), and Figure C104.2.8(3). For interruptions that occur in the attic framing space closest to the gable end, nine 3 inch fasteners shall be used to connect each section of the interrupted horizontal braces. For interruptions that occur in the second attic space from the gable end, six 3 inch fasteners shall be used to connect each section of the interrupted horizontal braces. For interruptions that occur in the attic framing space farthest from the gable end, three 3 inch fasteners shall be used to connect each section of the interrupted horizontal braces. Horizontal braces shall be continued far enough to allow connections to three existing roof framing members as shown in Figure C104.2.8(1), Figure C104.2.8(2), or Figure C104.2.8(3). Fasteners shall be spaced in accordance with Section C103.6.3. ~~Lumber members used to form~~ H~~h~~orizontal braces shall be the same width and depth as required for an uninterrupted member.

C104.2.9 Piggyback ~~trusses~~Gable End Frames. Piggyback ~~trusses~~ gable end frames (~~trusses~~ gable end frames ~~composed~~ built in ~~of~~ two ~~members~~ sections one above the other) shall be permitted to be retrofitted if either of the following cases is true.

1. The existing studs in both the upper ~~truss~~ gable end frame and the lower gable end frame~~truss~~ to which wall sheathing, panel siding, or other wall covering~~facade~~ are attached are sufficiently in line that retrofit studs can be installed and connections made between the two with retrofit stud(s).
2. The ~~same as condition 1 except the~~ existing studs in the upper ~~truss~~ frame are not sufficiently in line with the studs in the frame~~ones~~ below and the existing studs in the upper frame ~~truss~~ are 3 feet or shorter.

For C~~c~~ondition 1 both the lower stud and the upper stud shall be retrofitted using the methods of Section C104.2. For C~~c~~ondition 2 ~~two~~ the retrofit stud shall be connected to the lower studs using the methods of Section C104.2 and be continuous from the bottom horizontal brace to the top horizontal brace. No connection is required between the retrofit stud and the upper stud. In both conditions the bottom chord of the piggyback truss section shall be fastened to each retrofit stud using a connector with minimum axial capacity of 175 pounds.

C104.3 Retrofit studs. Retrofit studs shall be installed in accordance with Section C104.3.1 ~~and~~ using one of the five methods of Sections C104.3.2, through C104.3.6 and as shown in Figure C104.3. For the Retrofit Configuration obtained ~~derived~~ from Table C104.2 the size of retrofit studs shall be as indicated in Table C104.4.1 or Table C104.4.2. Retrofit studs shall extend from the top of the lower horizontal brace to the bottom of the upper horizontal brace except that a maximum gap of 1/8 inch is allowed at the bottom and ½ inch at the top. Where wall sheathing, panel siding, or other wall façade is fastened to a conventionally framed gable end ~~studs not manufactured into a truss, i.e. are field installed~~, retrofit studs shall be applied ~~to those field installed studs~~ in accordance with Section C104.2.1.

FIGURE C104~~.2~~.3
METHOD OF INSTALLING RETROFIT STUDS

C104.3.2 Method #1: Face to edge or face to face method. Retrofit studs shall be installed immediately adjacent to existing ~~(Section C104.2)~~ gable end wall studs as indicated in Figure C104.3(a). The retrofit studs shall overlap the edge or side of the existing stud by a minimum of 1-1/4 inches. Fasteners shall be installed as specified in Section C104.3.1.

C104.3.4 Method #3: Butted retrofit stud method. Provided that all of the following fastening conditions are met retrofit studs shall be permitted to be butted by their edge ~~or face~~ to existing studs with the addition of nail plates as indicated in Figure C104.3(c) and Figure C104.3.4.

1. The narrow~~1-1/2 inch~~ edge of retrofit studs shall be installed against the narrow~~1-1/2 inch~~ or the wide~~broad~~ face of existing studs.
2. A minimum of two nail plates shall be used.
3. Fasteners used to secure nail plates to studs shall be a minimum 1-1/4 inch long (#8 wood screws or 8d nails).
4. Fasteners placed in nail plates shall have ~~be~~ a minimum end distance of 2-1/2 inches for both studs and ~~along the length of lumber. A fastener shall be placed in nail plates~~ a maximum end distance of 6 inches from the ends of the shorter stud.
5. Fasteners shall have ~~be placed~~ a minimum ~~of a~~ ½ inch edge distance ~~from the edges of the studs~~. Fasteners shall be placed a maximum of 1-1/2 inches from the abutting vertical edges of existing studs and retrofit studs.
6. There shall be at least 3 fasteners through nail plates into all existing and retrofit studs to which the nail plate ~~it~~ is attached.
7. Nail plates with ~~Where there are~~ 3 fasteners ~~through nail plates~~ onto a single existing or retrofit stud ~~then nail plates~~ shall be spaced a maximum of 15 inches on center.
8. Nail plates with ~~Where there are~~ more than 3 fasteners ~~though nail plates~~ onto a single existing or retrofit stud ~~then nail plates~~ shall be spaced a maximum of 20 inches on center.
9. ~~In line~~ F~~f~~asteners used to secure nail plates shall be spaced vertically a minimum of 1-1/2 inches on center. Staggered fasteners used to secure nail plates shall be spaced horizontally a minimum of ½ inches.

C104.3.5 Method #4: Offset retrofit stud method. ~~Where retrofit studs are placed as indicated in Figure C104.3(d)~~ R~~r~~etrofit studs shall be permitted to be offset from existing studs by use of nail plates as shown in Figure C104.3(d) such that the vertical corner of a retrofit stud shall align with ~~be placed at~~ the vertical corner of an existing stud as indicated in Figure C104.3(d) and Figure C104.3.4, and ~~provided~~ the fastening conditions of Section C104.3.4 shall be ~~are~~ met.

C104.4 Connection between horizontal braces and retrofit studs. Connections between horizontal braces and retrofit studs shall comply with Section C104.4.1 or Section C104.4.2. Each retrofit stud shall be connected to the top and bottom horizontal brace members with a minimum ~~of a~~ 20 gauge 1-1/4 inch wide flat or coil metal strap with pre-punched holes for fasteners. Straps shall be fastened with 1-1/4 inch long fasteners (#8 wood screws or 8d nails) with the number of fasteners as indicated in ~~on~~ Table C104.4.1 and Table C104.4.2. Fasteners shall be no closer to the end of lumber than 2-1/2 inches.

C104.5.1 ~~Truss gable end~~Gable end frame ~~wall~~. The bottom chords of the gable end frame~~wall in a truss gable~~ shall be attached to the wall below using gusset ~~right~~ angles ~~brackets~~. A minimum of two fasteners shall be installed into the bottom chord. The gusset ~~right~~ angles ~~brackets~~ shall be installed throughout the portion of the gable end where the gable end wall height is greater than 3 feet at the spacing specified in Table C104.5.1. Connection to the wall below shall be by one of the methods listed below:

1, For a wood frame wall below, a minimum of two fasteners shall be installed. The fasteners shall be of the same diameter and style specified by the gusset angle ~~bracket~~ manufacturer and sufficient length to extend through the double top plate of the wall below.

2. For a concrete or masonry wall below without a sill plate, the type and number of fasteners into the wall shall be consistent with the gusset angle ~~bracket~~ manufacturer's specifications for fasteners installed in concrete or masonry.
3. For a concrete or masonry wall below with a 2x sill plate, the fasteners into the wall below shall be of the diameter and style specified by the gusset angle ~~bracket~~ manufacturer for concrete or masonry connections; but, long enough to pass through the wood sill plate and provide the required embedment into the concrete or masonry below. Alternatively, the gusset angle ~~bracket~~ can be anchored to the sill plate using 4 each 1-1/2 inch long fasteners of the same type as specified by the gusset angle ~~bracket~~ manufacturer for wood connections, provided that the sill plate is anchored to the wall on each side of the gusset angle ~~bracket~~ by a 1/4-inch diameter masonry screw with a 2-3/4 inches of embedment into the concrete or masonry wall. A ¼ inch washer shall be placed under the heads of the masonry screws.

(Portions of the proposal not shown remain unchanged)

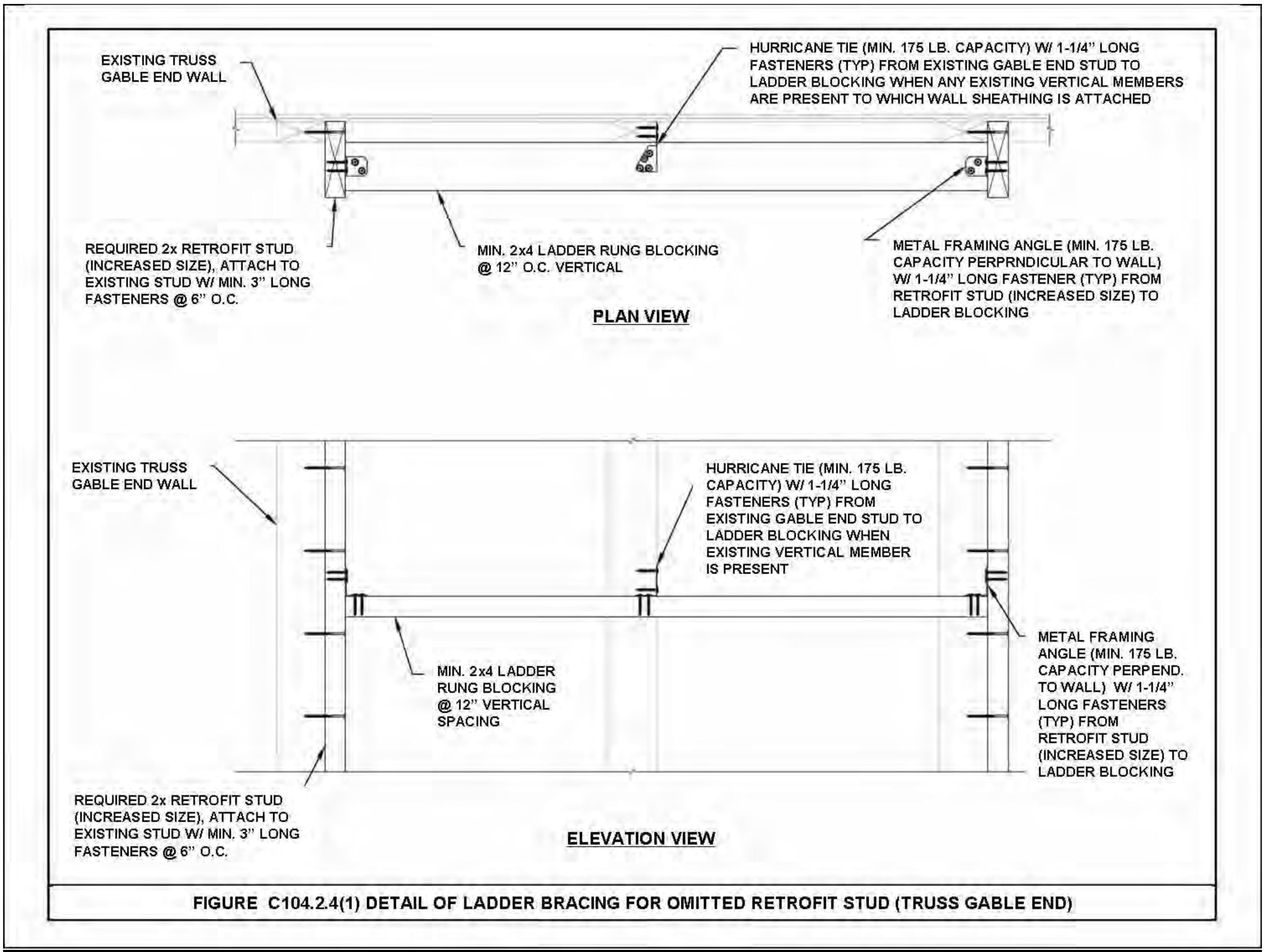
Commenter's Reason: The purpose of this public comment is to clarify the provisions for gable end retrofits. The original language is frequently repetitive, unclear or contains provisions more appropriate for a commentary than in code text. The proposed revisions here clarify and simplify the gable end retrofit provisions, making them easier for builders and code officials to interpret and use.

Public Comment 2:

Name: Gary J. Ehrlich, PE, representing the National Association of Home Builders (NAHB), requests Approval as Modified:

Modify the proposal as follows:

1. Add Figures C104.2.4(1), C104.2.4(2), C104.2.5, and C104.3.8:



<u>**FIGURE C104.2.4(1)**</u>
<u>**LADDER BRACING FOR OMITTED RETROFIT STUD (GABLE END FRAME)**</u>

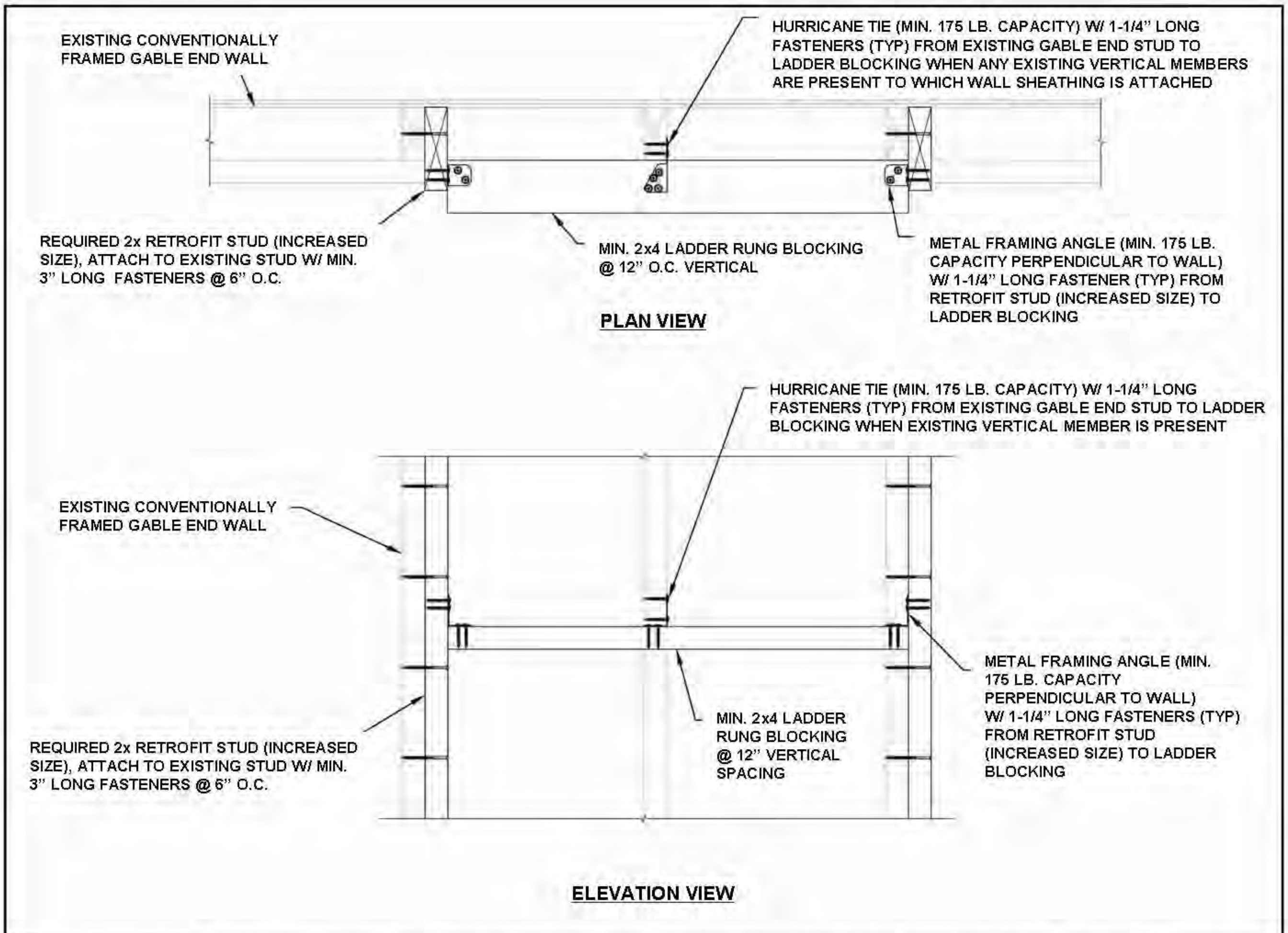
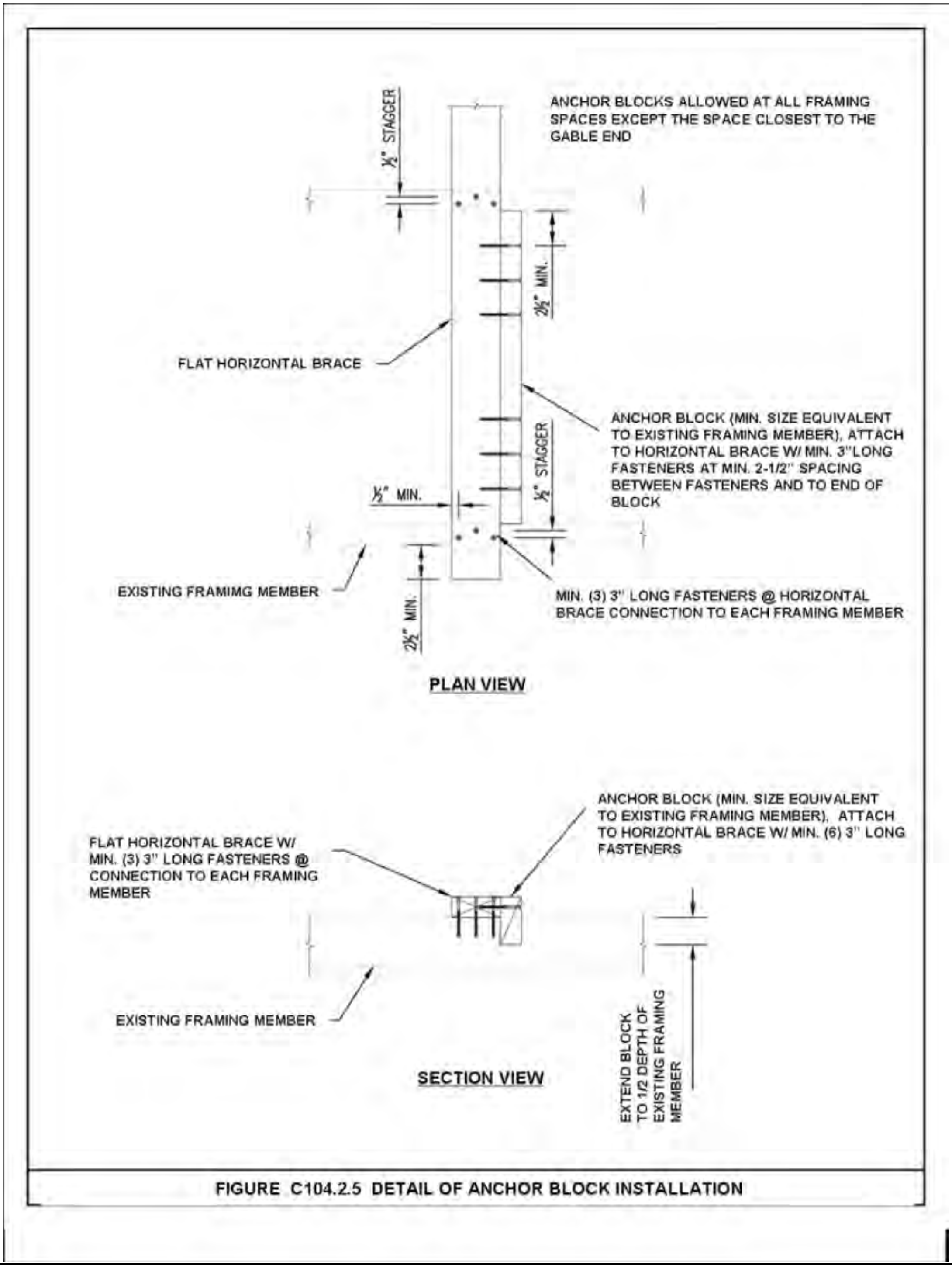


FIGURE C104.2.4(2) DETAIL OF LADDER BRACING FOR OMITTED RETROFIT STUD (CONVENTIONAL FRAMING)

FIGURE C104.2.4(2)
LADDER BRACING FOR OMITTED RETROFIT STUD (CONVENTIONALLY FRAMED GABLE END)



<u>FIGURE C104.2.5</u>
<u>ANCHOR BLOCK INSTALLATION</u>

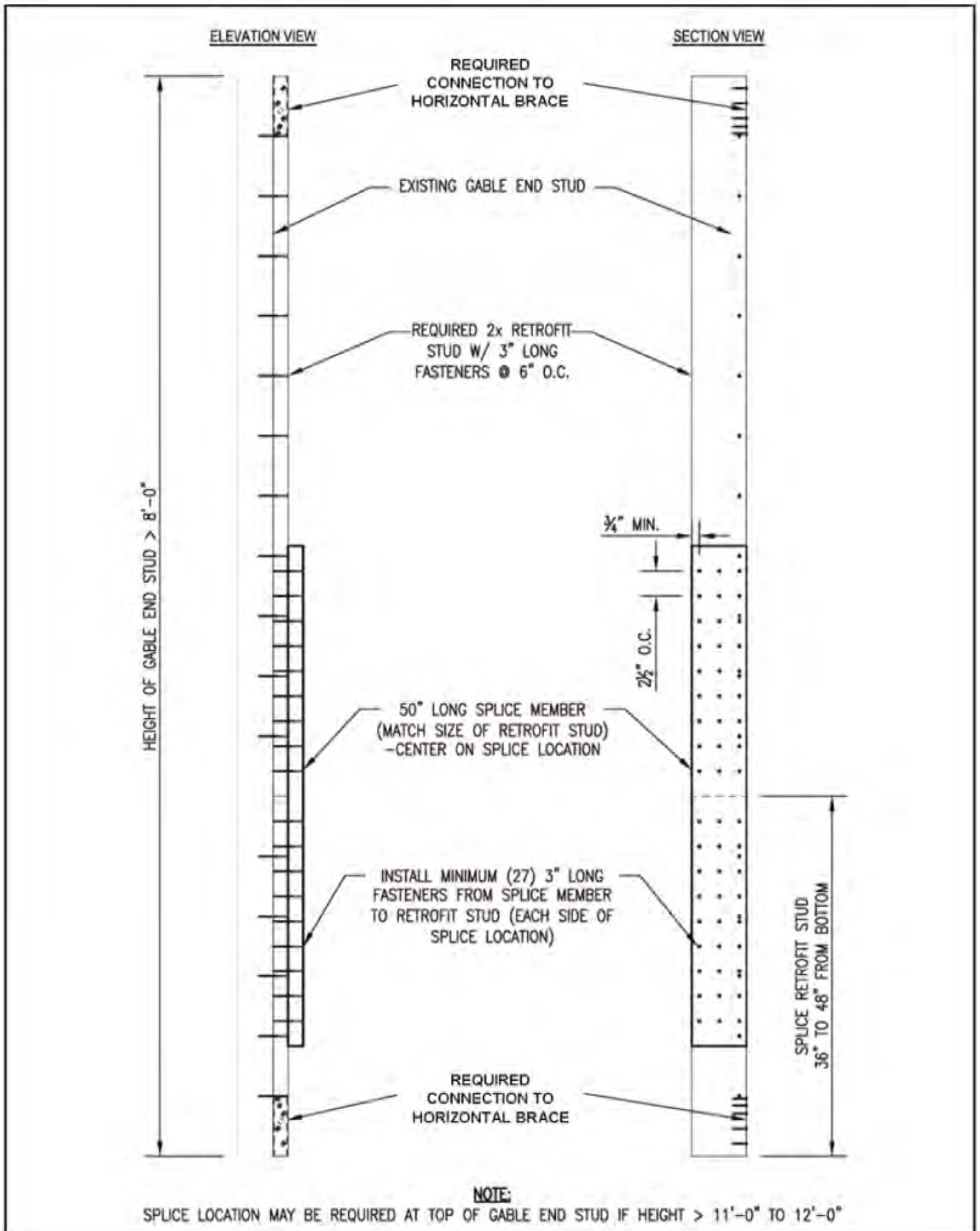


FIGURE C104.3.8 DETAIL OF RETROFIT STUD SPLICE

FIGURE C104.3.8
RETROFIT STUD SPLICES

2. Replace Tables C104.4.1, C104.4.2, and C104.5.1 with the following:

TABLE C104.4.1
ELEMENT SIZING AND SPACING FOR L-BENT RETROFIT METHOD

Retrofit Elements	Retrofit Configuration			
	A	B	C	D
Minimum size and number of Horizontal Braces	2x4	2x4	2x4	2 each 2x4
Minimum size and number of Retrofit Studs	2x4	2x6	2x8	2 each 2x8
Minimum number of fasteners connecting each end of straps to Retrofit Studs or to Horizontal Braces #8 screws or 10d nails 1-1/4" long	6	9	12	8 on each strap
Minimum number of fasteners to connect Compression Blocks to Horizontal Braces #8 screws or 10d nails 3" long	6	8	10	12

For SI: 1 Inch = 25.4mm, 1 Foot = 304.8mm

TABLE C104.4.2
ELEMENT SIZING AND SPACING FOR U-BENT RETROFIT METHOD

Retrofit Elements	Retrofit Configuration			
	A	B	C	D
Minimum size and number of Horizontal Braces	2x4	2x4	2x4	2 each 2x4
Minimum size and number of Retrofit Studs	2x4	2x6	2x8	2 each 2x8
Minimum number of fasteners connecting Straps to each edge of Horizontal Braces #8 screws or 10d nails 1-1/4" long	6	7	7	6 on each side of strap

For SI: 1 Inch = 25.4mm, 1 Foot = 304.8mm

TABLE C104.5.1
SPACING OF GUSSET ANGLES

Exposure Category	Basic Wind Speed (mph)	Spacing of Gusset Angles (inches)
C	110	38
C	120	32
C	130	28
C	140	24
C	150	20
B	110	48
B	120	40
B	130	36
B	140	30
B	150	26

(Portions of the proposal not shown remain unchanged)

Commenter's Reason: The purpose of this public comment is two-fold. First the comment adds four figures – Figures C104.2.4(1), C104.2.4(2), C104.2.5, and C104.3.8 -- which were mistakenly omitted from the original proposal. Second, the comment replaces three proposed Tables C104.4.1, C104.4.2, and C104.5.1 with version reformatted for improved clarity. No technical changes have been made to the reformatted Tables.

Public Comment 3:

Gary Ehrlich, representing the National Association of Home Builders, requests Approval as Modified.

Modify the proposal as follows:

C103.6.3.3 Metal connectors for wood to wood connections. Metal connectors for wood to wood connections shall meet the following conditions.

1. Fastener spacing to edge or ends of lumber shall be as dictated by the prefabricated holes in the connectors and the connectors shall be installed in accordance with the manufacturer.
2. Fasteners in 1-1/4 inch wide metal straps that are installed on the narrow~~1-1/2 inch broad~~ face of lumber shall be a minimum 1/4 inches from either edge of the lumber. Consistent with Section C103.6.3.1 fasteners shall be permitted~~allowed~~ to be spaced according to the fastener holes fabricated into the strap.
3. Fasteners in metal nail plates shall be spaced a minimum of ½ inches perpendicular to ~~across wood~~ grain and a minimum of 1-1/2 inches parallel to ~~wood~~ grain.

C104.3.4 Method #3: Butted retrofit stud method. Provided that all of the following fastening conditions are met retrofit studs shall be permitted to be butted by their edge or face to existing studs with the addition of nail plates as indicated in Figure C104.3(c) and Figure C104.3.4.

1. The narrow ~~1-1/2 inch~~ edge of retrofit studs shall be installed against the narrow ~~1-1/2 inch~~ or the wide ~~broad~~ face of existing studs.

Figure C103.6.3 revise the phrase in the third note from the top "Distance across grain minimum 1 inch" to "Distance perpendicular to grain minimum 1 inch"

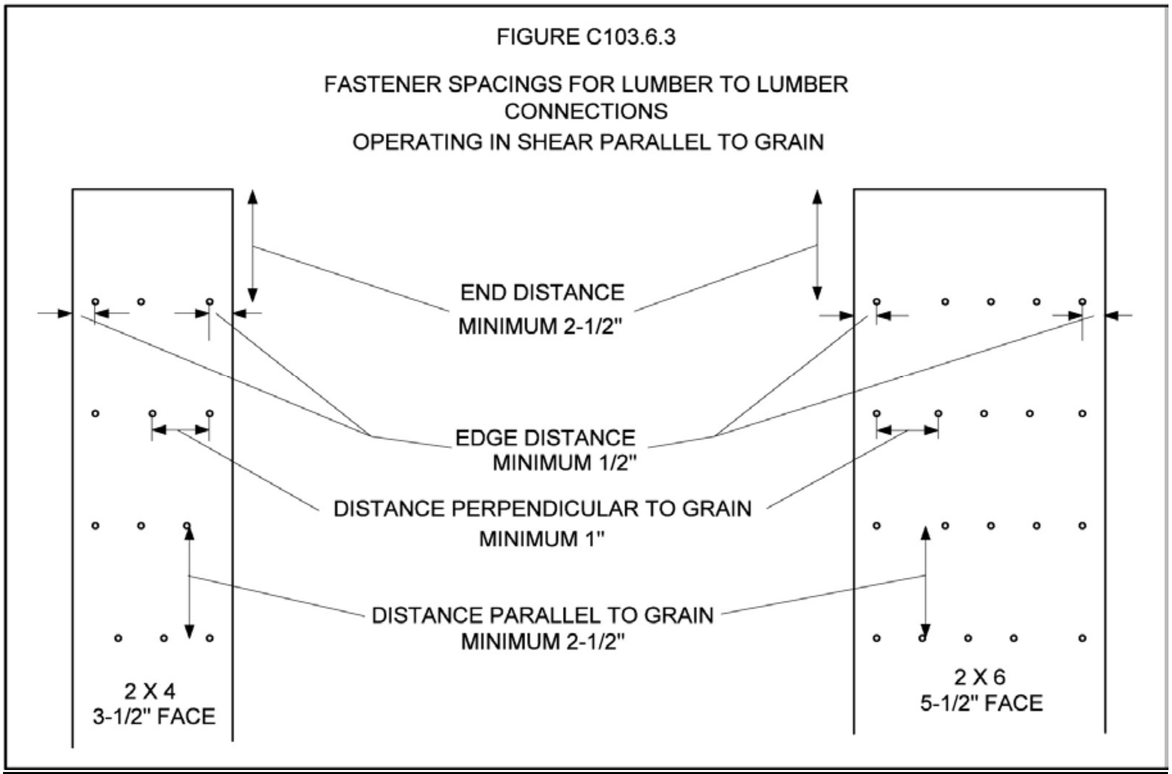


FIGURE C103.6.3
FASTENER SPACINGS FOR LUMBER TO LUMBER CONNECTIONS OPERATING IN SHEAR PARALLEL TO GRAIN

C104.1 General. These prescriptive methods of retrofitting are intended to increase the resistance of existing gable end construction for out-of-plane wind loads resulting from high wind events. The ceiling diaphragm shall be comprised of minimum ½ inch thick gypsum board~~drywall~~, minimum nominal 3/8 inch thick wood structural panels, or plaster. An overview isometric drawing of one kind of gable end retrofit to improve wind resistance is shown in Figure C104.1.1.

C104.2 Horizontal braces. Horizontal braces shall be installed approximately perpendicular to the roof and ceiling framing members at the location of each existing gable end stud greater than 3 feet in length. Unless it is adjacent to an omitted horizontal brace location, horizontal braces shall be minimum 2x4 dimensional lumber as defined in Section C103.3. A single horizontal brace is required at the top and bottom of each gable end stud for Retrofit Configuration A, B, or C and two horizontal braces are required for Retrofit Configuration D. Maximum heights of gable end wall studs and associated retrofit studs for each Retrofit Configuration shall not exceed the values listed in Table C104.2. Horizontal braces shall be oriented with their wide ~~broad~~ faces across the roof or ceiling framing members, be fastened to a minimum of three framing members, and extend at least 6 feet measured perpendicularly from the gable end plus 2-1/2 inches beyond the last top chord or bottom chord member (rafter or ceiling joist) from the gable end as shown in Figure C104.2(1), Figure C104.2(2), Figure C104.2(3), and Figure C104.2(4).

C104.2.2 Main method of installation. Each horizontal brace shall be fastened to each existing roof or ceiling member that it crosses using three 3-inch long fasteners (#8 wood screws or 10d nails) as indicated in Figure C104.2(1) and Figure C104.2(3) for trusses and Figure C104.2(2) and Figure C104.2(4) for conventionally framed gable end walls. Alternative methods for providing horizontal bracing of the gable end studs as provided in Sections C104.2.3 through C104.2.9 shall be permitted~~allowed~~ in lieu of this primary installation method.

C104.2.3 Omitted horizontal brace. Where impediments, other permanently attached obstacles or conditions exist that prevent installation in accordance with Section C104.2.2 horizontal braces may be omitted for height limitations corresponding to Retrofit Configurations A and B as defined in Table C104.2 provided installation is as indicated in Figure C104.2.3 and provided all of the following conditions are met. This method is not permitted~~allowed~~ for Retrofit Configurations C or D.

1. *(No changes)*
2. *(No changes)*
3. Where the existing studs on each side of an omitted horizontal brace have their wide~~broad~~ face perpendicular to the gable end wall, the retrofit studs at those locations and the retrofit stud at the omitted horizontal brace locations shall be sized such that they protrude a minimum of 3-1/2 inches beyond the interior edge of the existing studs for both Retrofit Configurations A and B. The edges of the three retrofit studs facing towards the interior of the attic shall be aligned such that they are the same distance from the gable end wall.
4. *(No changes)*
5. Retrofit studs adjacent to the omitted horizontal brace shall be fastened to the horizontal brace using straps in accordance with Table C104.4.1 consistent with the size of the retrofit stud. The method applicable to Table C104.4.2 is not permitted~~allowed~~.
6. *(No changes)*
7. *(No changes)*
8. The use of shortened horizontal braces using the alternative method of Section C104.2.5 is not permitted~~allowable~~ for horizontal braces adjacent to the omitted horizontal braces.
9. *(No changes)*

C104.2.4 Omitted horizontal brace and retrofit stud. Where impediments, other permanently attached obstacles or conditions exist that prevent installation in accordance with Section C104.2.2 or Section C104.2.3 by not permitting installation of horizontal braces, then retrofit studs and horizontal braces shall be permitted to be omitted from those locations by installation of ladder assemblies for Retrofit Configurations A and B as defined in Table C104.2 provided all of the following conditions are met**.** This method is not permitted~~allowed~~ for Retrofit Configurations C or D.

1. *(No changes)*
2. *(No changes)*
3. Where the existing studs on each side of an omitted horizontal brace have their wide~~broad~~ face parallel to the gable end wall the retrofit studs at those locations and the retrofit stud at the omitted horizontal brace locations shall be 2x6 lumber for Retrofit Configuration A and 2x8 lumber for Retrofit Configuration B.
4. *(No changes)*
5. *(No changes)*
6. Ladder rungs shall be made of at a minimum 2x4 lumber oriented with their wide~~broad~~ face horizontal and spaced a maximum of 16 **-** inches on center vertically.
7. *(No changes)*
8. *(No changes)*

C104.3 Retrofit studs. Retrofit studs shall be installed in accordance with Section C104.3.1 and using one of the five methods of Sections C104.3.2, through C104.3.6 and as shown in Figure C104.3. For the Retrofit Configuration derived from Table C104.2 the size of retrofit studs shall be as indicated in Table C104.4.1 or Table C104.4.2. Retrofit studs shall extend from the top of the lower horizontal brace to the bottom of the upper horizontal brace except that a maximum gap of 1/8 inch is permitted~~allowed~~ at the bottom and ½ inch at the top. Where wall sheathing, panel siding, or other wall covering~~façade~~ is fastened to a conventionally framed gable end studs not manufactured into a truss, i.e. are field installed, retrofit studs shall be applied to those field installed studs in accordance with Section C104.2.1.

C104.3.4 Method #3: Butted retrofit stud method. Provided that all of the following fastening conditions are met retrofit studs shall be permitted to be butted by their edge or face to existing studs with the addition of nail plates as indicated in Figure C104.3(c) and Figure C104.3.4.

1. The 1-1/2 inch edge of retrofit studs shall be installed against the 1-1/2 inch or the wide~~broad~~ face of existing studs.
2. *(No changes)*
3. *(No changes)*
4. *(No changes)*
5. *(No changes)*
6. *(No changes)*
7. *(No changes)*
8. *(No changes)*
9. *(No changes)*

C104.4.1 L-bent strap method. (No changes).

1. A strap shall be applied to the edges of a retrofit stud nearest the gable end wall and to the face of horizontal braces using at each end of the strap the number of fasteners specified in Table C104.4.1. Straps shall be long enough so that each strap extends sufficient distance onto the vertical face of the retrofit stud that the fastener closest to the ends of the studs is a minimum of 2-1/2 inches from the end of the stud. Straps shall be permitted~~allowed~~ to be twisted to accommodate the transition between the tops of retrofit studs and horizontal bracings following roof pitches.
2. Compression blocks shall be installed on the horizontal braces directly against either the existing vertical gable end wall stud or the retrofit stud. Figure C104.2(1) (trusses) and Figure C104.2(2) (conventionally framed) show the installation of the compression block against the existing vertical gable end wall stud with the strap from the retrofit stud running beside the compression block. Compression blocks shall be permitted~~allowed~~ to be placed over straps. Compression blocks shall be fastened to the horizontal braces with at least the minimum number of 3 inch long fasteners (#8 wood screws or 10d nails) specified in Table C104.4.1. End and edge distances for fasteners shall be in accordance with Section C103.6.3.

C104.4.2 U-bent strap method. *(No changes)*

1. Straps shall be of sufficient length to meet the requirements for the number of fasteners in accordance with Table C104.4.2 and to meet the end distance requirements of Section C103.6.3 shall be shaped around retrofit studs and fastened to the edges of horizontal braces. Straps shall wrap the back edge of the retrofit stud snuggly with a maximum gap of ¼ inches. Rounded bends of straps shall be permitted~~allowed~~. One fastener shall be installed that connects each strap to the side of the associated retrofit stud.
2. (No changes)
3. Straps shall be permitted~~allowed~~ to be twisted to accommodate the transition between the tops of retrofit studs and horizontal braces that follow the roof pitch.

(Portions of the proposal not shown remain unchanged)

Commenter's Reason: The purpose of this public comment is to make editorial revisions to the text of EB72 to replace certain words with the proper terms used in building codes and standards.

Public Comment 4:

David Bonowitz, SE, representing the National Council of Structural Engineers Associations, Code Advisory Committee, Existing Buildings Subcommittee (NCSEA EBS), requests Disapproval.

Commenter's Reason: NCSEA EBS recommends disapproval of this well-intentioned proposal for the following reasons:

The proposed Appendix would be inconsistent with the body of the IEBC and with other Appendix Chapters because the proposed Appendix does not state its performance objective. Thus, it is unclear whether compliance with Appendix C would satisfy upgrade requirements triggered by alterations, additions, change of occupancy, or repair. In fact, we believe that Appendix C would *not* satisfy all those triggered requirements, but its inclusion in the code, even as voluntary provisions, gives the wrong impression that it is equivalent. Indeed, the IBC Structural Committee's reason suggests that local jurisdictions might want to cite the proposed Appendix as equivalent or "deemed to comply".

As a matter of code development philosophy, including an appendix that is not cited anywhere by the body of the code is a questionable practice that will not serve code officials well and is likely to lead to confusion. Well-intentioned provisions for voluntary work such as those proposed by EB72 are useful to practitioners, but they are better published elsewhere – especially in a format that would allow ample commentary and guidance to contractors and owners.

The proposed Appendix, while intended for 1-2 family dwellings, provides no scope limitations as to building size or occupancy. As written, the proposed provisions could be used for very tall or wide gables as well as gables typical of a house. Further, they could be applied to schools or assisted living facilities without limitation or guidance appropriate to special occupancies.

By limiting the scope of retrofit work to be practical, the proposed provisions might not result in a complete retrofit solution. That might be acceptable if the proposed Appendix was clear about its limited intent, but no such explanations are provided. (Proposed section C101.1 is clear that Appendix C does not match the requirements for *new* construction, but that only confuses the matter, because it suggests incorrectly that Appendix C *does* or *might* match the typically reduced requirements of the IEBC.) An example of rational engineering provisions missing from proposed Appendix C is found in section C104.1, which requires only a plaster or ½-inch drywall ceiling acting as a structural diaphragm. In hurricane conditions, for which Appendix C is intended, these materials become wet and lose structural capacity. Further, Appendix C is not specific about the force levels or prescriptive details for the load path between this ceiling diaphragm and roof trusses or perimeter wall framing.

We understand the proposed provisions are based on calculations produced for typical 1-2 family dwelling conditions by a qualified engineering consultant. However, some of the limitations and assumptions of those calculations do not appear in the proposed provisions, and some additional details are given in the provisions that were not reviewed by the consultant.

Procedurally, the provisions are incomplete and need significant editing to match the terminology and standards of the IEBC. For examples, proposed sections C104.2.4, C104.2.5, and C104.3.8 refer to a total of four figures that do not exist.

Final Action: AS AM AMPC____ D

EB73-09/10
804.1.1

Proposed Change as Submitted

Errata: This code change was contained in the errata posted on the ICC website.

Proponent: Tom Lariviere, Chairman - Joint Fire Service Review Committee

Revise as follows:

804.1.1 High-rise buildings. ~~In high-rise~~ High-rise buildings~~, work areas~~ shall be provided with automatic sprinkler protection throughout. ~~where the building has a sufficient municipal water supply system to the site. Where the work area exceeds 50 percent of floor area, sprinklers shall be provided in the specified areas where sufficient municipal water supply for design and installation of a fire sprinkler system is available at the site.~~

Reason: IEBC Chapter 8 applies to Level 3 alterations, which by definition already exceed 50% of the floor area. The entire Chapter 8 applies to alterations where the proposed work exceeds 50% of total floor area of the building. Therefore, the reference to 50% in Section 804.1.1 is redundant, and this portion of the Section 804.1.1 is deleted.

The additional part of this proposal is to eliminate the allowance for high-rise buildings to escape from the sprinkler requirements when the available water is inadequate. There are few, if any, water systems that are capable of providing sprinklers in a high rise building without a fire pump. Most newly constructed buildings require a fire pump to overcome low residual pressure in the municipal water system and are not provided an exception based on a "sufficient municipal water supply". High-rise buildings covered in IEBC Chapter 8 should be treated in the same manner as new construction in the requirements for fire detection and automatic fire suppression, and therefore the exception allowing elimination of the sprinkler system is deleted.

The existing language "sufficient municipal water supply" is vague as to application of water volume and/or pressure and fire flow requirement. In a practical sense, the existing municipal water supply could have sufficient volume but not sufficient pressure needed to push the water to the upper stories of the high rise. The exception could allow exclusion of the automatic sprinkler system that would otherwise be required in the IBC or IFC and therefore this exception should be eliminated from the IEBC. Existing fire protection standards supply engineering solutions for the provision of water where the municipal supply is lacking or non-existent.

Cost Impact: This code change proposal will increase the cost of construction.

ICCFILENAME: LARIVIERE-EB2-804.1.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was felt to be too restrictive and would be a disincentive to upgrading existing buildings. In particular it was felt that the IEBC needs to provide an incremental approach to installing sprinklers in high rise buildings. Without the incremental approach the framework of the IEBC will be undermined. Concern was raised that existing tenants located in the building where other tenants are making alterations would then be required to install a sprinkler system.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joe Pierce, Dallas Fire Department and Joint Fire Service Review Chairman, representing the Joint Fire Service Review Committee, requests Approval as Submitted.

Commenter's Reason: This proposal was Disapproved at the Code Development Hearing because the Code Development Committee felt that the requirement was too restrictive. However, IEBC Section 804.1 only applies to Level 3 alterations, which by definition already exceed 50% of the floor area. In fact, the entire Chapter 8 applies to alterations where the proposed work exceeds 50% of total floor area of the building. So the wording in Section 804.1.1 of requiring fire sprinklers when the work area exceeds 50% is redundant at minimum.

But to the main point of the code change, this current wording allows for a high-rise which is required to install a fire sprinkler system based on this section to waive the requirements for the fire sprinkler system. It would be quite a surprise to find a municipal water system capable of supplying the required water. To understand this dilemma, you need to look at the mechanical requirements of the water system and the sprinkler system.

The fire sprinkler system must supply the required flow at the top floor. This means that the flow (let's estimate at 250 GPM) must be available at the roof (because that is where the sprinklers will be for the top floor). So we have 250 GPM that must be available at about 85 feet above the street, plus a fire hose flow of 100 GPM. To accomplish this, the municipal water supply must provide the 350 GPM at a pressure that can push the water to the roof and still provide enough pressure for the sprinkler to operate properly. To be classified as a "high-rise" the top floor must be at least 75 feet above grade, making the roof at about 85 feet. At 85 feet in height, the pressure required just to lift the water to that elevation is about 37 PSI. In addition to the 37 PSI we will also need the minimum sprinkler operating pressure of 7 PSI or more; plus the friction loss incurred through the piping bringing the water from the street to the building, up to the roof, and from the riser to the furthest sprinkler. This friction loss may be up to 15 PSI. We now have a total required pressure of 59 PSI, and this is a minimum.

Final Action: AS AM AMPC____ D

S3-09/10-PART I
1503.6

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company representing the Window and Door Manufacturers Association (WDMA)

PART I – IBC STRUCTURAL

Revise as follows:

1503.6 Crickets and saddles. A cricket or saddle shall be installed on the ridge side of any chimney or penetration greater than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

> **Exception:** Skylights installed and flashed in accordance with the manufacturer's instructions.

Reason: This code language, as written, precludes the use of engineered skylight systems that are designed to prevent water infiltration into the penetration without the use of a cricket. The proposed change addresses this unintended consequence of this language of the IBC and the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WOESTMAN-S4-1503.6

Public Hearing Results

PART I- IBC STRUCTURAL
Committee Action: **Disapproved**

Committee Reason: The proposed exception to Section 1503.6 would apply to all skylights as written. Specifying "unit" skylights may not be enough of a clarification to tie the exception to applicable Chapter 24 requirements. If not completely clear, an exception to allow the use of the manufacturers' instructions could open the door to misapplication.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jeff Inks, Windows and Door Manufacturer's Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1503.6 Crickets and saddles. A cricket or saddle shall be installed on the ridge side of any chimney or penetration greater than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

> **Exception:** Unit skylights installed in accordance with Section 2405.5 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.

Commenter's Reason: The Structural Committee was not opposed to the intent of the original proposal which is to fix the unintended consequence of the current IBC code text that precludes the use of engineered skylight systems that are designed to prevent water infiltration into the penetration without the use of a cricket or saddle. However, as stated in their reason statement, the Committee was concerned that the exception as proposed could result in a broader application of it than is intended.

That concern is addressed by the modification proposed by this comment which in addition to specifying that the exception only applies to unit skylights, they must also be installed in accordance with Section 2405.5. This language clearly indicates the applicability and limitations of the exception.

Part II of this proposal was identically modified in advance of it being heard by the IRC B&E Committee in Baltimore and was unanimously approved by them without any testimony in opposition to it.

Final Action: AS AM AMPC____ D

S3-09/10-PART II
IRC 903.2.2

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company representing the Window and Door Manufacturers Association (WDMA)

PART II – IRC BUILDING/ENERGY

Revise as follows:

R903.2.2 Crickets and saddles. A cricket or saddle shall be installed on the ridge side of any chimney or penetration more than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

> **Exception:** Skylights installed and flashed in accordance with the manufacturer's instructions.

Reason: This code language, as written, precludes the use of engineered skylight systems that are designed to prevent water infiltration into the penetration without the use of a cricket. The proposed change addresses this unintended consequence of this language of the IBC and the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WOESTMAN-S4-1503.6

Public Hearing Results

PART II- IRC B/E
Committee Action: **Approved as Modified**

Modify the proposal as follows:

R903.2.2 Crickets and saddles. A cricket or saddle shall be installed on the ridge side of any chimney or penetration more than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

> **Exception:** Unit skylights installed in accordance with Section R308.6 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.

Committee Reason: The exception is needed to address roof penetration that is engineered to prevent water infiltration without a cricket. The modification clarifies that the exception only applies to unit skylights.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mark S Graham, National Roofing Contractors Association (NRCA), requests Disapproval.

Commenter's Reason: The IBC portion (Part I) of the code change proposal was disapproved by the IBC Structural Committee. The IRC portion (Part II), which was heard after the IBC portion, was modified by the proponent and was Approved as Modified by the IRC B/E Committee. This Public Comment is seeking a Final Action of Disapproved to Part II so as to keep the requirements of the IBC and IRC consistent on this issue.

The modification offered by the proponents that was approved as modified by the IRC B/E Committee waives the Code's current requirement for crickets behind unit skylight penetrations wider than 30 inches where the skylight has been installed according to IRC Section R308.6. Review of

Section 308.6 reveals this section provides little specific installation guidance other than in R308.6.8, where it is indicated unit skylights installed on roofs of slope 3:12 or greater need to be mounted on 4 inch minimum height curbs, unless otherwise specified in the manufacturer's installation instructions. R308.6.9 indicates units skylights need to be tested and labeled according to AAMA/WDMA/CSA 101/I.S2/A440; this test method does not address the proper installation to or watertightness of the unit skylight interface to the roof covering.

The use of crickets behind vertical roof penetrations, such as unit skylights, of specific widths to direct run-off water away from the backside of the penetrations and proper flashing of vertical penetrations has long been recognized in the roofing industry as the most effective means making and maintaining these vertical penetrations in roof coverings watertight.

Final Action: AS AM AMPC____ D

S4-09/10

1504.3, Chapter 35

Proposed Change as Submitted

Proponent: Mike Ennis representing Single Ply Roofing Industry (SPRI, Inc.)

1. Revise as follows:

1504.3 Wind resistance of nonballasted roofs. Roof coverings installed on roofs in accordance with Section 1507 that are mechanically attached or adhered to the roof deck shall be designed to resist the design wind load pressures for components and cladding in accordance with Section 1609 <u>and shall be installed in accordance with ANSI/SPRI WD-1.</u>

2. Add standard to Chapter 35 as follows:

SPRI

<u>WD-1-08</u> <u>Wind Design Standard Practice for Roofing Assemblies</u>

Reason: The International Building Code provides specific requirements for calculating the wind uplift load pressure on the roof assembly. However it does not currently provide a prescriptive method to enhance the perimeter and corner attachment due to the higher wind loads in these regions. ANSI/SPRI WD-1 is a national consensus standard that has been reviewed by testing laboratories, membrane manufacturers, roofing system component suppliers, contractors and consultants. This standard provides prescriptive requirements for corner and perimeter enhancement. The user first identifies a suitable roof assembly that will resist the calculated wind uplift pressure for the field of the roof, then enhances the fastening pattern to meet the calculated corner and perimeter wind uplift load pressure. Designing the roof system to resist the higher wind loads at the perimeter and corner regions is accomplished by either adding additional fasteners or increasing the amount of adhesive used, depending upon the specific roof system chosen. This approach allows the user to work from one base assembly and enhance the attachment of the base assembly for perimeter and corner regions instead of trying to locate tested assemblies for each of these areas.

The ANSI/SPRI standard also requires that a 2.0 safety factor be applied to tested wind uplift values, unless another value is specified. So, for example, if a roof system passes a wind uplift test at 120 lbs/ft2, this value is divided by 2 before determining if the system will resist the calculated wind uplift pressure loads for the building. The IBC does not currently contain this requirement.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, SPRI WD-1-08, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: ENNIS-S1-1504.3

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at <u>http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf</u> :

Analysis: Review of proposed new standard SPRI WD-1 indicated that, in the opinion of ICC Staff, the standard complies with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: There was some question on the scope of reference to a "design" standard, SPRI WD-1, for the "installation" requirement as was proposed. Additional clarification should be provided on the derivation of the factor of safety that is employed in the standard. The proposed requirements would be more suitably located in Section 1504.3.1 rather than the charging section. The committee suggests that the proponent address these questions in the public comment phase in addition to including his proposed floor modification.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, Single Play Roofing Industry (SPRI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1504.3 Wind resistance of nonballasted roofs. Roof coverings installed on roofs in accordance with Section 1507 that are mechanically attached or adhered to the roof deck shall be designed to resist the design wind load pressures for components and cladding in accordance with Section 1609<u>.</u> ~~and~~ <u>Roof systems with built-up, modified bitumen, fully adhered or mechanically attached single ply membranes</u> shall be installed in accordance with ANSI/SPRI WD-1.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification is proposed to address questions raised at the code change hearings, specifically:

1) Questions about the scope of reference of the ANSI/SPRI WD-1 standard.

The scope of the ANSI/SPRI WD-1 standard limits its application to BUR, modified bitumen and single ply roof membrane systems. It was never the intent to extend its application to any other roofing system. Testimony at the code change hearings by members on the metal roofing industry correctly pointed out that in its original format metal roofing systems would be included as part of the code change proposal. The proposed modification limits the scope of the proposal to only those systems called out in the scope of the ANSI/SPRI standard.

2) Additional clarification should be provided on the derivation of the safety factor that is employed in the standard.

The standard recommends a safety factor of 2 that is applied to the tested wind uplift resistance value before comparison to the design pressures. The tested wind uplift resistance is divided by the safety factor. A safety factor of 2 has been commonly used in the roofing industry for many years and has proven through field experience to provide an acceptable level of safety between tested values and ultimate failure values observed in the field.

3) Determine if the proposed requirement would be more suitably located in Section 1504.3.1, rather than the charging section.

The appropriate location for this code change proposal is Section 1504.3 as submitted in the original code change proposal. This conclusion is based on a review of the scope of Sections 1504.3 and Section 1504.3.1

The charging section for the original code change proposal was Section 1504.3 **Wind resistance of nonballasted roofs.** This section describes how to calculate design wind load pressures for nonballasted roof systems and requires that the system be installed in a manner that will resist the design wind loads. Section 1504.3.1 **Other roof systems.** describes the test procedures that are to be used to evaluate the uplift resistance of various types of mechanically attached and fully adhered roof assemblies. ANSI/SPRI WD1 is a wind design standard practice that provides a two-part methodology for designing for wind uplift resistance of nonballasted Built-Up, Modified Bitumen, and Single-Ply roofing system assemblies installed over any type of roof deck. The first part allows the user to determine the rooftop wind uplift design pressures for the field, perimeter and corner areas of a building. In the second part the user selects an appropriate roofing system assembly by comparing the tested wind uplift resistance of that assembly to the wind uplift design pressures determined from the First Part. A safety factor is applied to the tested wind uplift resistance value before comparison to the design pressures. ANSI/SPRI WD1 is a design standard, not a wind uplift test standard and is therefore appropriately referenced in Section 1504.3. The use of the ANSI/SPRI WD1 standard allows the user to meet the intent of Section 1504.3 by calculating the design wind pressures and installing a roof system that will resist these design pressures.

Final Action: AS AM AMPC____ D

S6-09/10

1504.4, 1504.4.1 (New), 1504.4.2 (New), Table 1504.4 (New), 1504.8, Table 1504.8

Proposed Change as Submitted

Proponent: Thomas L Smith, AIA, RRC, TLSmith Consulting Inc. on behalf of the Roofing Industry Ad Hoc Working Group on Roof Aggregate (including, the Federal Emergency Management Agency, the Asphalt Roofing Manufacturers Association and SPRI).

1. Delete and substitute as follows:

~~**1504.4 Ballasted low-slope roof systems.** Ballasted low-slope (roof slope < 2:12) single-ply roof system coverings installed in accordance with Section 1507.12 and 1507.13 shall be designed in accordance with Section 1504.8 and ANSI/SPRI RP-4.~~

<u>**1504.4 Aggregate and paver surfaced low-slope roof coverings.** Aggregate and paver surfaced roof system coverings shall be designed and installed in accordance with Section 1504.4.1 or 1504.4.2 as applicable.</u>

2. Add new text as follows:

1504.4.1 Ballasted surfaced roof coverings. Aggregate and paver surfaced roof system coverings shall be designed and installed in accordance with ANSI/SPRI RP-4.

Exceptions:

1. Aggregate and concrete pavers are not permitted where the building height exceeds 150 feet (45 720 mm).
2. In hurricane-prone regions as defined in Section 1609.2, aggregate is not permitted on Occupancy Category III or IV buildings where the basic wind speed is greater than 100 mph (45 m/s).

1504.4.2 Aggregate surfaced roof coverings. Aggregate surfaced roof system coverings shall be designed and installed in accordance with Table 1504.4 based on the exposure category and basic wind speed at the building site. The aggregate shall comply with ASTM D 1863.

Exceptions:

1. In hurricane-prone regions as defined in Section 1609.2, aggregate is not permitted on Occupancy Category III or IV buildings where the basic wind speed is greater than 100 mph (45 m/s).
2. In hurricane-prone regions as defined in Section 1609.2, aggregate is not permitted on Occupancy Category I or II buildings when the basic wind speed is greater than 110 mph (49 m/s).

TABLE 1504.4
MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOF COVERINGS[a,b]
FOR OCCUPANCY CATEGORY I AND II BUILDINGS [c]

ASTM D1863 Gradation	Mean Roof Height[d] (ft)	WIND EXPOSURE AND BASIC WIND SPEED (MPH, GUST)[e]														
		Exposure Category B					Exposure Category C					Exposure Category D				
		85	90	100	110	120	85	90	100	110	120	85	90	100	110	120
No. 7 or No. 67	15	0	0	15	20	25	22	25	31	38	45	27	31	38	45	53
	20	0	12	17	23	28	23	27	33	40	47	29	32	40	47	55
	30	13	15	21	27	32	26	29	36	44	51	31	35	43	50	58
	40	15	18	24	29	35	28	31	39	46	53	33	37	45	52	60
	50	17	20	26	32	38	29	33	40	48	55	34	38	46	54	62
	60	18	21	28	34	40	30	34	42	49	57	35	39	47	56	64
	80	21	24	30	37	43	32	36	44	52	60	37	41	49	58	66
	100	23	26	33	40	46	34	38	46	54	62	38	43	51	60	68
	125	25	28	35	42	49	36	40	48	56	64	40	44	53	62	70
	150	27	30	37	45	52	37	41	50	58	66	41	45	54	63	72
No. 6	15	0	0	11	15	20	16	19	25	31	37	22	25	31	38	45
	20	0	0	13	17	22	18	21	27	34	40	23	26	33	40	47
	30	0	11	16	21	26	20	24	30	36	43	25	29	36	43	50
	40	0	13	18	24	29	22	25	32	39	45	27	30	37	45	52
	50	12	15	20	26	31	23	27	34	40	47	28	31	39	46	53
	60	13	16	22	28	33	24	28	35	42	49	29	33	40	47	55
	80	16	19	25	30	36	26	30	37	44	51	30	34	42	50	57
	100	18	21	27	33	39	28	31	39	46	53	32	36	43	51	59
	125	19	23	29	35	42	29	33	40	48	55	33	37	45	53	61
	150	21	24	31	37	44	30	34	42	50	57	34	38	46	54	62

SI: 1" = 25.4 mm, 1 ft = 0.3 m, 1 mph = 0.44 m/s

a. Interpolation between wind speeds and building heights shall be permitted.

b. Aggregate surfaced roofs shall not be permitted for basic wind speeds greater than 120 mph, or where the building height exceeds 150 feet.

c. For Occupancy Category III and IV buildings, use the next higher wind speed column.

d. Mean roof height shall be measured from the grade plane to the roof surface at the perimeter of the roof portion under consideration.

e. Wind exposure and basic wind speed shall be determined in accordance with ASCE 7.

3. Delete without substitution:

~~**1504.8 Aggregate.** Aggregate used as surfacing for roof coverings and aggregate, gravel or stone used as ballast shall not be used on the roof of a building located in a hurricane-prone region as defined in Section 1609.2, or on any other building with a mean roof height exceeding that permitted by Table 1504.8 based on the exposure category and basic wind speed at the site.~~

~~**TABLE 1504.8**~~
~~**MAXIMUM ALLOWABLE MEAN ROOF HEIGHT PERMITTED FOR BUILDINGS WITH GRAVEL OR STONE ON THE ROOF IN AREAS OUTSIDE A HURRICANE-PRONE REGION**~~

~~Basic Wind Speed From Figure 1609 (mph)~~ [b]	~~Maximum Mean Roof Height (ft)~~ [a,c]		
	~~Exposure category~~		
	~~B~~	~~C~~	~~D~~
~~85~~	~~170~~	~~60~~	~~30~~
~~90~~	~~110~~	~~35~~	~~15~~
~~95~~	~~75~~	~~20~~	~~NP~~
~~100~~	~~55~~	~~15~~	~~NP~~
~~105~~	~~40~~	~~NP~~	~~NP~~
~~110~~	~~30~~	~~NP~~	~~NP~~
~~115~~	~~20~~	~~NP~~	~~NP~~
~~120~~	~~15~~	~~NP~~	~~NP~~
~~Greater than 120~~	~~NP~~	~~NP~~	~~NP~~

~~Greater than 120 NP NP NP~~
~~For SI: 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.~~
~~a. Mean roof height in accordance with Section 1609.2.~~
~~b. For intermediate values of basic wind speed, the height associated with the next higher value of wind speed shall be used, or direct interpolation is permitted.~~
~~c. NP = gravel and stone not permitted for any roof height.~~

Reason: Concern with roof aggregate blow-off is not new (Minor, 1977). It has continued to be reinforced by field observations, particularly in regard to damage caused to glazing on surrounding buildings as well as the building from which the aggregate was lifted into the airstream. Most problems have been associated with extreme wind events such as hurricanes and have involved roofs not in compliance with RP-4 and with aggregate surfaced roofs for which the RP4 standard was not intended to address. As a result, recent building code changes (i.e., IBC 2006 and 2009) have severely restricted the use of aggregate surfaced roofs. However, these new restrictions were not based on the K-W design method (Kind Wardlaw 1976), the wind tunnel studies underlying the K-W design method (Kind 1977), or a quantitative analysis of observed good and bad roofing system performances in real wind events. Instead, current building code limitations are based on variation in surface pressure with building height which is known to be an inappropriate predictor of aggregate blow-off or scour due to pressure equalization effects (Smith, 1997). Furthermore, these recent restrictions do not address critical parameters such as aggregate size and parapet height which govern performance.

This code change proposal addresses two types of roof coverings: ballasted single ply roofs and those with aggregate surfaces, such as Built-up roofs (BUR) and certain spray polyurethane roof systems. Reasoning statements are provided for each new section:

New section1504.4.1 - Over 6 billion square feet of ballasted single ply roofing applications have been installed over the last two decades The vast majority of these systems have performed very well with respect to their resistance to wind pressure loads. However some damage has been observed due to aggregate blowing off non-code compliant roofs during high wind events. The above proposals are based on over 200 wind tunnel tests in addition to over 40 years of field experience and observations from hurricane investigation teams. These proposals provide restrictions on the use of ballasted single ply roof systems that will allow for the responsible use of aggregate surfacing that is a cost effective method to keep the roof system in place and to improve the energy performance of the building.

ANSI/SPRI RP-4 is the code referenced design guide for ballasted single ply roof systems. The requirements contained in the guide are based on over 200 wind tunnel tests along with extensive field studies. One of the design criteria of ANSI/SPRI RP-4 is to prevent gravel blow-off. Wind tunnel testing conducted at the National Research Council Canada evaluated conventional stone ballasted and stone and paver ballasted protected membrane roofs. For the systems containing stone ballasting the primary objective was to determine 4 critical wind speeds:

1. U_{c1} – the wind speed at which one or more stones were first observed to move an appreciable distance (i.e. several inches)
2. U_{c2} – the wind speed above which scouring of stones would continue more or less indefinitely as long as the wind speed is maintained.
3. U_{c3} – the wind speed at which stones were first observed to leave the roof by going over the upstream parapet (this was the parapet adjacent to the wind direction)
4. U_{c4} – the wind speed at which stones were first observed to leave the roof by going over the downstream parapet (opposite side from the wind)

In these experiments three nominal stone sizes were used. Each nominal stone size represented a mixture of stone sizes (larger and smaller) similar to the gradation, which would be obtained from a stone quarry. These experiments evaluated the impact of the following variables on the critical wind speeds defined above:

Stone size
Parapet height
Building height
Building geometry
Direction of wind impacting the building

Rooftop wind speed, rooftop gust wind speed, and the shape of the approaching wind velocity profile

In addition to the extensive wind tunnel test program, observed field performance was also a basis for the requirements included in ANSI/SPRI RP-Two of the most critical controlling factors identified through this extensive test program on the various critical wind speeds were stone size and parapet height. A brief summary of the wind tunnel test program, and reports written as part of this program follows.

LTR-LA-142 Estimation of Critical Wind Speeds for Scouring of Gravel or Crushed Stone on Rooftops January 1974

Objectives:

- Determine the critical wind speeds and corresponding surface shear stress that cause movement of various stone sizes and shapes by taking direct measurements of these values via wind tunnel testing.
- Use this data to determine constants that can be used in equations to calculate critical surface shear stress
- Obtain guidance about the effects of parapets and obstacles, which cause strong three-dimensional effects, notably vortices.

Conclusions:

- The surface shear stress required to cause stone motion is directly proportional to nominal stone diameter.
- The constant of proportionality appears to be essentially independent of stone size and shape and of the detailed shape of the velocity profile near the gravel surface.
- Critical wind speeds to initiate stone motion can therefore be easily predicted if the relationship between surface shear stress and wind speed is known for the situation of interest.
- The dead air region behind a parapet extended downstream about 15 parapet heights. The turbulence of natural wind will tend to reduce the dead air zone.

LTR-LA-162 Wind Tunnel Tests on Some Building Models to Measure Wind Speeds at Which Gravel is Blown Off Rooftops June 1974

Objectives:

- This series of tests was conducted to build upon the data obtained in the January 1974 test series. Specifically to provide data for some typical building geometries and to investigate the effects of building form, building height, parapet height, wind direction, and gravel size on the critical wind speeds required to cause scouring and blow-off of roofing gravel.
- In this series 1/10 scale models were evaluated in a 30’ x 30’ wind tunnel.

Conclusions

- The critical wind speeds at which scouring of nominal 0.9”, 1.5” and 2.8” diameter gravel (scaled to 1/10 size) occurs and begins to blow-off rooftops were investigated. The nominal sizes represent the average size of a typical mixture.
- The critical wind speeds are lowest when the wind direction is at or about 45 to the walls of the building.
- For a given building configuration the critical wind speeds are proportional to the square root of the gravel size.
- The critical wind speeds increase with increasing parapet height and decrease with increasing building height.
- The length:width ratio of the building is unimportant as long as the width and length are large compared to the parapet height.

NRC No. 15544 Design of Rooftops Against Gravel Blow-Off September 1976

Objectives:

- This report describes a procedure that can be used to estimate the wind speeds at which gravel of a given nominal size will be blown off rooftops.
- The report also describes a procedure for determining design wind speeds at rooftop level.
- The gravel blow-off procedure is based on data obtained from previous wind tunnel tests described above.

Conclusions

- The results of wind tunnel tests conducted to determine critical wind speeds for scour or blow-off of roofing gravel for a specific low-rise building shape can be generalized to apply to any low-rise rectangular building having a flat rooftop.
- Similar generalization is possible for high-rise shapes of any particular length:width ratio.
- This permits development of a general, easy to use procedure for estimating critical wind speeds required to cause scour or blow-off of roofing gravel from various building configurations.

LTR-LA-189 Further Wind Tunnel Tests on Building Models to Measure Wind Speeds at Which Gravel is Blown Off Rooftops August 1977

Objectives:

- Obtain additional data to permit previously obtained results to be generalized so as to be applicable to any rectangular flat-roofed low-rise building.
- Provide data on the effects of substituting solid paving blocks for loose gravel in the most wind sensitive areas of the rooftop.

Conclusions:

- The wind speed at rooftop level appears to be the dominant factor in controlling gravel scour and blow-off as opposed to the wind velocity profile.
- The measured wind speeds at rooftop level were used to reinterpret the data from previous wind tunnel tests.
- Within the boundaries of experimental scatter the critical wind speeds are independent of the rooftop level in the wind boundary layer, allowing for generalization of results to various building heights and geometries.

LTR-LA-234 Model Studies of the Wind Resistance of Two Loose-Laid Roof-Insulation Systems May 1979

Objectives:

- Investigate the resistance of protected membrane roof systems to damage from high winds.
- Identify wind speeds and failure mechanisms for protected membrane roof systems.

Conclusions:

- The results show that wind flows induce pressure distributions underneath the roof-insulation systems as well as on their exterior surfaces.
- These pressure differences cause uplift and are responsible for system failure.
- The wind speed to cause failure for the 2 ft. x 2 ft. paver slabs was found to be proportional to the square root of the system weight per unit area. This relationship should also be true for different geometries.

LTR-LA-269 Further Model Studies of the Wind Resistance of Two Loose-Laid Roof-Insulation Systems (High Rise Buildings) April 1984

Objectives:

- This study is an extension of the May 1979 study, to investigate the resistance of various protected membrane roof systems to damage from high winds when they are installed on high-rise buildings.

Conclusions:

- The mechanisms for wind damage are the same as those identified in earlier tests, namely gravel scour and uplifting of boards by pressure forces.
- The static pressure underneath boards or pavers tend to become equal to the exterior surface because of airflow through the joints between boards or pavers. Complete equalization cannot occur, however, in regions where the exterior pressure distribution is highly non-linear and uplifting pressure differences occur in those regions. System failure therefore tends to occur in these regions.
- High parapets are very effective in increasing resistance to wind damage.

Mechanical interconnection of boards or pavers by use of strapping, tongue & groove, etc. is an effective method for increasing wind resistance.

For any particular system configuration, the wind speed to cause failure is proportional to the square root of the system weight per unit area.

Gust speed at rooftop level is the pertinent speed for use in assessing the resistance of the roofing system to wind damage.

LTR-LA-294 Further Wind Tunnel Tests of Loose-Laid Roofing Systems April 1987

Objectives:

Conduct extensive wind tunnel work to further assess the resistance to wind damage of protected membrane roofing system using paver slabs, or similar elements.

Low, intermediate and high-rise buildings were tested, each with several parapet heights.

Conclusions:

When a membrane is loose-laid on a leaky roof deck, ballooning will occur due to air flowing through holes in the deck from the interior of the building. This will normally result in failure at wind speeds well below those required to product failure by other mechanisms.

In the case of immobile membranes, failure results from pressure differences, which develop across elements in some regions of the roof.

Increased parapet height generally resulted in more favorable pressure distributions. That is, maximum suctions were reduced and suction peaks were broadened, so that pressure was less non-uniform and therefore increased failure speeds could be expected.

Element size has a noticeable effect on failure speed, i.e. failure speeds were higher for larger elements.

Pressure non-uniformity is reduced by vortex generators mounted on the parapets near the upwind corner of the roof, thus increasing failure wind speeds.

LTR-LA-295 Pressure Distribution Data Measured During the September 1986 Wind Tunnel Tests on Loose-Laid Roofing Systems September 1987

Objectives:

This report supplements LTR-LA-294 by including contour plots of mean and peak roof surface pressure coefficients and mean and peak coefficients for pressure differential between the upper surface and the underside of the roofing system.

New Section 1504.4.2 and New Table 1504.4 – The new Section 1504.2 provides prescriptive design requirements to avoid blow-off of loose aggregate used on roof systems such as BUR and certain SPF roofs. Based on the Kind-Wardlaw design method, blow-off of loose aggregate is avoided by using minimum parapet heights determined by wind speed, Exposure Category, roof height, Building Category and aggregate size.

The Kind-Wardlaw design method ("K-W" design method) for prevention of scour and blow-off of aggregate from aggregate surfaced roofs has been available since the 1970s (Kind & Wardlaw 1976). It saw limited use until the 1980s when adopted as the basis for the initial 1988 edition of ANSI/SPRI RP-4, "Wind Design Standard for Ballasted Single-Ply Roofing Systems," (RP-4) standard which, in its updated form, continues to be used by the single-ply roofing industry for ballasted roofs (SPRI 2008). SPRI utilized the K-W design method as the basis for aggregate ballasted roof systems to prevent ballast scour.

For aggregate surfaced roof systems, a main wind-related issue of concern is with aggregate blow-off. Scour is not considered important to aggregate surfaced roofs, except to the extent that it might require maintenance (re-distribution of aggregate) after an extreme wind event to maintain fire resistance and the long-term durability of the roof system against degradation caused by solar (U-V) radiation or cause pile-up of aggregate on a downwind parapet.

The technical underpinnings of this proposal are three-fold:

1. The wind tunnel basis of the K-W design method was re-evaluated to confirm or make technically supported improvements with respect to prevention of aggregate blow-off
2. Quantitative field observations of roofing system performance in extreme wind events were compared with the K-W design method
3. Prescriptive design requirements to prevent aggregate blow-off based on items 1 and 2 were developed as a new Table 1504.4 for inclusion in the IBC.

As a result of this study (Crandell, 2009), improvements are recommended for a modified K-W design method for aggregate surfaced roofs. The improvements include a reconfiguration of the design method that allows critical wind velocity for initiation of aggregate blow-off to be predicted as a linear relationship directly with parapet height. This approach greatly simplifies the design method at no loss of accuracy, thereby improving the utility of the method for design practitioners to address a recognized deterrent to broader application of the K-W design method (Smith, 1997). It also avoids inefficiencies (generally overdesign) caused by use of non-dimensional building geometry-based parameters to determine roof design requirements of actual buildings (e.g., wind speed limit, aggregate size, and parapet height).

In addition, the effect of gravel size on critical velocity for blow-off is improved based on the reviewed wind tunnel data which shows a clear relationship between critical velocity for blow-off and the cube-root of the aggregate diameter (not the square-root as used in the K-W design method).

Finally, the modified K-W design method using the above improvements is compared to field observations with sufficient quantitative data (e.g., local wind speed, exposure, aggregate size, parapet height, and building height) available to allow for a meaningful comparison. As a result, a calibration factor is proposed to bring the modified K-W design method in line with observations of successful performance while still maintaining adequate requirements to eradicate clearly problematic observations of aggregate blow-off. Use of such a calibration approach is consistent the RP-4 standard's application of the K-W design method.

REFERENCES:

ASCE (2005). Minimum Design Loads for Buildings and Other Structures. American Society of Civil Engineers, Reston, VA.

Crandell, J. H. (2009) Design of Aggregate Surfaced Roofs to Avoid Aggregate Blow-off: Development of a Modified Kind-Wardlaw Design Method for Buildings of All Heights

International Code Council, Inc. (2006). International Building Code. Falls Church, VA

Kind, R.J. and Wardlaw R.L. (1976). Design of Rooftops Against Gravel Blow-Off. National Aeronautical Establishment, National Research Council, Canada.

Kind, R.J. (1977). Further Wind Tunnel Tests on Building Models to Measure Wind Speeds at Which Gravel is Blown Off Rooftops. LTR-LA-189. National Aeronautical Establishment, National Research Council, Canada.

Minor, J.E. (September 1977). Performance of Roofing Systems in Wind Storms. *Proceedings of the Symposium on Roofing Technology*, National Bureau of Standards and National Roofing Contractors Association.

RICOWI (2007). Hurricane Katrina Investigation Report. Roofing Industry Committee on Weather Issues, Inc., Powder Springs, GA.

Smith, T.L., Kind, R.J., and McDonald, R.J. (1992). Hurricane Hugo: Evaluation of Wind Performance and Wind Design Guidelines for Aggregate Ballasted Single-Ply Membrane Roof Systems. Asociacion Internacional De La Impermeabilizacion, VII Congreso Internacional, Madrid, Spain.

Smith, T.L. (June 1997). Aggregate Blow-Off from BUR and SPF Roofs: Recognizing the Potential Hazards and Avoiding Problems. *Proceedings of The 8th U.S. Conference on Wind Engineering*, AAWE.

SPRI (2008). Wind Design Standard for Ballasted Single-Ply Roofing Systems. ANSI/SPRI RP-4-2008. Single-Ply Roofing Industry, Waltham, MA.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: SMITH-S1-1504.4

Public Hearing Results

Committee Action: Disapproved

Committee Reason: There are concerns with the ten percent fines that would be permitted in the ballast, since testing indicates these fines are a problem in glass breakage. The proposed restrictions (exceptions) that are based on a building's Occupancy Category do not properly address the debris hazard posed to (or by) adjacent buildings, since the Occupancy Category is not relevant to the ballast blowing off the roof. There were concerns raised on correlating the parapet height to the area of the roof.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael D. Fischer, The Kellen Company, representing Roofing Industry Ad Hoc Working Group on Aggregate (including the Federal Emergency Management Agency, the Asphalt Roofing Manufacturers Association and SPRI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1504.4 Ballasted and aAggregate ~~and paver~~ surfaced low-slope (roof slope < 2:12) roof coverings. Ballasted and aAggregate ~~and paver~~ surfaced roof system coverings shall be designed and installed in accordance with Section 1504.4.1 or 1504.4.2 as applicable.

1504.4.1 Ballasted surfaced roof coverings. Ballasted surfaced roof ~~Aggregate and paver surfaced roof system~~ coverings and parapets shall be designed and installed in accordance with ANSI/SPRI RP-4. Special inspection for compliance with ANSI/SPRI RP-4 shall be required in accordance with Section 1706.

Exceptions:

1. Ballasted surfaced roof coverings ~~Aggregate and concrete pavers~~ are not permitted where the building height exceeds 150 feet (45 720 mm) or where the wind speed limits prescribed in ANSI/SPRI RP-4 are exceeded.
2. In hurricane-prone regions as defined in Section 1609.2, stone ~~aggregate~~ is not permitted on Occupancy Category III or IV buildings where the basic wind speed is greater than 100 mph (45 m/s).

1504.4.2 Aggregate surfaced roof coverings. Aggregate surfaced roof system coverings shall be designed and installed in accordance with Table 1504.4 based on the exposure category and basic wind speed at the building site. The aggregate shall comply with ASTM D 1863. Special inspection for compliance with this section shall be required in accordance with Section 1706.

Exceptions:

1. Aggregate is not permitted where the building height exceeds 150 feet (45 720 mm) or where the basic wind speed exceeds 120 mph (54 m/s) in accordance with the limits of Table 1504.4.
2. In the hurricane-prone-regions as defined in Section 1609.2, aggregate is not permitted on Occupancy Category III or IV buildings where the basic wind speed is greater than 100 mph (45 m/s).
3. In hurricane-prone regions as defined in Section 1609.2, aggregate is not permitted on Occupancy Category I or II buildings when the basic wind speed is greater than 110 mph (49 m/s).

TABLE 1504.4

MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOF COVERINGS [a~~,b~~]

FOR OCCUPANCY CATEGORY I AND II BUILDINGS [b~~c~~]

ASTM D1863 Gradation	Mean Roof Height[c~~d~~] (ft)	WIND EXPOSURE AND BASIC WIND SPEED (MPH, GUST)[~~e~~ d]														
		Exposure Category B					Exposure Category C					Exposure Category D				
		85	90	100	110	120	85	90	100	110	120	85	90	100	110	120
No. 7 or No. 67	15	0	0	15	n/p ~~20~~	n/p ~~25~~	22	25	31	n/p ~~38~~	n/p ~~45~~	27	31	38	n/p ~~45~~	n/p ~~53~~
	20	0	12	17	n/p ~~23~~	n/p ~~28~~	23	27	33	n/p ~~40~~	n/p ~~47~~	29	32	40	n/p ~~47~~	n/p ~~55~~
	30	13	15	21	n/p ~~27~~	n/p ~~32~~	26	29	36	n/p ~~44~~	n/p ~~51~~	31	35	43	n/p ~~50~~	- n/p ~~58~~
	40	15	18	24	n/p ~~29~~	n/p ~~35~~	28	31	39	n/p ~~46~~	n/p ~~53~~	33	37	45	n/p ~~52~~	- n/p ~~60~~
	50	17	20	26	n/p ~~32~~	n/p ~~38~~	29	33	40	n/p ~~48~~	n/p ~~55~~	34	38	46	n/p ~~54~~	n/p ~~62~~
	60	18	21	28	n/p ~~34~~	n/p ~~40~~	30	34	42	n/p ~~49~~	n/p ~~57~~	35	39	47	n/p ~~56~~	n/p ~~64~~
	80	21	24	30	n/p ~~37~~	n/p ~~43~~	32	36	44	n/p ~~52~~	n/p ~~60~~	37	41	49	n/p ~~58~~	n/p ~~66~~
	100	23	26	33	n/p ~~40~~	n/p ~~46~~	34	38	46	n/p ~~54~~	n/p ~~62~~	38	43	51	n/p ~~60~~	n/p ~~68~~
	125	25	28	35	n/p ~~42~~	n/p ~~49~~	36	40	48	n/p ~~56~~	n/p ~~64~~	40	44	53	n/p ~~62~~	- n/p ~~70~~
	150	27	30	37	n/p ~~45~~	n/p ~~52~~	37	41	50	n/p ~~58~~	n/p ~~66~~	41	45	54	n/p ~~63~~	n/p ~~72~~
No. 6	15	0	0	11	15	20	16	19	25	31	37	22	25	31	38	45
	20	0	0	13	17	22	18	21	27	34	40	23	26	33	40	47
	30	0	11	16	21	26	20	24	30	36	43	25	29	36	43	50
	40	0	13	18	24	29	22	25	32	39	45	27	30	37	45	52
	50	12	15	20	26	31	23	27	34	40	47	28	31	39	46	53
	60	13	16	22	28	33	24	28	35	42	49	29	33	40	47	55
	80	16	19	25	30	36	26	30	37	44	51	30	34	42	50	57
	100	18	21	27	33	39	28	31	39	46	53	32	36	43	51	59
	125	19	23	29	35	42	29	33	40	48	55	33	37	45	53	61
	150	21	24	31	37	44	30	34	42	50	57	34	38	46	54	62

SI: 1" = 25.4 mm, 1 ft = 0.3 m, 1 mph = 0.44 m/s

n/p = not permitted

a. Interpolation between wind speeds and building heights shall be permitted.

~~b. Aggregate surfaced roofs shall not be permitted for basic wind speeds greater than 120 mph, or where the building height exceeds 150 feet.~~

b ~~c~~. For Occupancy Category III and IV buildings, use the next higher wind speed column.

c ~~d~~. Mean roof height shall be measured from the grade plane to the roof surface at the perimeter of the roof portion under consideration.

d ~~e~~. Wind exposure and basic wind speed shall be determined in accordance with Section 1609 ~~ASCE 7~~.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The intent of this public comment is to address comments received during the first code development hearing (including the IBC-S committee's reasons for disapproval), provide editorial clarifications, and urge approval as modified by final action. The technical justification for this public comment stands on the scientific basis and references as reported in the original proposal. The technical justification of the original proposal and this public comment is consistent with wind tunnel studies that are reported in the scientific literature, used as a basis for wind risk modeling, applied in the ANSI/RP-4 consensus standard, and confirmed by a quantitative analysis of aggregate surfaced roof systems in a number of hurricane events over the past 20 or more years.

One concern raised was that "ten percent fines are a problem in glass breakage" which refers to concerns with the presence of fines in the aggregate specified for roof ballast or surfacing. The distribution of aggregate size and gradation requirements are consistent with those used in the wind tunnel studies from which these provisions were derived. In addition, they are consistent with a number of quantitative field studies of ballasted and aggregate surfaced roofs that were used to confirm the "real world" effectiveness of these proposed provisions. However, for reason of simplicity and to limit aggregate to the larger gradation, Table 1504.4 is changed to allow only use of No.6 aggregate in the 110 and 120 mph wind zones (which are also the wind zones where special inspection requirements apply). The greater concern then should be with compliance with these proposed provisions, especially in areas where compliance is critical by experience. Thus, this public comment has added reference to special inspection requirements in Chapter 17 and clarified that the required special inspections must ensure compliance with the proposed requirements for ballast or aggregate, parapet height, etc. to ensure intended performance (also as requested by testimony at the first hearing).

A second concern was related to the use of building occupancy to trigger limitations on use of aggregate roof surfacing or ballast because adjacent buildings are the actual hazard, not the building with the aggregate roof surfacing itself. However, these proposed provisions are based on preventing the worst-case aggregate blow-off mechanism which occurs at the windward corner of buildings where vortices first cause aggregate to lift off the roof of a building and then commonly impact the same building. In areas particularly susceptible to wind borne debris hazards (i.e., the wind borne debris region), other code provisions are required to protect adjacent buildings, particularly those of higher importance categories. Thus, together with these improved provisions that prevent roof aggregate blow-off and code provisions to protect glazing against debris damage, this concern is effectively and comprehensively addressed in the code. Also, others suggested that the proposal should rely on the performance requirements in Table 1504.4 rather than prescriptive Occupancy Category limits. But, the building occupancy category limits are retained in this Public Comment as a precautionary action which may be reconsidered in future code development cycles.

There was also concern mentioned with considering the roof area and aspect ratio effect on potential for aggregate blow-off. However, this concern is only relevant if the proposed requirements were based on a less conservative aggregate blow-off mechanism (such as blow-off from the leeward roof side which occurs after and at a higher wind speed than aggregate blow-off of the leading corner of a building). Thus, the concern is addressed by choice of using the most conservative aggregate blow-off mechanism as the basis for the proposed requirements. Furthermore, the requirements are based on a wide range of building aspect ratios and areas both in wind tunnel experiments and a quantitative confirmation of the design approach by comparison to a number and variety of actual roof systems having experienced major hurricane events over the past 20 or more years as reported in the literature.

Finally, an editorial change was made to move the mandatory limitation in footnote ‘b’ of Table 1504.4 to the enabling text in proposed Section 1504.4.2. Also, an editorial change was included in footnote ‘d’ to label the ASCE 7 standard as “ASCE 7-05” to ensure that ICC staff make appropriate correlating changes to this proposal should S84-09/10 be approved in final action resulting in use of ASCE 7-10 and a new basis for the wind speed map. Other changes clarify the proposal in its use of terminology (i.e., using “ballasted surfaced roof covering” in lieu of “aggregate and paver” when ballasted roofs actually use stone and pavers and aggregate surfaced roofs use aggregate).

In conclusion, this public comment proposal stands as a significant improvement to the effectiveness and performance (scientific) basis for building code provisions aimed at controlling and preventing roof aggregate blow-off risk. Current provisions in the IBC 2009 are less effective and provide either overly-conservative or non-conservative solutions in comparison to the state-of-the-art scientific basis for this proposal. Final action approval is urged.

Final Action: AS AM AMPC____ D

S7-09/10
1504.5

Proposed Change as Submitted

Proponent: Mark S. Graham, representing National Roofing Contractors Association (NRCA)

Revise as follows:

1504.5 Edge securement for low-slope roofs. Low-slope ~~membrane~~ built-up, modified bitumen and single-ply roof systems metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested in accordance with ANSI/SPRI ES-1, except the basic wind speed shall be determined from Figure 1609.

Reason: This proposed code change is intended to add clarity to the code by providing the specific roof membrane types to which Section 1504.5 applies.

The term “…membrane…” is not currently specifically defined in the context of roof systems in Section 1505—Definitions or Chapter 2—Definitions.

The description of roof membranes as “…built-up, modified bitumen and single-ply…” is consistent with other descriptions for membrane-type roof systems already included in Chapter 15.

Cost Impact: The code change proposal will not increase the cost of construction**.**

ICCFILENAME: GRAHAM-S3-1504.5

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal clarifies the code by listing the specific roof membrane types to which Section 1504.5 applies.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Mike Ennis, Single Ply Roofing Industry (SPRI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1504.5 Edge securement for low-slope roofs. Low-slope ~~built-up, modified bitumen and single-ply~~ roof system~~s~~ metal edge securement, except gutters and <u>metal roof systems</u>, shall be designed and installed for wind loads in accordance with Chapter 16 and tested <u>for resistance</u> in accordance with ANSI/SPRI ES-1, except the basic wind speed shall be determined from Figure 1609.

Commenter's Reason: This code change proposal should be modified because the wind load resistance of edge metal systems should be tested for low slope roof assemblies beyond those specially called out in this code change proposal. ANSI/SPRI ES-1, the test standard called out in Section 1504.5, contains test procedures that can be used to evaluate the attachment of the edge metal securement system, independent of the type of membrane being used. Third party evaluation of wind damage on low-slope (<2:12) roof systems has consistently demonstrated that one of the major causes of damage during wind events is failure of the edge metal securement leading to progressive damage and failure of the rest of the roof system. There are three test procedures contained in ANSI/SPRI ES-1. RE-1 as it is designated within the standard, evaluates the ability of the edge metal system to secure the membrane in mechanically attached and ballasted single ply roof systems. RE-2 evaluates the pull off resistance of edge metal flashing when exposed to design wind load forces. RE-3 evaluates the pull off resistance of copings when exposed to vertical and horizontal wind load forces. RE-1 is specific to mechanically attached or ballasted low-slope roofing assemblies. RE-2 and RE-3 evaluate the securement of the edge metal independent of the type of low-slope assembly being used. Inspection of low-slope roof assemblies after high wind events has clearly demonstrated the importance of keeping the edge securement in place during wind events. The ANSI/SPRI ES-1 test procedure should be used to evaluate edge metal securement for all low slope roof assemblies except metal roof assemblies, which have evaluated edge metal securement in conjunction with individual systems.

Public Comment 2:

Mike Ennis, Single Ply Roofing Industry (SPRI), requests Disapproval.

Commenter's Reason: This code change proposal should be denied because the wind load resistance of edge metal systems should be tested for low slope roof assemblies beyond those specially called out in this code change proposal. ANSI/SPRI ES-1, the test standard called out in Section 1504.5, contains test procedures that can be used to evaluate the attachment of the edge metal securement system, independent of the type of membrane being used. Third party evaluation of wind damage on low-slope (<2:12) roof systems has consistently demonstrated that one of the major causes of damage during wind events is failure of the edge metal securement leading to progressive damage and failure of the rest of the roof system. There are three test procedures contained in ANSI/SPRI ES-1. RE-1 as it is designated within the standard, evaluates the ability of the edge metal system to secure the membrane in mechanically attached and ballasted single ply roof systems. RE-2 evaluates the pull off resistance of edge metal flashing when exposed to design wind load forces. RE-3 evaluates the pull off resistance of copings when exposed to vertical and horizontal wind load forces. RE-1 is specific to mechanically attached or ballasted low-slope roofing assemblies. RE-2 and RE-3 evaluate the securement of the edge metal independent of the type of low-slope assembly being used. Inspection of low-slope roof assemblies after high wind events has clearly demonstrated the importance of keeping the edge securement in place during wind events.

Final Action: AS AM AMPC____ D

S8-09/10
1504.5

Proposed Change as Submitted

Proponent: Mark S. Graham, representing National Roofing Contractors Association (NRCA)

Revise as follows:

1504.5 Edge securement for low-slope roofs. Low-slope membrane roof systems metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested in accordance with <u>Test Methods RE-1, RE-2 and RE-3 of</u> ANSI/SPRI ES-1, except the basic wind speed shall be determined from Figure 1609.

Reason: This proposed code change is intended to add clarity to the code by providing the specific reference to ANSI/SPRI ES-1's test method requirements (RE-1, RE-2 and RE-3).

ANSI/SPRI ES-1 consists of two primary parts. In the first part the wind loads at a roof edge are determined. In the second part the edge metal flashings' wind resistances are determined according to ANSI/SPRI ES-1's RE-1, RE-2 and RE-3 test methods.

Currently, Section 1504 requires that wind loads be determined according to the code's Chapter 16, not ANSI/SPRI ES-1. Adding specific reference to ANSI/SPRI ES-1's test methods helps clarify that.

This proposed code change is not intended to change the code's current technical requirements; it is only intended to add a specific reference and clarity to which part of ANSI/SPRI ES-1 applies in Section 1504.5.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: GRAHAM-S4-1504.5

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change clarifies the scope of reference to ANSI/SPRI ES-1 in Section 1504.5. By indicating the specific test methods, RE-1, RE-2 and RE-3, the applicable portions of the reference standard are more obvious to the reader.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, Single Ply Roofing Industry (SPRI), requests Disapproval.

Commenter's Reason: There is no need for this code change, as it adds no additional clarification to the requirements of the code. Section 1504.5 Edge securement for low-slope roofs.states **"**Low-slope membrane roof system metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with ANSI/SPRI ES-1, except the basic wind speed shall be determined from Figure 1609". The current wording in the code is very clear. The test procedures that are called out for specific reference are all of the test procedures in ANSI/SPRI ES-1, so specifically listing them adds words but no clarification to the intent of the code.

Final Action: AS AM AMPC____ D

S9-09/10

1504.9 (New), Chapter 35

Proposed Change as Submitted

Proponent: Mike Ennis representing Single Ply Roofing Industry (SPRI)

1. Add new text as follows:

1504.9 Roof gardens and landscaped roofs. Roof gardens and landscaped roofs shall comply with Section 1507.16 and shall be installed in accordance with ANSI/SPRI RP14.

2. Add standard to Chapter 35 as follows:

SPRI
RP 14-07 Wind Design Standard for Vegetative Roofing Systems

Reason: Section 1507.16 requires that roof gardens and landscaped roofs comply with the requirements of Chapter 15. Section 1504.1 provides requirements for wind resistance of various roofing assemblies, however no guidance is provided for designing roof gardens and landscaped roofs to withstand wind loads. Roof gardens and landscaped roofs perform in the same manner as ballasted single ply roof assemblies when exposed to wind loads. ANSI/SPRI RP14 is a national consensus standard that has been developed with input from roof membrane manufacturers, component suppliers, contractors, green roofing professionals, testing organizations, and consultants. This design standard is much like the ballast design guide for single-ply roofs currently recognized by the IBC (ANSI/SPRI RP4). It provides the user with a series of tables that define requirements based on design wind speed, building height, parapet height and wind exposure. Three design options are provided. These design options vary in their ability to resist wind loads. Design option 1 uses a 10 lbs/ft2 minimum required load of growth media or trays, Design option 2 also requires minimum 10 lbs/ft2 of growth media or trays in the field of the roof and 13 lbs/ft2 of growth media or interlocking trays or 22 lbs/ft2 of individual trays in the corner and perimeter regions. Design option 3, which is designed for high wind load areas, requires 13 lbs/ft2 of growth media or interlocking trays, or 22 lbs/ft2 of individual trays in the field of the roof and does not allow any loose growth media or trays in the perimeter and corner regions. The perimeter of the building is defined as 40% of the building height. Adjustments are provided to increase the wind resistance of the design based on specific building conditions such as the buildings importance factor, large openings in adjacent walls and rooftop projections to name a few. The standard also provides requirements for newly planted garden roofs that do not have fully developed root systems. Fully developed root systems allow the garden roof assembly to perform very well when exposed to high wind situations, however prior to development of the root system special precautions must be taken.

The basis for the standard includes wind tunnel data generated in support of the ballasted single ply design guide. This wind tunnel testing helped develop an understanding of the impact of particle size and parapet height on the performance of ballasted assemblies. It also provided information regarding the weight of ballast required to keep the roof systems in place at various wind speeds. This data, along with 50-years of garden roof performance data from both the US and Europe were used in the development of this standard.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, SPRI RP-14 07, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: ENNIS-S4-1504.9

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard ANSI/SPRI RP 14 indicated that, in the opinion of ICC Staff, the standard did not comply with ICC standards criteria, Section 3.6.3(1) Readily available.

Committee Action: Disapproved

Committee Reason: The committee's disapproval was based on the status of the proposed reference standard. As a draft, it is not readily available.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, Single Ply Roofing Industry (SPRI), requests Approved as Submitted.

Commenter's Reason: This code change proposal was submitted to address a need for evaluating the wind uplift resistance of roof gardens and landscaped roofs. At the time of the code change hearings the design standard referenced in this proposal (ANSI/SPRI RP14) was only available in draft form and therefore did not meet the requirements of the International Building Code. Since that time the development of this standard has been completed and it is now an ANSI national consensus standard, meeting the requirements of the International Building Code.

Final Action: AS AM AMPC____ D

S12-09/10

1505.8 (New), Chapter 35

Proposed Change as Submitted

Proponent: Mike Ennis representing the Single Ply Roofing Industry

1. Add new text as follows:

1505.8 Roof gardens and landscaped roofs. Roof gardens and landscaped roofs shall comply with Section 1507.16 and shall be installed in accordance with ANSI/SPRI VF-1.

2. Add standard to Chapter 35 as follows:

SPRI

VF-1-08 Fire Design Standard for Vegetative Roofs

Reason: Section 1507.16 requires that roof gardens and landscaped roofs comply with the requirements of Chapter 15. Section 1505 requires that roofing assemblies be fire classified. The current test procedures used to provide this fire classification are not applicable to garden and landscape roofs due to the many variables (plant types, moisture content, etc.) that exist for these types of systems. ANSI/SPRI VF-1 is a national consensus standard that has been developed with input from roof membrane manufacturers, component suppliers, contractors, green roofing professionals, testing organizations, and consultants. This standard provides a design method to assure an acceptable level of performance of roof gardens and landscaped roofs when exposed to exterior fire sources. The general approach used in this standard is to design in fire breaks for large roof areas, around rooftop equipment and penetrations, and next to adjacent walls. Some of the specific requirements are:

Exposed membrane areas must conform to the designed fire resistance requirements as determined by the authority having jurisdiction.
For all vegetated roofing systems abutting combustible vertical surfaces, a Class A (per ASTM E108 or UL790) rated assembly must be achieved for a minimum 6 ft (1.83 m) wide continuous border placed around rooftop structures and all rooftop equipment.
For large roof areas: Partition the roof area into sections not exceeding 15,625 ft2 (1,450 m^2), with each section having no dimension greater than 125 ft (39 m) by installing a minimum of 3ft. (0.9 m) wide, Class A rated assembly barrier zones.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, VF-1-08, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: ENNIS-S5-1505.8

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard ANSI/SPRI VF 1 indicated that, in the opinion of ICC Staff, the standard did not comply with ICC standards criteria, Section 3.6.3(1) Readily available.

Committee Action: **Disapproved**

Committee Reason: Disapproval was based on the proponents request for disapproval. Further, the proposed standard SPRI VF-1-08 has not been submitted.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, Single Ply Roofing Industry (SPRI), request Approval as Submitted.

Commenter's Reason: This code change proposal was submitted to address a need for evaluating the fire resistance of roof gardens and landscaped roofs. At the time of the code change hearings the design standard referenced in this proposal (ANSI/SPRI VF1) was only available in draft form and therefore did not meet the requirements of the International Building Code. Since that time the development of this standard has been completed and it is now an ANSI national consensus standard, meeting the requirements of the International Building Code.

Final Action: AS AM AMPC____ D

S15-09/10-PART I

1507.2.8.1, 1507.3.3.3 (New), 1507.4.5 (New), 1507.5.3.1 (New), 1507.6.3.1 (New), 1507.7.3.1 (New), 1507.8.3.1 (New), 1507.9.3.1 (New)

Proposed Change as Submitted

Proponent: T. Eric Stafford, PE, representing Institute for Business and Home Safety

PART I – IBC STRUCTURAL

1. Revise as follows:

1507.2.8.1 High wind attachment. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

2. Add new text as follows:

1507.3.3.3 High wind attachment. Underlayment applied in areas subject to high wind [over 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

1507.4.5 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

1507.5.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

1507.6.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

1507.7.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

1507.8.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

1507.9.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Reason: Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind over about 110 mph. In the laboratory tests, specimen covered with ASTM 226 Type I and Type II underlayments performed dramatically differently. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. Plastic caps deformed much more than the metal caps in several installations. Consequently, the use of metal caps is recommended for areas with the highest basic design wind speeds.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Stafford-S3-1507.2.8.1

Public Hearing Results

PART I- IBC STRUCTURAL
Committee Action: Disapproved

Committee Reason: As worded, the requirements could be applied to currently used products that do not have problems, excluding self-adhered underlayment unless it is nailed down. This would be an extensive change and the committee was not provided with the data to support these specific requirements. The need for this underlayment requirement is unclear since it is under a covering that is already held down. There is no credit given for the nails through the shingles, for instance. Typically the roof covering manufacturer provides direction on how to install the underlayment and the underlayment varies with the type of roof covering. While the phrase "underlayment … shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions" is currently used in Section 1507.2.8.1, there are questions on its intent and the wording should be clear on whether this refers to the fastener or underlayment manufacturer before adding it in several new sections.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

T. Eric Stafford, Institute for Business and Home Safety, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1507.2.8.1 High wind attachment. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm)on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section 1507.2.8 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inches (25.4 ~~41~~ mm) with a thickness ~~shank~~ of at least 32 gauge sheet metal. The cap nail shank shall be a minimum of 12 gage with a length to penetrate through the roof sheathing or a minimum of ¾ inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

1507.3.3.3 High wind attachment. Underlayment applied in areas subject to high wind [over 110 miles per hour (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section 1507.3.3.1 and 1507.3.3.2 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inches (25.4 ~~41~~ mm) with a thickness ~~shank~~ of at least 32 gauge sheet metal. The cap nail shank shall be a minimum of 12 gauge with a length to penetrate through the roof sheathing or a minimum of ¾ inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

1507.4.5 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm)on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ (25.4 ~~41~~ mm) inches with a thickness ~~shank~~ of at least 32 gauge sheet metal. The cap nail shank shall be a minimum of 12 gauge with a length to penetrate through the roof sheathing or a minimum of ¾ inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

1507.5.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm)on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inches (25.4 ~~41~~ mm) with a thickness ~~shank~~ of at least 32 gauge sheet metal. The cap nail shank shall be a minimum of 12 gauge with a length to penetrate through the roof sheathing or a minimum of ¾ inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

1507.6.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm)on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inches (25.4 ~~41~~ mm) with a thickness ~~shank~~ of at least 32 gauge sheet metal. The cap nail shank shall be a minimum of 12 gauge with a length to penetrate through the roof sheathing or a minimum of ¾ inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

1507.7.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm)on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inches (25.4 ~~41~~ mm) with a thickness ~~shank~~ of at least 32 gauge sheet metal. The cap nail shank shall be a minimum of 12 gauge with a length to penetrate through the roof sheathing or a minimum of ¾ inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

1507.8.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm)~~ and end laps shall be a minimum of 6 inches~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inches (25.4 ~~41~~ mm) with a thickness ~~shank~~ of at least 32 gauge sheet metal. The cap nail shank shall be a minimum of 12 gauge with a length to penetrate through the roof sheathing or a minimum of ¾ inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

1507.9.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure 1609] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inches (25.4 ~~41~~ mm) with a thickness ~~shank~~ of at least 32 gauge sheet metal. The cap nail shank shall be a minimum of 12 gauge with a length to penetrate through the roof sheathing or a minimum of ¾ inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

Commenter's Reason: The modifications proposed in this public comment are essentially identical to the Floor Amendment on S15-09/10 Part II that was approved by the IRC Building/Energy Code Development Committee. S15-09/10 Part II was Approved as Modified by the IRC Building/Energy Code Development Committee. The same amendments approved by that committee are proposed for S15-09/10 Part 1. The modifications proposed by this public comment reflect some compromises with affected industry groups. NAHB and ARMA supported Approval of this code change at the Code Development Hearings with the modifications provided.

The proposed amendments to S15-09/10 Part I include some editorial corrections to the required lap lengths and the thickness of the fastener (12 gage instead of 32 gage). The head diameter of the cap portion of the nail is proposed to be reduced to 1 inches in recognition of the type most commonly used in the field. The language that required the use of metal cap nails where the wind speed exceeds 140 mph is proposed to be deleted reflecting a compromise with affected industry groups. Finally, some on the IBC Structural Code Development Committee felt that the language, as proposed, appeared to exclude the use of a self adhered polymer modified bitumen underlayment. This was not intended by the original language. To clarify that self adhered underlayments are permitted, a new Exception is added specifically permitting the use of a self-adhered underlayment complying with ASTM D 1970.

Public Comment 2:

John Kurtz, International Staple, Nail & Tool Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1507.2 Underlayment. Underlayment shall be in accordance with Sections 1507.2.1 through 1507.2.3.

1507.2.1 Specifications. Required underlayment shall conform to types listed in Table 1507.2.1.

TABLE 1507.2.1
UNDERLAYMENT STANDARDS

Section	Roof Covering	ASTM Specification: Wind Speed 120 mph or lower	ASTM Specification: Wind Speed over 120 mph
1507.3	Asphalt shingles	D 226 Type I D 4869 Type I D 6757	D 226 Type II D 4869 Type IV D 6757 D 1970
1507.4	Clay and concrete tile	D 226 Type II D 2626 D 6380 Class M	D 1970
1507.5	Metal roof panels	No requirement.	D 226 Type II D 1970
1507.6	Metal roof shingles	D 226 Type I D 4869	D 226 Type II D 4869 Type IV D 1970
1507.7	Mineral-surfaced roll roofing	D 226 Type I D 4869	D 226 Type II D 4869 Type IV D 1970
1507.8	Slate shingles	D 226 Type I D 4869	D 226 Type II D 4869 Type IV D 1970
1507.9	Wood shingles	D 226 Type I	D 226 Type II

		D 4869	D 4869 Type IV D 1970
1507.10	Wood shakes	D 226 Type I D 4869	D 226 Type II D 4869 Type IV D 1970

1507.2.2 Application. Underlayment shall be applied in accordance with Table 1507.2.2.

TABLE 1507.2.2
UNDERLAYMENT APPLICATION

Section	**Roof Covering**	**Underlayment Application and Minimum Laps**	
		Wind Speed 120 mph or lower	**Wind Speed over 120 mph**
1507.3	Asphalt shingles	Distortions in underlayment shall not interfere with ability of the shingles to seal. 2:12 ≤ Slope ≤ 4:12 2 layer: First course 19" wide. Succeeding courses 36" width with 19" head lap. Slope > 4:12 1 layer with 2" side lap.	Distortions in underlayment shall not interfere with ability of the shingles to seal. End laps offset by 6 feet. 2:12 ≤ Slope ≤ 4:12 2 layer: First course 19" wide. Succeeding courses 36" width with 19" head lap. 4" end laps. Slope > 4:12 1 layer with 4" side lap. 4" end laps.
1507.4	Clay and concrete tile	2.5:12 ≤ Slope ≤ 4:12 2 layer: First course 19" wide. Succeeding courses 36" width with 19" head lap. Slope > 4:12 1 layer with 2" side lap.	2.5:12 ≤ Slope ≤ 4:12 2 layer: First course 19" wide. Succeeding courses 36" width with 19" head lap. 4" end laps. Slope > 4:12 1 layer with 4" side lap. 4" end laps. End laps offset by 6 feet.
1507.5	Metal roof panels	Install in accordance with manufacturer's instructions.	
1507.6	Metal roof shingles	For basic wind speed > 110 mph, install in accordance with manufacturer's instructions.	
1507.7	Mineral-surfaced roll roofing	No requirement.	
1507.8	Slate shingles	No requirement.	
1507.9	Wood shingles	No requirement.	
1507.10	Wood shakes	No requirement.	

1507.2.3 Attachment. Underlayment shall be attached in accordance with Table 1507.2.3(1).

TABLE 1507.2.3(1)
UNDERLAYMENT ATTACHMENT
Fastener Requirements with Maximum Fastener Spacing

Section	**Roof Covering**	**Basic Wind Speed**		
		Wind Speed 110 mph or lower	**Wind Speed over 110 mph up to 120 mph**	**Wind Speed over 120 mph**
1507.3	Asphalt shingles	Sufficient to hold in place. (No requirements.)	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	Fasteners Metal or plastic cap nails or staples with cap nominal 1" diameter and cap minimum thickness of 32 gage sheet metal. Nail shank and staple gage in accordance with Table 1507.2.3(2). Fastener length sufficient to penetrate through the roof deck or a minimum of ¾" into the roof sheathing. Fastener Spacing See Table 1507.2.3(2)
1507.4	Clay and concrete tile	Sufficient to hold in place. (No requirements.)	In accordance with tile manufacturer's instructions. Side lap fastened 36" o.c.	
1507.5	Metal roof panels	No requirement.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
1507.6	Metal roof shingles	No requirement.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
1507.7	Mineral-surfaced roll roofing	No requirement.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
1507.8	Slate shingles	No requirement.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
1507.9	Wood shingles	No requirement.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
1507.10	Wood shakes	No requirement.	In accordance with shake manufacturer's instructions.	

TABLE 1507.2.3(2)
FASTENER SPACING FOR UNDERLAYMENT

Cap Fastener	Fastener on-center spacing along laps (inches)	Fastener spacing between head laps (grid) (inches)
5/8" leg, 21 gage staple	3	6
21 gage staple	3	7
20 gage staple	4	8
0.080 -.083 diam. nail	4	9
0.090 diam. Nail 18 gage staple	5	10
0.105 diam. Nail (12 gage) 17 gage staple 0.120 diam. nail (11 gage)	6	12

(Renumber remaining sections)

~~**1507.2.3 Underlayment.** Unless otherwise noted, required underlayment shall conform to ASTM D 226, Type I, ASTM D 4869, Type I, or ASTM D 6757.~~

(Renumber remaining sections)

~~**1507.2.8 Underlayment application.** For roof slopes from two units vertical in 12 units horizontal (17-percent slope) and up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be two layers applied in the following manner. Apply a minimum 19-inch-wide (483 mm) strip of underlayment felt parallel with and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment overlapping successive sheets 19 inches (483 mm), by fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seat. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.~~
~~**1507.2.8.1 High wind attachment.** Underlayment applied in areas subject to high winds (greater than 110 mph in accordance with Figure 1609) shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.~~

~~**1507.2.8.2**~~ **1507.3.7 Ice barrier.** In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the *exterior wall* line of the building.

Exception: Detached accessory structures that contain no conditioned floor area.

~~**1507.3.3 Underlayment.** Unless otherwise noted, required underlayment shall conform to: ASTM D 226, Type II; ASTM D 2626 or ASTM D 6380, Class M mineral-surfaced roll roofing.~~

~~**1507.3.3.1 Low-slope roofs.** For roof slopes from 2½ units vertical in 12 units horizontal (21-percent slope), up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be a minimum of two layers applied as follows:~~

1. ~~Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~
2. ~~Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied overlapping successive sheets 19 inches (483 mm) and fastened sufficiently in place.~~

~~**1507.3.3.2 High-slope roofs.** For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to, and starting from the eaves and lapped 2 inches (51 nun), fastened only as necessary to hold in place.~~

~~**1507.5.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869.~~

(Renumber remaining sections)

~~**1507.6.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869.~~

(Renumber remaining sections)

~~**1507.7.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869.~~

(Renumber remaining sections)

~~**1507.8.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869.~~

(Renumber remaining sections)

TABLE ~~1507.8~~ 1507.9
WOOD SHINGLE AND SHAKE INSTALLATION

ROOF ITEM	WOOD SHINGLES	WOOD SHAKES
4. Underlayment		
~~Temperate climate~~	~~Underlayment shall comply with ASTM D 226, Type I.~~	~~Underlayment shall comply with ASTM D 226, Type I.~~

(Portions of table and footnotes not shown do not change.)

~~**1507.9.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869.~~

(Renumber remaining sections)

Commenter's Reason: The original proposal intended to increase the likelihood of holding underlayment in place if roof coverings were lost to high winds. Proposal was disapproved for inherent technical deficiencies, ambiguity, and insufficient supporting data. Our proposed modification would accomplish the intent with commercially available fasteners and better code language. Our proposed modification builds on a successful floor modification to Part II (IRC.)

Our proposed modification corrects deficiencies in the Part II floor modification, namely, (1) specification of fasteners not generally in use, (2) exclusion of successfully used fasteners, and (3) unnecessarily verbose/repetitive code language.

Our proposed modification (1) allows use of power tools currently owned by builders, (2) allows use of a range of successfully used cap nails and cap staples, (3) maintains equivalence to application performance proposed by the Public Hearing floor modification, though it was arbitrary, and (4) summarizes fastening requirements for underlayment in one code section rather than repeating requirements in eight sections for eight separate roof coverings.

Final Action: AS AM AMPC____ D

S15-09/10-PART II

IRC R905.2.7.2, R905.3.3.3, R905.4.3.2 (New), R905.5.3.2 (New), R905.6.3.2 (New), R905.7.3.2 (New), R905.8.3.2 (New), R905.10.5.1 (New)

Proposed Change as Submitted

PART II – IRC BUILDING/ENERGY

1. Revise as follows:

R905.2.7.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

R905.3.3.3 Underlayment and high wind. Underlayment applied in areas subject to high wind [over 110 miles per hour (49 m/s) in accordance with R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

2. Add new text as follows:

R905.4.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

R905.5.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

R905.6.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

R905.7.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

R905.8.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

R905.10.5.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Head laps shall be 4 inches (102 mm) and end laps shall be a minimum of 6 inches (152 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.

Reason: Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind over about 110 mph. In the laboratory tests, specimen covered with ASTM 226 Type I and Type II underlayments performed dramatically differently. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. Plastic caps deformed much more than the metal caps in several installations. Consequently, the use of metal caps is recommended for areas with the highest basic design wind speeds.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Stafford-S3-1507.2.8.1

Public Hearing Results

PART II- IRC B/E
Committee Action: **Approved as Modified**

Modify the proposal as follows:

R905.2.7.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches (152 mm)~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inch~~es~~ (~~41~~ 25.4 mm) with a ~~shank~~ thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

R905.3.3.3 Underlayment and high wind. Underlayment applied in areas subject to high wind [over 110 miles per hour (49 m/s) in accordance with R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches (152 mm)~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inch~~es~~ (~~41~~ 25.4 mm) with a ~~shank~~ thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

R905.4.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches (152 mm)~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inch~~es~~ (~~41~~ 25.4 mm) with a ~~shank~~ thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

R905.5.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches (152 mm)~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inch~~es~~ (~~41~~ 25.4 mm) with a ~~shank~~ thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

R905.6.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches (152 mm)~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inch~~es~~ (~~41~~ 25.4 mm) with a ~~shank~~ thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

R905.7.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches (152 mm)~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inch~~es~~ (~~41~~ 25.4 mm) with a ~~shank~~ thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

R905.8.3.2 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches (152 mm)~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inch~~es~~ (~~41~~ 25.4 mm) with a ~~shank~~ thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

R905.10.5.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6 inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all ~~Head~~ laps shall be a minimum of 4 inches (102 mm) ~~and end laps shall be a minimum of 6 inches (152 mm)~~. Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 ~~5/8~~ inch~~es~~ (~~41~~ 25.4 mm) with a ~~shank~~ thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

~~Underlayment installed where the basic wind speed equals or exceeds 140 mph (63 m/s) shall be attached using metal cap nails with a head diameter of not less than 1 5/8 inches (41 mm) with a shank of at least 32 gauge sheet metal with a length to penetrate through the roof sheathing.~~

Committee Reason: This change will add underlayment requirements that will improve the performance of the roof covering in high wind situations. The modification corrects an error with respect to the nailing and adds self-adhering underlayment as an alternate. The committee has concern that eight sections are being added that prescribe the same requirement. The proponent should consolidate these and bring this back later.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

John Kurtz, International Staple, Nail & Tool Association, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows::

R905.1.1 Underlayment. Underlayment shall be in accordance with Sections R905.1.1.1 through R905.1.1.2.

R905.1.1.1 Specifications. Required underlayment shall conform to types listed in Table R905.1.1.1.

TABLE R905.1.1.1
UNDERLAYMENT STANDARDS

Section	Roof Covering	ASTM Specification	
		Wind Speed 120 mph or lower	**Wind Speed over 120 mph**
R905.2	Asphalt shingles	D 226 Type I D 4869 Type I D 6757	D 226 Type II D 4869 Type IV D 6757 D 1970
R905.3	Clay and concrete tile	D 226 Type II D 2626 Type I D 6380 Class M	D 226 Type II D 2626 Type I D 6380 Class M D 1970
R905.4	Metal roof shingles	D 226 Type I or II D 4869 Type I or II D 1970	D 226 Type II D 4869 Type IV D 1970
R905.5	Mineral-surfaced roll roofing	D 226 Type I D 4869 Type I or II	D 226 Type II D 4869 Type IV D 1970
R905.6	Slate and slate-type shingles	D 226 Type I D 4869 Type I or II	D 226 Type II D 4869 Type IV D 1970
R905.7	Wood shingles	D 226 Type I D 4869 Type I or II	D 226 Type II D 4869 Type IV D 1970
R905.8	Wood shakes	D 226 Type I D 4869 Type I or II	D 226 Type II D 4869 Type IV D 1970
R905.10	Metal roof panels	No requirement.	D 226 Type II D 1970

R905.1.1.2 Application. Application and attachment of underlayment shall be in accordance with the following:

1. Underlayment shall be applied in accordance with Table R905.1.1.2(1).
2. Underlayment shall be attached in accordance with Table R905.1.1.2(2).

TABLE R905.1.1.2(1)
UNDERLAYMENT APPLICATION

<table>
<tr><th rowspan="2">Section</th><th rowspan="2">Roof Covering</th><th colspan="2">Underlayment Application and Minimum Laps</th></tr>
<tr><th>Wind Speed 120 mph or lower</th><th>Wind Speed over 120 mph</th></tr>
<tr><td>R905.2</td><td>Asphalt shingles</td><td>2:12 ≤ Slope ≤ 4:12
2 layer: First course 19” wide. Succeeding courses 36” width with 19” head lap.

Slope > 4:12
1 layer with 2” side lap.

End laps offset by 6 feet.</td><td>Distortions in underlayment shall not interfere with ability of the shingles to seal. End laps offset by 6 feet.

2:12 ≤ Slope ≤ 4:12
2 layer: First course 19” wide. Succeeding courses 36” width with 19” head lap. 4” end laps.

Slope > 4:12
1 layer with 4” side lap. 4” end laps.</td></tr>
<tr><td>R905.3</td><td>Clay and concrete tile</td><td>2.5:12 ≤ Slope ≤ 4:12
2 layer: First course 19” wide. Succeeding courses 36” width with 19” head lap.

Slope > 4:12
1 layer with 2” side lap.</td><td rowspan="7">2.5:12 ≤ Slope ≤ 4:12
2 layer: First course 19” wide. Succeeding courses 36” width with 19” head lap. 4” end laps.

Slope > 4:12
1 layer with 4” side lap. 4” end laps.

End laps offset by 6 feet.</td></tr>
<tr><td>R905.4</td><td>Metal roof shingles</td><td>For basic wind speed > 110 mph, install in accordance with manufacturer’s instructions.</td></tr>
<tr><td>R905.5</td><td>Mineral-surfaced roll roofing</td><td>No requirement.</td></tr>
<tr><td>R905.6</td><td>Slate and slate-type shingles</td><td>No requirement.</td></tr>
<tr><td>R905.7</td><td>Wood shingles</td><td>No requirement.</td></tr>
<tr><td>R905.8</td><td>Wood shakes</td><td>No requirement.</td></tr>
<tr><td>R905.10</td><td>Metal roof panels</td><td>Install in accordance with manufacturer’s instructions.</td></tr>
</table>

TABLE R905.1.1.2(2)
UNDERLAYMENT ATTACHMENT
Fastener Requirements with Maximum Fastener Spacing

Section	**Roof Covering**	**Basic Wind Speed**		
		Wind Speed 110 mph or lower	**Wind Speed over 110 mph up to 120 mph**	**Wind Speed over 120 mph**
R905.2	Asphalt shingles	Sufficient to hold in place. (No requirements.)	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	Fasteners Metal or plastic cap nails or staples with cap nominal 1" diameter and cap minimum thickness of 32 gage sheet metal. Nail shank and staple gage in accordance with Table R905.1.1.2(3). Fastener length sufficient to penetrate through the roof deck or a minimum of ¾" into the roof sheathing. Fastener Spacing See Table R905.1.1.2(3)
R905.3	Clay and concrete tile	Sufficient to hold in place. (No requirements.)	In accordance with tile manufacturer's instructions. Side lap fastened 36" o.c.	
R905.4	Metal shingles	In accordance with panel manufacturer's instructions.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
R905.5	Mineral surfaced roll	No requirement.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
R905.6	Slate shingles	In accordance with panel manufacturer's instructions.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
R905.7	Wood shingles	No requirement.	In accordance with shingle manufacturer's instructions. Side lap fastened 36" o.c.	
R905.8	Wood shakes	No requirement.	In accordance with shake manufacturer's instructions. Side lap fastened 36" o.c.	
R905.10	Metal roof panels	In accordance with panel manufacturer's instructions.	In accordance with panel manufacturer's instructions.	

TABLE R905.1.1.2(3)
FASTENER SPACING FOR UNDERLAYMENT

Cap Fastener	**Fastener on-center spacing along laps (inches)**	**Fastener spacing between head laps (grid) (inches)**
5/8" leg, 21 gage staple	3	6
21 gage staple	3	7
20 gage staple	4	8
0.080 -.083 diam. nail	4	9
0.090 diam. Nail 18 gage staple	5	10
0.105 diam. Nail (12 gage) 17 gage staple 0.120 diam. nail (11 gage)	6	12

~~**R905.2.3 Underlayment.** Unless otherwise noted, required underlayment shall conform to ASTM D 226 Type I, ASTM D 4869 Type I, ASTM D 6757.~~

~~Self-adhering polymer modified bitumen sheet shall comply with ASTM D 1970.~~

(Renumber remaining sections)

~~**R905.2.7 Underlayment application.** For roof slopes from two units vertical in 12 units horizontal (17-percent slope), up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be two layers applied in the following manner. Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be offset by 6 feet (1829 mm).~~

~~**R905.2.7.1**~~ **R905.2.6 Ice barrier.** In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(l), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached accessory structures that contain no *conditioned floor area*.

~~**R905.2.7.2 Underlayment and high wind.** Underlayment applied in areas subject to high winds [above 110 mph (49m/s) per Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~**R905.3.3 Underlayment.** Unless otherwise noted, required underlayment shall conform to ASTM D 226 Type 11; ASTM D 2626 Type 1; or ASTM D 6380 Class M mineral surfaced roll roofing.~~

~~**R905.3.3.1 Low slope roofs.** For roof slopes from two and one-half units vertical in 12 units horizontal (2½:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows:~~

1. ~~Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~
2. ~~Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently in place.~~

~~**R905.3.3.2 High slope roofs.** For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches (51 mm), fastened sufficiently in place.~~

~~**R905.3.3.3 Underlayment and high wind.** Underlayment applied in areas subject to high wind [over 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

(Renumber remaining sections)

~~**R905.4.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or Type 11, ASTM D 4869, Type I or Type 11, or ASTM D 1970. Underlayment shall be installed in accordance with the manufacturer's installation instructions.~~

~~**R905.4.3.1**~~ **R905.4.3 Ice barrier.** In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(l), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area.*

~~**R905.5.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

~~**R905.5.3.1**~~ **R905.5.3 Ice barrier.** In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(l), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underpayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area.*

~~**R905.6.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type 1, or ASTM D 4869, Type I or II. Underlayment shall be installed in accordance with the manufacturer's installation instructions.~~

~~**R905.6.3.1**~~ **R905.6.3 Ice barrier.** In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(l), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area.*

~~**R905.7.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

~~**R905.7.3.1**~~ **R905.7.3 Ice barrier.** In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(l), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area.*

~~**R905.8.3 Underlayment.** Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

~~**R905.8.3.1**~~ **R905.8.3 Ice barrier.** In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(l), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area.*

~~**R905.10.5 Underlayment.** Underlayment shall be installed in accordance with the manufacturer's installation instructions.~~

Commenter's Reason: The original proposal would increase the likelihood of holding roof covering underlayment in place if roof coverings were lost to high winds. The proposal's fastener types and fastener spacing were arbitrary; they were not developed by consensus tests or engineering analysis, or from commercially available products. The original proposal would make it difficult to build the planned performance level with specified fasteners. Last, the original intent could be achieved with one concise code section rather than adding redundant language to eight code sections.

Our proposed modification provides the same or better underlayment fastening with more fastener options, with concise code language.

Public Comment 2:

Gary J. Ehrlich, P.E., National Association of Home Builders, requests Disapproval.

Commenter's Reason: The purpose of this public comment is to request disapproval of the underlayment provisions approved at the Public Hearings in Baltimore. The proposal added extensive requirements for underlayment in multiple sections of Chapter 9. While we recognize the desire to maintain separate sets of requirements for each roofing material (e.g. asphalt shingles, metal roofing, concrete and clay tiles), the overall section is becoming lengthy, and we are concerned it has become difficult to insure consistent are maintained across all the roofing types covered in Chapter 9.

We question the need to increase the thickness and fastening requirements for the underlayment currently required by the code. The tests referenced by the reason statement were not provided to the committee or the membership for review. Therefore, we cannot verify the proponent's claim that the increased requirements are either justified or consistent with the research. The IBC Structural Committee, usually sympathetic to proposals which increase the stringency of code requirements, specifically noted the absence of technical data in disapproving Part I of this code change.

The underlayment gets installed beneath a roof covering which itself is fastened to the roof deck, purlins, or other substrate. If the underlayment has become exposed to the full wind pressure, clearly the roof covering has been lost. It would make more sense to concentrate on insuring that the roof covering is properly selected and installed for the basic wind speed specified for the dwelling.

Finally, we note that Section R301.2.1.1 limits the wind provisions of the IRC to 110mph. Where the basic wind speed equals or exceeds 110mph, the code user must refer to the applicable provisions of the listed documents in that section. That list of standards includes the ICC-600 *Standard for Residential Construction in High-Wind Regions,* which contains roof covering requirements (including underlayment) in Sections 504 and 505. The ICC-600 requirements would therefore be the governing provisions in areas of 110mph wind speeds and higher. To add high-wind provisions to the IRC itself would risk creating conflicts with ICC-600, as well as making the IRC unwieldy for the majority of code users who are not in high-wind regions.

Final Action: AS AM AMPC____ D

S23-09/10-PART I
1507.17 (New)

Proposed Change as Submitted

Proponent: Bob Eugene, representing Underwriters Laboratories Inc.

PART I – IBC STRUCTURAL

Add new text as follows:

<u>**1507.17 Formed plastic shingles**. The installation of formed plastic shingles shall comply with the provisions of this section.</u>

<u>**1507.17.1 Attachment.** Plastic shingles shall be attached as required by the manufacturer.</u>

<u>**1507.1.1 Wind resistance.** Plastic shingles shall be tested in accordance with procedures adapted from ASTM D 3161.Plastic shingles shall comply with the classification requirements of Table 1507.2.7.1(1) for the appropriate maximum basic wind speed. Plastic shingle packaging shall bear a label to indicate compliance with the procedures adapted from ASTM D 3161 and the required classification from Table 1507.2.7.1(2).</u>

Reason: The proposal provides guidance for installers and code officials regarding the installation of formed plastic shingles. The appropriate design slope and fastening of the shingles are different for each manufacturer's product. For wind resistance, the procedures used in ASTM D 3161 for asphalt shingles are appropriate to use, when adapted for these types of shingles.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EUGENE-S2-1507.17

Public Hearing Results

PART I- IBC STRUCTURAL
Committee Action: **Disapproved**

Committee Reason: There are concerns with the proposal to adapt an asphalt shingle standard to formed plastic shingles.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene, Underwriters Laboratories, Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IBC STRUCTURAL

FORMED PLASTIC SHINGLES. A roof covering composed of plastic in sheets fabricated into shingles.

1507.17 Formed plastic shingles. The installation of formed plastic shingles shall comply with the provisions of this section.

1507.17.1 Sheathing requirements. Formed plastic shingles shall be fastened to solidly sheathed decks.

1507.17.2 Deck slope. Formed plastic shingles shall not be installed on roofs below three units vertical in 12 horizontal (25-percent slope).

1507.17.3 Underlayment. Underlayment shall comply with ASTM D 226, Type I or Type II, ASTM D 4869, Type I or Type II, or ASTM D 1970. Underlayment shall be installed in accordance with the manufacturer's installation instructions.

1507.17.3.1 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area*.

1507.17.4 Material standards. Formed plastic shingles shall be listed in accordance with UL 790.

~~**1507.17.1**~~ **1507.17.5 Attachment.** Formed ~~P~~plastic shingles shall be ~~attached~~ secured to the roof deck in accordance with this chapter and the approved ~~as required by the~~ manufacturer's instructions.

~~**1507.17.1.1**~~ **1507.17.5.1 Wind resistance.** Plastic shingles shall be tested in accordance with procedures adapted from ASTM D 3161.Plastic shingles shall comply with the classification requirements of Table 1507.2.7.1(1) for the appropriate maximum basic wind speed. Plastic shingle packaging shall bear a label to indicate compliance with the procedures adapted from ASTM D 3161 and the required classification from Table 1507.2.7.1(2).

1507.17.6 Flashing. At the juncture of roof vertical surfaces, flashing and counterflashing shall be provided in accordance with this chapter and the manufacturer's installation instructions and, where of metal, shall not be less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). Valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of Type I underlayment running the full length of the valley, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less, metal valley flashing underlayment shall be solid-cemented to the roofing underlayment for slopes less than seven units vertical in 12 units horizontal (58-percent slope) or be of self-adhering polymer modified bitumen sheet.

Commenter's Reason: Formed plastic shingles are routinely installed. UL had proposed adding the supplemental criteria for wind resistant applications, but the committees rightly noted that the basic application for formed plastic shingles was not clearly included in the code. In response, applicable provisions have been incorporated for plastic shingles consistent with other comparable roofing applications already governed by the code. Additionally, the scope of ASTM D3161 is in the process of being broadened to include these products.

Final Action: AS AM AMPC____ D

S23-09/10- PART II
IRC R905.16 (New)

Proposed Change as Submitted

PART II – IRC BUILDING/ENERGY

Add new text as follows:

R905.16 Formed plastic shingles. The installation of formed plastic shingles shall comply with the provisions of this section.

R905.16.1 Attachment. Plastic shingles shall be attached as required by the manufacturer.

R905.16.1.1 Wind resistance. Plastic shingles shall be tested in accordance with procedures adapted from ASTM D 3161. Plastic shingles shall meet the classification requirements of Table R905.2.4.1 (2) for the appropriate maximum basic wind speed. Plastic shingle packaging shall bear a label to indicate compliance with the procedures adapted from ASTM D 3161 and the required classification from Table R905.2.4.1 (2).

Reason: The proposal provides guidance for installers and code officials regarding the installation of formed plastic shingles. The appropriate design slope and fastening of the shingles are different for each manufacturer's product. For wind resistance, the procedures used in ASTM D 3161 for asphalt shingles are appropriate to use, when adapted for these types of shingles.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: EUGENE-S2-1507.17

Public Hearing Results

PART II- IRC B/E
Committee Action: **Disapproved**

Committee Reason: There is no definition of the term "formed plastic shingles". Other requirements need to be addressed, such as deck, underlayment and flashing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene, Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART II – IRC BUILDING/ENERGY

FORMED PLASTIC SHINGLES. A roof covering composed of plastic in sheets fabricated into shingles.

R905.16 Formed plastic shingles. The installation of formed plastic shingles shall comply with the provisions of this section.

R905.16.1 Sheathing requirements. Formed plastic shingles shall be fastened to solidly sheathed decks.

R905.16.2 Deck slope. Formed plastic shingles shall not be installed on roofs below three units vertical in 12 horizontal (25-percent slope).

R905.16.3 Underlayment. Underlayment shall comply with ASTM D 226, Type I or Type II, ASTM D 4869, Type I or Type II, or ASTM D 1970. Underlayment shall be installed in accordance with the manufacturer's installation instructions.

R905.16.3.1 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached *accessory structures* that contain no *conditioned floor area*.

R905.16.4 Material standards. Formed plastic shingles shall be listed in accordance with UL 790.

~~**R905.16.1**~~ **R905.16.5 Attachment.** Formed ~~P~~plastic shingles shall be ~~attached~~ secured to the roof deck in accordance with this chapter and the approved ~~as required by the~~ manufacturer's instructions.

~~**R905.16.1.1**~~ **R905.16.5.1 Wind resistance.** Plastic shingles shall be tested in accordance with procedures adapted from ASTM D 3161. Plastic shingles shall meet the classification requirements of Table R905.2.4.1 (2) for the appropriate maximum basic wind speed. Plastic shingle packaging shall bear a label to indicate compliance with the procedures adapted from ASTM D 3161 and the required classification from Table R905.2.4.1 (2).

R905.16.6 Flashing. At the juncture of roof vertical surfaces, flashing and counterflashing shall be provided in accordance with this chapter and the manufacturer's installation instructions and, where of metal, shall not be less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). Valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of Type I underlayment running the full length of the valley, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less, metal valley flashing underlayment shall be solid-cemented to the roofing underlayment for slopes less than seven units vertical in 12 units horizontal (58-percent slope) or be of self-adhering polymer modified bitumen sheet.

Commenter's Reason: See S23-09/10, Part I

Final Action: AS AM AMPC____ D

S26-09/10
1509.1, 1509.2.4

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, City of San Jose**,** representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay)

Revise as follows:

1509.1 General. The provisions of this section shall govern the construction of rooftop structures and of rooftop mounted enclosures such as mechanical equipment screens.

1509.2.4 Type of construction. Penthouses and other rooftop enclosures shall be constructed with walls, floors and roof as required for the building.

Exceptions:

1. On buildings of Type I construction, the exterior walls and roofs of penthouses with *a fire separation distance* of more than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be of at least 1-hour fire resistance rated noncombustible construction. Walls and roofs with a *fire separation distance* of 20 feet (6096 mm) or greater shall be of noncombustible construction. Interior framing and walls shall be of noncombustible construction.
2. On buildings of Type I construction two stories above *grade plane* or less in height and Type II construction, the exterior walls and roofs of penthouses with a *fire separation distance* of more than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be of at least 1-hour fire-resistance-rated noncombustible *or fire-retardant-treated wood* construction. Walls and roofs with *a fire separation distance* of 20 feet (6096 mm) or greater shall be of noncombustible or *fire-retardant-treated wood* construction. Interior framing and walls shall be of noncombustible or fire retardant- treated wood construction.
3. On buildings of Type III, IV and V construction, the exterior walls of penthouses with a *fire separation distance* of more than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be at least 1-hour fire resistance-rated construction. Walls with a *fire separation distance* of 20 feet (6096 mm) or greater from a common property line shall be of Type IV construction or noncombustible, *or fire-retardant-treated wood* construction. Roofs shall be constructed of materials and fire-resistance rated as required in Table 601 and Section 603 Item 25.3. Interior framing and walls shall be Type IV construction or noncombustible or *fire-retardant-treated wood* construction.
4. On buildings of Type I construction, unprotected noncombustible enclosures including screens housing only mechanical equipment and located with a minimum *fire separation distance* of 20 feet (6096 mm) shall be permitted.
5. On buildings of Type I construction two stories or less above *grade plane* in height, or Type II, III, IV, and V construction, unprotected noncombustible or *fire-retardant-treated wood* enclosures including screens housing only mechanical equipment and located with a *minimum fire separation distance* of 20 feet (6096 mm) shall be permitted.
6. On one-story buildings, combustible unroofed mechanical equipment screens, fences or similar enclosures are permitted where located with a *fire separation distance* of at least 20 feet (6096 mm) from adjacent property lines and where not exceeding 4 feet (1219 mm) in height above the roof surface.
7. Dormers shall be of the same type of construction as the roof on which they are placed, or of the exterior walls of the building.

Reason: The provisions of Section 1509 include more than just "*rooftop structures*" that are defined in Section 1502 as "*an enclosed structure*", such as a penthouse. The section currently contains provisions for unroofed mechanical equipment screens and towers that may be unenclosed. As a result, there have been disagreements between code enforcers and designers regarding the application of fire resistance rules specified within the exceptions to Section 1509.2.4, to *unenclosed* rooftop structures such as mechanical equipment screens. To address this, the scope statement in Section 1509.1 is revised to specifically add rooftop mounted enclosures such as mechanical equipment screens.

Current exceptions 4, 5 and 6 to Section 1509.2.4 address more than just penthouses. According to written interpretations from ICC staff (Paul Wong), these exceptions are intended to address the necessary fire resistance of mechanical equipment screens that are unenclosed rooftop structures. To clarify this intent, the wording in Exceptions 4 and 5 is revised to state "*enclosures including screens*". The wording in exception 6 is not revised because it is clear that it applies to roof screens as currently written. Exception 6 however is limited to screens having a maximum height of 4'-0", and many jurisdictions require taller screens to hide roof mounted HVAC equipment. As a result exceptions 4 and 5 provide rules that can be applied to those taller screens.

Each of these changes in intended to clarify that unenclosed roof screens are specifically included in the provisions.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MAIEL-S2-1509.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Although the proposal would provide more specific standards and options based on different types of equipment, the committee felt the proposal lacked technical justification. It was not clear what the hazards were regarding mechanical equipment screens that would necessitate that they be more strictly regulated than the roof surface on which they sit.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, PE., City of San Jose, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Chapters), requests Approval as Submitted.

Commenter's Reason: Section 1509.2.4 Exception 6 currently regulates unroofed *mechanical equipment screens, fences and similar enclosures*, but only gives guidance for the construction of those elements located on one-story buildings. Clearly, buildings of other story heights utilize rooftop mechanical equipment screens, fences and similar enclosures, but nothing in current Section 1509 specifically address roof screens on those taller buildings.

The fire resistance that is being proposed for mechanical equipment screens will be no more restrictive than those already stated in Exception No. 4 and 5 for the walls of *enclosures housing only mechanical equipment*. We believe that applying the same rules to roof screens is not more restrictive than the current code, it simply clarifies what should be required. The proposed change simply spells out that roof screens are intended to be regulated consistent with ICC staff interpretations of this section and its exceptions.

A question raised by one of the committee members relating to how the fire resistant construction of roof screens compares with what is permitted for roof coverings is not the subject of this proposal. We did not profess in the original reason statement or nor did we ever believe that there is any relationship between roof screens and roof coverings. Instead the premise of the code change was and still is that roof screens are very similar to walls of roof structure enclosures and should be regulated consistent with those existing provisions. We ask that this simple change, to address roof screens on buildings over one-story in height be added to the code.

Final Action: AS AM AMPC____ D

S27-09/10

1509.2-1509.5.2, 1509.6-1509.7.5 (New)

Proposed Change as Submitted

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing Alcan Composites USA, Inc. and Jesse J. Beitel, Hughes Associates, Inc., representing, Trespa North America, Ltd.

1. Revise as follows:

1509.1 General. The provisions of this section shall govern the construction of rooftop structures.

1509.2 Penthouses. ~~A penthouse or~~ Penthouses in compliance with Sections 1509.2.1 through ~~1509.2.4~~ 1509.2.5 shall be considered as a portion of the story directly below the roof deck on which such penthouses are located. All other penthouses shall be considered as an additional story of the building.

1509.2.1 Height above roof deck. ~~A penthouse~~ Penthouses ~~or other projection above the roof in structures constructed on~~ buildings of other than Type I construction ~~shall not exceed 28 feet (8534 mm) above the roof where used as an enclosure for tanks or for elevators that run to the roof and in all other cases~~ shall not exceed ~~extend more than~~ 18 feet (5486 mm) in height above the roof deck as measured to the average height of the roof of the penthouse.

Exceptions:

1. Where used to enclose tanks or elevators that travel to the roof level, penthouses shall be permitted to have a maximum height of 28 feet (8534 mm) above the roof deck.
2. Penthouses located on the roof of buildings of Type I construction shall not be limited in height.

1509.2.2 Area limitation. The aggregate area of penthouses and other enclosed rooftop structures shall not exceed one-third the area of the supporting roof deck. Such penthouses and other enclosed rooftop structures shall not be required to be included in determining ~~contribute to either~~ the building area or number of stories as regulated by Section 503.1. The area of ~~the penthouse~~ such penthouses shall not be included in determining the fire area ~~defined~~ specified in Section 901.7 ~~902~~.

1509.2.3 Use limitations. ~~A penthouse~~ Penthouses~~, bulkhead or any other similar projection above the roof~~ shall not be used for purposes other than the shelter of mechanical or electrical equipment or ~~shelter of~~ vertical shaft openings in the roof assembly.

1509.2.4 Weather protection. Provisions such as louvers, louver blades or flashing shall be made to protect the mechanical and electrical equipment and the building interior from the elements. ~~Penthouses or bulkheads used for purposes other than permitted by this section shall conform to the requirements of this code for an additional story. The restrictions of this section shall not prohibit the placing of wood flagpoles or similar structures on the roof of any building.~~

~~**1509.2.4**~~ **1509.2.5 Type of construction.** Penthouses shall be constructed with walls, floors and roof as required for the type of construction of the building on which such penthouses are built.

Exceptions:

1. On buildings of Type I construction, the exterior walls and roofs of penthouses with a fire separation distance ~~of more~~ greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a ~~of at least~~ 1-hour fire resistance-rating ~~rated noncombustible construction~~. The exterior walls and roofs of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall ~~be of noncombustible construction~~ not be required to have a fire-resistance rating. ~~Interior framing and walls shall be of noncombustible construction.~~
2. On buildings of Type I construction two stories or less in height above grade plane or ~~less in height and~~ Type II construction, the exterior walls and roofs of penthouses with a fire separation distance ~~of more~~ greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a ~~of at least~~ 1-hour fire-resistance-rating ~~rated noncombustible or~~ and be constructed of fire-retardant-treated wood ~~construction~~. The exterior walls and roofs of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall be permitted to be constructed of ~~noncombustible or~~ fire-retardant-treated wood ~~construction~~ and shall not be required to have a fire-resistance rating. Interior framing and walls shall be permitted to be constructed of ~~noncombustible or~~ fire retardant treated wood ~~construction~~.
3. On buildings of Type III, IV or ~~and~~ V construction, the exterior walls of penthouses with a fire separation distance ~~of more~~ greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a ~~at least~~ 1-hour fire-resistance-rating or a lesser fire-resistance rating as required by Table 602 ~~rated construction~~. The exterior walls of penthouses with a fire separation distance of 20 feet (6096 mm) or greater ~~from a common property line~~ shall be of Type IV construction, or shall be constructed of noncombustible~~,~~ or fire-retardant-treated wood, ~~construction~~ and shall not be required to have a fire-resistance rating. ~~Roofs shall be constructed of materials and fire-resistance rated as required in Table 601 and Section 603, Item 25.3. Interior framing and walls shall be Type IV construction or noncombustible or fire-retardant-treated wood construction.~~
4. ~~On buildings of Type I construction, unprotected noncombustible enclosures housing only mechanical equipment and located with a minimum fire separation distance of 20 feet (6096 mm) shall be permitted.~~

4 ~~5~~. On buildings of ~~Type I construction two stories or less above grade plane in height, or~~ Type ~~II,~~ III, or IV ~~and V~~ construction, ~~unprotected~~ penthouses constructed of noncombustible materials or fire-retardant-treated wood, ~~enclosures~~ housing only mechanical equipment, and located with a ~~minimum~~ fire separation

distance ~~of~~ not less than 20 feet (6096 mm) shall be permitted and shall not be required to be fire-resistance-rated.

6. ~~On one-story buildings, combustible unroofed mechanical equipment screens, fences or similar enclosures are permitted where located with a fire separation distance of at least 20 feet (6096 mm) from adjacent property lines and where not exceeding 4 feet (1219 mm) in height above the roof surface.~~
7. ~~Dormers shall be of the same type of construction as the roof on which they are placed, or of the exterior walls of the building.~~

1509.3 Tanks. Tanks having a capacity of more than 500 gallons (2 m^3) ~~placed in or~~ located on the roof deck of a building shall be supported on masonry, reinforced concrete, steel or Type IV construction provided that, where such supports are located in the building above the lowest story, the support shall be fire-resistance rated as required for Type IA construction.

1509.3.1 Valve and drain. ~~Such tanks shall have~~ In the bottom or on the side near the bottom of the tank, a pipe or outlet~~,~~ fitted with a suitable quick opening valve for discharging the contents in an emergency into a ~~through an adequate~~ drain shall be provided.

1509.3.2 Location. ~~Such~~ Tanks shall not be placed over or near a ~~line of stairs~~ stairway or an elevator shaft, unless there is a solid roof or floor underneath the tank.

1509.3.3 Tank cover. Unenclosed ~~roof~~ tanks shall have covers sloping toward the ~~outer edges~~ perimeter of the tanks.

1509.4 Cooling towers. Cooling towers located on the roof deck of a building and greater than ~~in excess of~~ 250 square feet (23.2 m^2) in base area or greater than ~~in excess of~~ 15 feet (4572 mm) ~~high~~ in height above the roof deck, as measured to the highest point on the cooling tower, where ~~located on building~~ the roof~~s more~~ is greater than 50 feet (15 240 mm) ~~high~~ in height above grade plane shall be constructed of noncombustible materials ~~construction~~. The base area of cooling towers shall not exceed one-third the area of the supporting roof deck ~~area~~.

> **Exception:** Drip boards and the enclosing construction shall be permitted to be ~~of~~ wood not less than 1 inch (25 mm) nominal thickness, provided the wood is covered on the exterior of the tower with noncombustible material.

1509.5 Towers, spires, domes and cupolas. ~~Any tower, spire, dome or cupula~~ Towers, spires, domes and cupolas shall be of a type of construction ~~not less in~~ having fire-resistance ~~rating~~ ratings not less than required for the building ~~to~~ on top of which ~~it~~ such tower, spire, dome or cupola is built. ~~attached, except that any such tower, spire, dome or cupula~~ Towers, spires, domes and cupolas greater than ~~that exceeds~~ 85 feet (25 908 mm) in height above grade plane as measured to the highest point on such structures, and either greater than ~~exceeds~~ 200 square feet (18.6 m2) in horizontal area or ~~is~~ used for any purpose other than a belfry or an architectural embellishment, shall be constructed of and supported on Type I or II construction.

1509.5.1 Noncombustible construction required. ~~Any tower, spire, dome or cupula~~ Towers, spires, domes and cupolas ~~that exceeds~~ greater than 60 feet (18 288 mm) in height above the highest point at which ~~it comes in~~ such structure contacts ~~contact with~~ the roof as measured to the highest point on such structure, or that exceeds 200 square feet (18.6 m^2) in area at any horizontal section, or which is intended to be used for any purpose other than a belfry or architectural embellishment, or is located on the top of a building greater than 50 feet (1524 mm) in building height shall be ~~entirely~~ constructed of and supported by noncombustible materials~~. Such structures~~ and shall be separated from the building below by construction having a fire-resistance rating of not less than 1.5 hours with openings protected in accordance with Section 712. ~~with a minimum 1.5-hour fire protection rating. Structures, except aerial supports 12 feet (3658 mm) high or less, flagpoles, water tanks and cooling towers, placed above~~ Such structures located on the top ~~roof~~ of a ~~any~~ building ~~more~~ greater than 50 feet (15 240 mm) in building height~~, shall be of noncombustible material and~~ shall be supported by noncombustible construction ~~of noncombustible material~~.

1509.5.2 Towers and spires. Enclosed towers and spires ~~where enclosed~~ shall have exterior walls constructed as required for the building ~~to~~ on top of which ~~they~~ such towers and spires are built ~~attached~~. The roof covering of spires shall not be ~~of a~~ less than the same class of roof covering ~~as~~ required for the ~~main roof of the rest of the structure~~ building on top of which the spire is located.

2. Add new text as follows:

1509.6 Mechanical equipment screens. Mechanical equipment screens shall be constructed of the materials specified for the exterior walls in accordance with the type of construction of the building without being required to comply with the fire-resistance rating requirements.

1509.6.1 Height limitations. Mechanical equipment screens shall not exceed 18 feet (5486 mm) in height above the roof deck, as measured to the highest point on the mechanical equipment screen, and the highest point on the mechanical equipment screen, as measured to grade plane, shall not exceed the maximum building height allowed for the building by other provisions of this code.

> **Exception:** Where located on buildings of Type IA construction, the height of mechanical equipment screens shall not be limited.

1509.6.2 Types I, II, III, and IV construction. Regardless of the requirements in Section 1509.6, mechanical equipment screens shall be permitted to be constructed of combustible materials where located on the roof decks of building of Type I, II, III, or IV construction in accordance with any of the following limitations:

1. The fire separation distance shall not be less than 20 feet (6096 mm) and the height of the mechanical equipment screen above the roof deck shall not exceed 4 feet (1219 mm) as measured to the highest point on the mechanical equipment screen.
2. The fire separation distance shall not be less than 20 feet (6096 mm) and the mechanical equipment screen shall be constructed of fire-retardant-treated wood complying with Section 2302.2 for exterior installation.
3. The materials shall have a flame spread index of 25 or less when tested in the minimum and maximum thicknesses intended for use with each face tested independently in accordance with ASTM E 84 or UL 723, the facings shall be tested in the minimum and maximum thicknesses intended for use in accordance with, and shall comply with the acceptance criteria of, NFPA 285, and the facings shall be installed as tested but without any substrates or wall assemblies.

1509.6.3 Type V construction. The height of mechanical equipment screens located on the roof decks of buildings of Type V construction, as measured from grade plane to the highest point on the mechanical equipment screen,shall be permitted to exceed the maximum building height allowed for the building by other provisions of this code where complying with any one of the following limitations, provided the fire separation distance is greater than 5 feet (1524 mm):

1. Where the fire separation distance is not less than 20 feet (6096 mm), the height above grade plane of the mechanical equipment screen shall not exceed 4 feet (1219 mm) more than the maximum building height allowed,
2. The mechanical equipment screen shall be constructed of noncombustible materials,
3. The mechanical equipment screen shall be constructed of fire-retardant-treated wood complying with Section 2303.2 for exterior installation, or
4. Where fire separation distance is not less than 20 feet (6096 mm), the mechanical equipment screen shall be constructed of materials having a flame spread index of 25 or less when tested in the minimum and maximum thicknesses intended for use in accordance with ASTM E 84 or UL 723.

1509.7 Other rooftop structures. Rooftop structures not regulated by Sections 1509.2 through 1509.6 shall comply with Section 1509.7.1 through 1509.7.5 as applicable.

1509.7.1 Aerial supports. Aerial supports shall be constructed of noncombustible materials.

> **Exception:** Aerial supports not greater than 12 feet (3658 mm) in height as measured from the roof deck to the highest point on the aerial supports shall be permitted to be constructed of combustible materials.

1509.7.2 Bulkheads. Bulkheads used for the shelter of mechanical or electrical equipment or vertical shaft openings in the roof assembly shall comply with Section 1509.2 as penthouses. Bulkheads used for any other purpose shall be considered as an additional story of the building.

1509.7.3 Dormers. Dormers shall be of the same type of construction as required for the roof in which such dormers are located or the exterior walls of the building.

1509.7.4 Fences. Fences and similar structures shall comply with Section 1509.6 as mechanical equipment screens.

1509.7.5 Flagpoles. Flagpoles and similar structures shall not be required to be constructed of noncombustible materials and shall not be limited in height or number.

3. Revise as follows:

1502.1 General. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

MECHANICAL EQUIPMENT SCREEN. A ~~partially enclosed~~ rooftop structure, not covered by a roof, used to aesthetically conceal ~~heating, ventilating and air conditioning (HVAC)~~ plumbing, electrical or mechanical equipment from view.

PENTHOUSE. An enclosed, unoccupied rooftop structure ~~above the roof of a building, other than a tank, tower, spire, dome, cupola or bulkhead.~~ used for sheltering mechanical and electrical equipment, tanks, elevators and related machinery, and vertical shaft openings.

ROOF DECK. The flat or sloped surface constructed on top of the exterior walls of a building or other supports for the purpose of enclosing the story below, or sheltering an area, to protect it from the elements, not including its supporting members or vertical supports.

ROOFTOP STRUCTURE. ~~An enclosed~~ A structure erected on ~~or above~~ top of the roof deck or on top of any part of a building.

Reason: The vast majority of the revisions proposed in this code change are editorial in nature but there are also a few technical changes, some of which are significant. The editorial changes are provided for:

clarification
elimination of redundant language including redundant Exceptions
consistency of terminology and application of requirements to specific types of rooftop structures
reformatting regarding the use of the Exception format
reformatting into subsections that deal with different requirements contained in the same section
determination of the height of rooftop structures

We have also provided phraseology to address how to determine the height of a rooftop structure since that height is not defined, unlike "Building Height" which is defined in Section 502.1. We have also substituted the term "roof deck" for the word "roof" since it is a defined term found in Section 1502.1. We have also proposed to revise the definition for "Roof Deck" to clarify its application and make it more specific.

The specific revisions proposed to each Subsection of Section 1509 are discussed in the following.

1509.2 Penthouses. The revision to the first sentence clarifies that the story below, of which the penthouse would be considered a portion if complying with these provisions, is the story that is located directly below the roof deck on which the penthouse is located. Since there are many stories below the penthouse, although it may be obvious, this clearly indicates that it is the story directly below the roof deck on which the penthouse is located. The second sentence merely makes it clear that any other penthouse not compliant with these provisions would actually be considered as an additional story of the building.

1509.2.1 Height above roof deck. The reference to other projections above the roof has been deleted since the focus of this section is penthouses which are defined in Section 1502.1. In fact, the definition for "Penthouse" is proposed to be revised by this code change to further clarify it based on the intent of the section addressing penthouses. Also, we have added new Sections 1509.6 and 1509.7 which address other projections above the roof. This section has also been reformatted into Exception format to make its application more clear and the wording has been revised to be consistent with other code text used throughout the code. These revisions should not result in any technical changes.

1509.2.2 Area limitation. The word "enclosed" is proposed to be added to modify the term "rooftop structures" to be consistent with the proposed revision to the definition for "rooftop structure" contained in this code change. It is our opinion that a rooftop structure encompasses all of the types of enclosures and other projections that could be located or constructed on the top of a roof deck of a building, so it would include both enclosed and unenclosed structures. So the definition of rooftop structure has been broadened to delete the limitation on enclosed structures. In this way both mechanical equipment screens, for which the definition is also being revised by this code change proposal, and penthouses become subsets of "rooftop enclosures". Mechanical equipment screens are not covered by a roof so they are not enclosed and "penthouses" are truly enclosed structures. The definition for "Mechanical Equipment Screen," as noted, is proposed to be revised to indicate that it is a rooftop structure that is not covered by a roof and is, thus, not enclosed. We believe this is a better definition than relying on the term "partially enclosed" which is proposed to be deleted in the definition for "Mechanical Equipment Screen." In the last sentence rather than referring to the definition for "Fire Area" in Section 902, we believe it is more appropriate to refer to where fire areas are used in Section 901.7 to clarify the intent of this sentence.

1509.2.3 Use limitations. The reference to "bulkhead or any other similar projection above the roof" has been deleted since it is being addressed in a proposed new Section 1509.7.2 as it is out of context in this section on penthouses. This section has also been revised to include electrical equipment as a part of the sheltering function of a penthouse since most mechanical equipment installations will also be associated with electrical equipment. The word "assembly" has been added to the word "roof" since "roof assembly" is a defined term in Section 1502.1.

New Section 1509.2.4 Weather protection. This is a reformatting of the section since this sentence addresses a separate requirement from the use limitations provisions in Section 1509.2.3. Again, "electrical equipment" has also been added for the same reasons as noted above. The second sentence has been deleted since it is redundant as it has already been addressed in Section 1509.2. The last sentence has been deleted since it is out of context as it addresses wood flagpoles or similar structures on the roofs of buildings. It has been relocated to a new Section 1509.7.5.

1509.2.5 Type of construction. The revision to the charging paragraph is basically a clarification for specifying compliance with the type of construction of the building on which the penthouses are built.

Exception 1. These revisions are editorial to be consistent with terminology used throughout the code. The revisions to the second sentence are to implement the intent of these Exceptions which address the fire-resistance ratings not being required. By default, this results in noncombustible construction in a Type I building. The last sentence has been deleted because it is unnecessary as this is a basic requirement for buildings of Type I construction.

Exception 2. Again, these are basically editorial revisions to use terminology consistent with the rest of the code and to be consistent with the revisions to Exception 1 as noted above. The revisions to the last sentence are made for the same reasons as noted in Exception 1 above where noncombustible construction is the requirement for such partitions, but the intent of the section is to allow for the use of fire-retardant-treated wood in lieu of noncombustible construction.

Exception 3. Since this is an Exception, the word “and” has been changed to “or” in the list of the types of construction to which this Exception is applicable. Additional editorial revisions have been made to be consistent with those made to Exceptions 1 and 2 above. The phrase “from a common property line” has been deleted because it is unnecessary since the term “fire separation distance” is a defined term in Section 702.1. The next to the last sentence has been deleted as it is unnecessary based on the charging sentence in Section 1509.2.4 to which this is an Exception. This appears to be a code requirement within an Exception that is not necessary. Similarly, the last sentence has also been deleted since other provisions of the code already allow such construction.

Exception 4. This Exception has been deleted since it is redundant. It is covered by Exception 1 above and is actually more limiting than Exception 1.

Exception 5. The reference to Types I and II construction have been deleted as they are already covered by Exception 2 above, whereas this Exception as noted in Exception 4 above is somewhat more restrictive than Exception 2. The rest of the revisions are editorial by utilizing consistent terminology to that used throughout the rest of the code and to be consistent with the revisions to Exceptions 1 and 2 above.

Exception 6. This Exception is being deleted since it does not address penthouses and is, thus, out of context. The provisions of this Exception, however, have been utilized in the new Sections 1509.6 and 1509.7 being added by this code change which will be discussed later.

Exception 7. This section is also being deleted since it is out of context as it does not address penthouses. It has been editorially revised and relocated as new Section 1509.7.3.

1509.3 Tanks. This entire subsection including sub-subsections .1, .2, and .3 have been editorially revised with no technical changes.

1509.4 Cooling towers. This section has been revised to make it clear that it is only applicable to cooling towers located on the roof deck of a building. It also provides a clarification on how the height of the cooling tower is to be measured for applying the limitations in this section. The rest of the changes are editorial without technical change.

1509.5 Towers, spires, domes, and cupolas. These are editorial revisions to make the section consistent with the previous sections in terms of format and terminology and also to incorporate the method for measuring the height of these structures.

1509.5.1 Noncombustible construction required. The first sentence has been revised to be consistent with Section 1509.5 including how to make the measurements for the height of these structures. The last sentence has been revised and broken up into separate parts with the one part referencing the noncombustible construction limitation incorporated into the first sentence which deals with the construction of these structures, whereas the last sentence deals with the support of these structures under certain conditions. The second sentence has been revised to be included in the first sentence since it is conditional to the application of the first sentence. The reference to the minimum 1.5 hour fire protection rating for protection of openings in the 1.5 hour separation of the structures from the building below has been deleted with a reference to Section 712 provided. Section 712 addresses how to protect openings in horizontal assemblies. Generally speaking, opening protectives with fire protection ratings are not used to protect openings in horizontal assemblies unless those openings are protected with shaft enclosures with openings. However, there are floor fire door assemblies that can be used which have a fire-resistance rating, as opposed to a fire protection rating.

1509.5.2 Towers and spires. These are basically editorial clarifications without any technical change.

1509.6 Mechanical equipment screens. This is a new section being proposed to specifically address mechanical equipment screens which are defined in Section 1502.1. They are not otherwise addressed in Section 1509 with the exception of the out of context Exception 6 to Section 1509.2.4 which only addresses the type of construction of penthouses as previously noted. Also, as previously noted, we are proposing to revise the definition for “Mechanical Equipment Screen” in Section 1502.1 to make it clear that it is a rooftop structure that is not covered by a roof, rather than a “partially enclosed” rooftop structure.

This new section takes what we believe to be a conservative approach to the construction of mechanical equipment screens on roofs by specifying that they must be constructed of the same materials as required by the code for exterior walls based on the type of construction of the building on which they are located. However, it is proposed that they be exempt from the fire-resistance rating requirements since they do not fully enclose a space as they are without a roof and they represent a different exposure hazard than a penthouse, for example. Basically, the exposure hazard of a mechanical equipment screen is the combustibility of the screen itself and the amount of combustible materials it contains.

1509.6.1 Height limitations. The height limits specified in this section are also conservative, in our opinion, as they are based on those required for penthouses in Section 1509.2.1. The height limit is also based on the assumption that the overall height of the mechanical equipment screen should not exceed that allowed for the maximum building height for the type of construction of the building on which it is constructed. Thus, the need for the Exception for mechanical equipment screens located on buildings of Type IA construction which are not limited in height by Table 503.

1509.6.2 Types I, II, III, and IV construction. This new section is, in essence, an Exception to the requirements in Section 1509.6 for these types of construction which require the exterior walls to be constructed of noncombustible materials. The three itemized limitations in this section allow for combustible materials to be used for the construction of mechanical equipment screens based upon the provisions in those three items as discussed in the following.

Item 1. This item is based on Exception 6 to Section 1509.2.4 as previously noted for penthouses which has been deleted. The 1-story building height limitation has not been included since we believe it is not necessary. In our opinion, the hazard of a combustible mechanical equipment screen located on the roof of a Type I, II, III, or IV building with a fire separation distance of not less than 20 feet and with the height of the mechanical equipment screen limited to 4 feet above the roof deck is not a significant fire hazard. It is interesting to note that Table 705.8 Maximum Area of Exterior Wall Openings Based on Fire Separation Distance and Degree of Opening Protection would allow up to 45% of the exterior wall area of a nonsprinklered building to have unprotected openings and would allow unlimited unprotected openings in sprinklered buildings. Thus, for a building having floor-to-floor heights of at least 10 feet, which is very minimal, unprotected window openings around the entire perimeter could be as tall as 4.5 feet. This would represent a greater fire exposure, once the story flashes over and the windows break out, than a burning 4 foot high mechanical equipment screen which will normally be set back some distance from the face of the exterior wall.

Item 2. The provisions of this Item are based on Exceptions 2 and 3 to Section 1509.2.4 for penthouses with the 2-story limit on Type I buildings omitted. We believe this to be a reasonable approach since the hazard doesn’t justify limiting the Type I buildings to two stories in height where fire-retardant-treated wood is used to construct these unenclosed mechanical equipment screens. The main difference between Item 1 above and this Item 2 is that Item 2 does not place a 4 foot height limit on the height of the mechanical equipment screen above the roof deck. That is because it must be constructed of fire-retardant-treated wood as compared to any combustible material allowed by the code being permitted in Item 1. Of course, the height of the mechanical equipment screen is still limited to a maximum of 18 feet above the roof based on Section 1509.6.1. It is also limited to the maximum building height that would be allowed by the type of construction of the building in accordance with Section 1509.6.1 as well.

Item 3. These limitations are based on a totally new concept where the combustible materials used to build the mechanical equipment screen are limited to a maximum flame spread index of 25 (which is also required for fire-retardant-treated wood) and the materials are required to be successfully tested in accordance with NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-Bearing Wall Assemblies Containing Combustible Components. This is the same test method that is used to validate the use of foam-plastic insulations in exterior walls of Types I, II, III, and IV construction, as well as for the use of metal composite materials (MCM) in accordance with Section 1407.10. Although the material would be tested as the outer face (or skin) of the exterior wall in the NFPA 285 test as part of an exterior wall assembly, the test clearly assesses the surface flame spread resistance of the materials constituting the outer face, as well as to a certain degree, the inner face where it is exposed to any open cavities in the wall assembly. The NFPA 285 test is conducted for a full 30 minutes under severe fire exposure conditions to both the inside of the wall assembly and the outside of the wall assembly with an exterior window burner replicating a fire that has gone to post-flashover and has broken out a window, exposing the outside face of the exterior wall finish. Since the materials used to construct the mechanical equipment screen do not comprise a completely enclosed wall assembly, the maximum flame spread index of 25 has been proposed as a conservative limitation for the backside face of the material which may not have been directly exposed to the exterior window burner flame in the NFPA 285 test. Since the NFPA 285 test is used to qualify combustible materials for use where noncombustible exterior walls are required, it seems reasonable to allow its use for this application for mechanical equipment screens without the need to have the entire wall assembly constructed as tested for the mechanical equipment screen, instead utilizing the materials tested on the exterior face of the wall system in accordance with NFPA 285.

1509.6.3 Type V construction. This new section is basically an Exception to the requirements in Section 1509.6.1 Height Limitations for Type V construction where the mechanical equipment screens are allowed to be constructed of combustible materials. The one condition that must be met for all four options in this section is that the minimum fire separation distance must be greater than 5 feet which is consistent with Section 1406 Combustible Materials on the Exterior Side of Exterior Walls.

Item 1. This item is based on Exception 6 to Section 1509.2.4 for penthouses which has been deleted. It was limited to one story buildings. However, we don't see the hazard represented by a 4 foot high increase in the overall height of the mechanical equipment screen on buildings of Type V construction (which are allowed to be constructed entirely of combustible materials) as justifying that one story limitation. This is especially true where the fire separation distance specified is not less than 20 feet. Please refer to the discussion on Item 1 of Section 1509.6.2 above.

Item 2. This seems intuitively obvious to allow these mechanical equipment screens to be taller when they are constructed of noncombustible materials where combustible materials would otherwise be permitted. Noncombustible materials pose no additional fire load or fire exposure to the building.

Item 3. This allows the use of fire-retardant-treated wood which, although combustible, does not pose a significant fire hazard, in our opinion, when constructed as a mechanical equipment screen where there is a minimum 5 foot fire separation distance.

Item 4. This is somewhat similar to Item 3 in that fire-retardant-treated wood is required to have a maximum flame spread index of 25 as proposed for the combustible materials allowed in this item. However, there is an additional requirement that the fire separation distance be not less than 20 feet as compared to the base requirement of 5 feet for these provisions to be allowed to be used. We believe that the fire hazard associated with this type of installation would not be significant so as to allow the greater heights for the mechanical equipment screens installed on these Type V buildings. Again, please refer to the discussion on Item 1 of Section 1509.6.2 above regarding the minimum 20 foot fire separation distance limitation.

1509.7 Other rooftop structures. This new section becomes a catchall section to address other rooftop structures that are not specifically regulated by Sections 1509.2 through 1509.6. In reviewing Section 1509 we found references to such other rooftop structures as aerial supports covered in proposed new Section 1509.7.1, bulkheads covered in proposed new Section 1509.7.2, dormers covered in proposed new Section 1509.7.3, fences covered in proposed new Section 1509.7.4, and flagpoles covered in proposed new Section 1509.7.5. So we believe we have addressed all of the rooftop structures the code currently addresses.

1509.7.1 Aerial supports. The requirements for this section are taken from Section 1509.5.1 which were deleted because they were out of context in regard to the provisions of the section which addressed towers, spires, domes, and cupolas.

1509.7.2 Bulkheads. It is proposed to treat bulkheads like penthouses as we believe was intended by Section 1509.2.3 where bulkheads are currently referred to. We eliminated bulkheads from that section since it specifically addresses penthouses. In this way we keep the section clean and then simply reference it and require bulkheads to be constructed to meet those requirements as if they were penthouses. Looking at the definition for "Bulkhead" in Webster's dictionary, the most likely meaning within the context of Section 1509 is "a projecting framework with a sloping door giving access to a cellar stairway or a shaft."

1509.7.3 Dormers. This is where Exception 7 of Section 1509.2.4 was relocated after it was deleted from that section addressing penthouses since it was clearly out of context.

1509.7.4 Fences. It is our best judgment that fences should be treated as mechanical equipment screens since they are similar structures and can be considered similar in fire hazard. It should be noted that they are mentioned in Exception 6 to Section 1509.2.4 for penthouses which was deleted, again, as being out of context.

1509.7.5 Flagpoles. These requirements are taken from the last sentence of Section 1509.2.3 for penthouses which was deleted as being out of context.

In summary, it is readily obvious after delving into Section 1509 that it is very disjointed and inconsistent and utilizes terminology and language that is not consistent with the rest of the code. It appears to be, as it most likely is, an amalgam of the three legacy code requirements for rooftop structures which was put together without a lot of detailed evaluation or review. Since Trespa North America, Ltd. manufactures products that are used in many of these applications, we have come across many projects where Section 1509 has been attempted to be applied but without much success. It is extremely difficult to determine what the true intent is of many of the requirements, especially those that do not specifically address penthouses. We have tried our best to clarify and reformat this section to make it clearer to understand, easier to read and interpret, and, hopefully, more effectively enforced and applied. We hope that the Committee will give this comprehensive revision to Section 1509 serious and in-depth consideration so that we can fix it for the 2012 IBC, remembering that we only have one chance to get it corrected before the next edition is published.

Cost Impact: The proponent shall indicate one of the following regarding the cost impact of the code change proposal: The code change proposal will not increase the cost of construction.

ICCFILENAME: Thornberry-S1-1509

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee recognized the need to improve this section and acknowledged the efforts of the proponents. Based on the testimony provided and the number of attempted modifications, the proposal needs additional refinement before it can be approved. The committee also expressed concerns that some of the wall and screening requirements for the penthouses would be more stringent that the walls of the building below. There was an uncomfortable mixture of materials and fire resistance ratings. The various fire separation distances appeared inconsistent as did the variety of height limits.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rick Thornberry, PE, The Code Consortium, Inc., representing, Alcan Composites USA, Inc. and Jesse Beitel, Hughes Associates, Inc., representing Trespa North America. Ltd, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1509.2 Penthouses. Penthouses in compliance with Sections 1509.2.1 through 1509.2.5 shall be considered as a portion of the story directly below the roof deck on which such penthouses are located. All other penthouses shall be considered as an additional story of the building.

1509.2.1 Height above roof deck. Penthouses constructed on buildings of other than Type I construction shall not exceed 18 feet (5486 mm) in height above the roof deck as measured to the average height of the roof of the penthouse.

Exceptions:

1. Where used to enclose tanks or elevators that travel to the roof level, penthouses shall be permitted to have a maximum height of 28 feet (8534 mm) above the roof deck.
2. Penthouses located on the roof of buildings of Type I construction shall not be limited in height.

1509.2.2 Area limitation. The aggregate area of penthouses and other enclosed rooftop structures shall not exceed one-third the area of the supporting roof deck. Such penthouses and other enclosed rooftop structures shall not be required to be included in determining the building area or number of stories as regulated by Section 503.1. The area of such penthouses shall not be included in determining the fire area specified in Section 901.7.

1509.2.3 Use limitations. Penthouses shall not be used for purposes other than the shelter of mechanical or electrical equipment, tanks, or vertical shaft openings in the roof assembly.

1509.2.4 Weather protection. Provisions such as louvers, louver blades or flashing shall be made to protect the mechanical and electrical equipment and the building interior from the elements.

1509.2.5 Type of construction. Penthouses shall be constructed with walls, floors and roof as required for the type of construction of the building on which such penthouses are built.

Exceptions:

1. On buildings of Type I construction, the exterior walls and roofs of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire resistance-rating. The exterior walls and roofs of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall not be required to have a fire-resistance rating.
2. On buildings of Type I construction two stories or less in height above grade plane or Type II construction, the exterior walls and roofs of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire-resistance-rating or a lesser fire-resistance rating as required by Table 602 and be constructed of fire-retardant-treated wood. The exterior walls and roofs of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall be permitted to be constructed of fire-retardant-treated wood and shall not be required to have a fire-resistance rating. Interior framing and walls shall be permitted to be constructed of fire retardant treated wood.
3. On buildings of Type III, IV or V construction, the exterior walls of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire-resistance-rating or a lesser fire-resistance rating as required by Table 602. On buildings of Type III, IV or VA construction, the exterior walls of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall be permitted to be of Type IV ~~construction or shall be constructed of~~ or noncombustible construction or fire-retardant-treated wood and shall not be required to have a fire-resistance rating.
4. ~~On buildings of Type III or IV construction, penthouses constructed of noncombustible materials or fire-retardant-treated wood, housing only mechanical equipment, and located with a fire separation distance not less than 20 feet (6096 mm) shall be permitted and shall not be required to be fire-resistance-rated.~~

1509.3 Tanks. Tanks having a capacity of more than 500 gallons (2 m^3) located on the roof deck of a building shall be supported on masonry, reinforced concrete, steel or Type IV construction provided that, where such supports are located in the building above the lowest story, the support shall be fire-resistance rated as required for Type IA construction.

1509.3.1 Valve and drain. In the bottom or on the side near the bottom of the tank, a pipe or outlet fitted with a suitable quick opening valve for discharging the contents in an emergency into a drain shall be provided.

1509.3.2 Location. Tanks shall not be placed over or near a stairway or an elevator shaft, unless there is a solid roof or floor underneath the tank.

1509.3.3 Tank cover. Unenclosed tanks shall have covers sloping toward the perimeter of the tanks.

1509.4 Cooling towers. Cooling towers located on the roof deck of a building and greater than 250 square feet (23.2 m^2) in base area or greater than 15 feet (4572 mm) in height above the roof deck, as measured to the highest point on the cooling tower, where the roof is greater than 50 feet

(15 240 mm) in height above grade plane shall be constructed of noncombustible materials. The base area of cooling towers shall not exceed one-third the area of the supporting roof deck.

Exception: Drip boards and the enclosing construction shall be permitted to be wood not less than 1 inch (25 mm) nominal thickness, provided the wood is covered on the exterior of the tower with noncombustible material.

1509.5 Towers, spires, domes and cupolas. Towers, spires, domes and cupolas shall be of a type of construction having fire-resistance ratings not less than required for the building on top of which such tower, spire, dome or cupola is built. Towers, spires, domes and cupolas greater than 85 feet (25 908 mm) in height above grade plane as measured to the highest point on such structures, and either greater than 200 square feet (18.6 m^2) in horizontal area or used for any purpose other than a belfry or an architectural embellishment, shall be constructed of and supported on Type I or II construction.

1509.5.1 Noncombustible construction required. Towers, spires, domes and cupolas greater than 60 feet (18 288 mm) in height above the highest point at which such structure contacts the roof as measured to the highest point on such structure, or that exceeds 200 square feet (18.6 m^2) in area at any horizontal section, or which is intended to be used for any purpose other than a belfry or architectural embellishment, or is located on the top of a building greater than 50 feet (1524 mm) in building height shall be constructed of and supported by noncombustible materials and shall be separated from the building below by construction having a fire-resistance rating of not less than 1.5 hours with openings protected in accordance with Section 712. Such structures located on the top of a building greater than 50 feet (15240 mm) in building height shall be supported by noncombustible construction.

1509.5.2 Towers and spires. Enclosed towers and spires shall have exterior walls constructed as required for the building on top of which such towers and spires are built. The roof covering of spires shall not be less than the same class of roof covering required for the building on top of which the spire is located.

1509.6 Mechanical equipment screens. Mechanical equipment screens shall be constructed of the materials specified for the exterior walls in accordance with the type of construction of the building. Where the fire separation distance is greater than 5 feet (1524 mm), mechanical equipment screens shall not be ~~without being~~ required to comply with the fire-resistance rating requirements.

1509.6.1 Height limitations. Mechanical equipment screens shall not exceed 18 feet (5486 mm) in height above the roof deck, as measured to the highest point on the mechanical equipment screen~~, and the highest point on the mechanical equipment screen, as measured to grade plane, shall not exceed the maximum building height allowed for the building by other provisions of this code~~.

Exception: Where located on buildings of Type IA construction, the height of mechanical equipment screens shall not be limited.

1509.6.2 Types I, II, III, and IV construction. Regardless of the requirements in Section 1509.6, mechanical equipment screens shall be permitted to be constructed of combustible materials where located on the roof decks of building of Type I, II, III, or IV construction in accordance with any one of the following limitations:

1. The fire separation distance shall not be less than 20 feet (6096 mm) and the height of the mechanical equipment screen above the roof deck shall not exceed 4 feet (1219 mm) as measured to the highest point on the mechanical equipment screen.
2. The fire separation distance shall not be less than 20 feet (6096 mm) and the mechanical equipment screen shall be constructed of fire-retardant-treated wood complying with Section 2302.2 for exterior installation.
3. ~~The materials~~ Where exterior wall covering panels are used, the panels shall have a flame spread index of 25 or less when tested in the minimum and maximum thicknesses intended for use with each face tested independently in accordance with ASTM E 84 or UL 723~~, the facings~~. The panels shall be tested in the minimum and maximum thicknesses intended for use in accordance with, and shall comply with the acceptance criteria of, NFPA 285~~,~~ and ~~the facings~~ shall be installed as tested ~~but without any substrates or wall assemblies~~. Where the panels are tested as part of an exterior wall assembly in accordance with NFPA 285, the panels shall be installed on the face of the mechanical equipment screen supporting structure in the same manner as they were installed on the tested exterior wall assembly.

1509.6.3 Type V construction. The height of mechanical equipment screens located on the roof decks of buildings of Type V construction, as measured from grade plane to the highest point on the mechanical equipment screen, shall be permitted to exceed the maximum building height allowed for the building by other provisions of this code where complying with any one of the following limitations, provided the fire separation distance is greater than 5 feet (1524 mm):

1. where the fire separation distance is not less than 20 feet (6096 mm), the height above grade plane of the mechanical equipment screen shall not exceed 4 feet (1219 mm) more than the maximum building height allowed,
2. the mechanical equipment screen shall be constructed of noncombustible materials,
3. the mechanical equipment screen shall be constructed of fire-retardant-treated wood complying with Section 2302.2 for exterior installation, or
4. where fire separation distance is not less than 20 feet (6096 mm), the mechanical equipment screen shall be constructed of materials having a flame spread index of 25 or less when tested in the minimum and maximum thicknesses intended for use with each face tested independently in accordance with ASTM E 84 or UL 723.

1509.7 Other rooftop structures. Rooftop structures not regulated by Sections 1509.2 through 1509.6 shall comply with Section 1509.7.1 through 1509.7.5 as applicable.

1509.7.1 Aerial supports. Aerial supports shall be constructed of noncombustible materials.

Exception: Aerial supports not greater than 12 feet (3658 mm) in height as measured from the roof deck to the highest point on the aerial supports shall be permitted to be constructed of combustible materials.

1509.7.2 Bulkheads. Bulkheads used for the shelter of mechanical or electrical equipment or vertical shaft openings in the roof assembly shall comply with Section 1509.2 as penthouses. Bulkheads used for any other purpose shall be considered as an additional story of the building.

1509.7.3 Dormers. Dormers shall be of the same type of construction as required for the roof in which such dormers are located or the exterior walls of the building.

1509.7.4 Fences. Fences and similar structures shall comply with Section 1509.6 as mechanical equipment screens.

1509.7.5 Flagpoles. Flagpoles and similar structures shall not be required to be constructed of noncombustible materials and shall not be limited in height or number.

1502.1 General.

MECHANICAL EQUIPMENT SCREEN. A rooftop structure<u>, not covered by a roof,</u> used to aesthetically conceal plumbing, electrical or mechanical equipment from view.

PENTHOUSE. An enclosed, unoccupied rooftop structure used for sheltering mechanical and electrical equipment, tanks, elevators and related machinery, and vertical shaft openings.

ROOF DECK. The flat or sloped surface constructed on top of the exterior walls of a building or other supports for the purpose of enclosing the story below, or sheltering an area, to protect it from the elements, not including its supporting members or vertical supports.

ROOFTOP STRUCTURE A structure erected on top of the roof deck or on top of any part of a building.

Commenter's Reason: We have submitted this Public Comment with the sincere hope that the revisions we have included herein will satisfy the concerns expressed during the Public Hearings by several members of the IBC General Code Development Committee so that this much needed improvement to Section 1509 Rooftop Structures can be approved as revised during the ICC Final Action Hearings and incorporated into the 2012 edition of the IBC. As we all know, this is the only opportunity we will have to fix this rather confusing section to make it more user friendly and code enforceable for inclusion in the 2012 IBC. Otherwise we will have to wait another three years for one more opportunity during the next three year code development cycle for the publication of the 2015 IBC.

At any rate, we have also worked with the ICC Tri-Chapter Code Committee (which represents the ICC East Bay, Peninsula, and Monterey Bay Chapters) in further revising this Code Change Proposal to address their issues and concerns in providing for a comprehensive yet reasonable overhaul of the requirements for rooftop structures which are questionable at best in the current code. In fact, the ICC Tri-Chapter Code Committee has another Public Comment to their Code Change Proposal S26-09/10 which tries to make some minor yet significant changes to this section which they have also found to be very confusing and difficult to interpret and enforce.

The revisions proposed in this Public Comment further clarify the original rewrite and make it more internally consistent, as well as simplified to some extent. Some of the more conservative and restrictive requirements have been somewhat relaxed to satisfy some of the concerns expressed by members of the ICC Tri-Chapter Code Committee and members of the IBC General Code Development Committee for establishing reasonable minimum requirements for regulating rooftop structures.

Otherwise, we stand on our original Reason Statement for this Code Change Proposal which has clearly indicated what we've done to make these extensive and comprehensive revisions to Section 1509 and how they interrelate with the current code provisions, as well as with each other, to provide for a more systematic set of requirements for the various types of rooftop structures found on buildings. We truly believe that the revisions made in this Public Comment, if approved by the Class A voting members, will result in a much better set of requirements for rooftop structures than we currently have. Although this rewrite may not be perfect, it is certainly significantly better than what we have now. Therefore, we strongly urge the Class A voting members to overturn the Committee's recommendation for disapproval and approve this Public Comment which will result in approval as revised of Code Change S27-09/10.

Final Action: AS AM AMPC____ D

S29-09/10
1510.3

<u>Proposed Change as Submitted</u>

Proponent: Mike Ennis representing Single Ply Roofing Industry (SPRI, Inc.)

Revise as follows:

1510.3 Recovering versus replacement. New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2 Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

Exceptions:

1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.

2. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1510.4.
3. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.
4. <u>The application of a new single-ply membrane directly over an existing roofing system shall be permitted without tear-off of the existing roof coverings except where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.</u>

Reason: A layer of single-ply membrane is very lightweight, adding approximately 1/3 of a pound per square foot to the existing structure. The single-ply membrane can be used as a reflective layer to reduce rooftop temperatures, thus providing a cooling benefit for the building. The cooling benefits of reflective roof systems are recognized by the energy codes. This exception will allow for a cost effective method for increasing the energy efficiency of the building while providing excellent waterproofing protection. A single layer of membrane will also provide the same function and benefit as a new protective coating over an existing spray polyurethane foam roofing system, which is currently allowed as an exception under Section 1510.3, Exception 3.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ENNIS-S2-1510.3

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed exception is not necessary because the existing recovering versus replacement requirement already allows this. Furthermore, it would be a loophole to conditions 2 and 3.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, Single Ply Roofing Industry (SPRI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1510.3 Recovering versus replacement. New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

Exceptions:

1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
2. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1510.4.
3. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.
4. <u>For existing low-slope (roof slope < 2:12) roofs with two applicants of any type of roof covering</u> ~~The~~ <u>the</u> application of a new single-ply membrane directly over an existing roofing system shall be permitted without tear-off of the existing roof coverings ~~except where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing~~.

Commenter's Reason: The intent of the original code change proposal was to provide an exemption to the requirement contained in Condition 3 of Section 1510.3 that the existing roof must be torn off if there are two or more applications of any type of roof covering, The exemption would be for an additional layer of single-ply roof membrane because it is lightweight, provides a cost-effective means of returning the roof to watertight condition, and can reduce the energy consumption of the building.

The modifications are proposed to address the following comments made at the code change hearings:

1) The proposed exception is not necessary because the existing recovering vs. replacement requirement already allows this.

Section 1510.3 Recovering vs. replacement does not allow for the installation of an additional layer if the existing already contains two layers of an existing roof. The original proposal included the wording of condition 1 of Section 1510.3 to emphasis the importance of not recovering over an existing roof that is water soaked. This caused confusion as to the intent of the proposed exception. Removing this language from the exception and including specific language describing when the exception is to be allowed clarifies the intent.

2) This exception would provide a loophole to conditions 2 and 3 of Section 1510.3.

The proposed modification directs the exception to existing low slope (roof slope <2:12) roof assemblies. This removes the potential of providing a loophole to condition 2 of Section 1510.3. The intent is to provide an exception to condition 3 of Section 1510.3.

3) Concern was expressed regarding the wind uplift and fire resistance of the resulting system by installing a new single ply membrane over an existing roof.

Manufacturers of singe ply roof membrane systems have conducted testing in accordance with the requirements of the International Building Code to evaluate the wind uplift and fire resistance of roof recovery assemblies. Recover assemblies must meet the requirements of the International Building Code.

4) How many additional layers of single ply roof membrane would be allowed?

The proposed modification limits the exception to roofs with a maximum of two existing applications of roof covering.

Final Action: AS AM AMPC____ D

S34-09/10
1603.1.5

<u>Proposed Change as Submitted</u>

Proponent: Kevin Moore, PE, SE, SECB and Edwin Huston, PE, SE, SECB, representing National Council of Structural Engineers Associations

Revise as follows:

1603.1.5 Earthquake design data. The following information related to seismic design loads shall be shown, regardless of whether seismic loads govern the design of the lateral-force-resisting system of the building:

1. Seismic importance factor, *I*, and *occupancy category.*
2. Mapped spectral response accelerations, S_S and S_1.
3. *Site class.*
4. Spectral response coefficients, S_{DS} and S_{D1}.
5. *Seismic design category.*
6. Basic seismic-force-resisting system(s).
7. Design base shear.
8. Seismic response coefficient(s), C_S.
9. Response modification factor(s), *R*.
10. Analysis procedure used.
11. <u>Applicable horizontal structural irregularities.</u>
12. <u>Applicable vertical structural irregularities.</u>

Reason: Structural irregularities (defined in ASCE-7 section 12.3) can result in restrictions on building height, prohibition of certain configurations, increased design forces, additional analytical requirements, restriction of permissible analytical procedures, greater building separations, or additional detailing requirements for certain structural elements. It is often not evident whether one or more irregularities are applicable to a structure, because many of them require structural analysis to determine their applicability. This information is useful for building officials, plan checkers, peer reviewers, and for structural engineers in future building additions and/or alterations.

Cost Impact: This proposal will not increase the cost of construction.

ICCFILENAME: MOORE-HUSTON-S2-1603.1.5

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The proposal to include horizontal and vertical irregularities in the seismic data required for construction documents was judged to be too burdensome. This information is not as imperative as the other data that is currently required. Architectural design changes would affect this, requiring the information to be revised. It is recognized that the existence of certain irregularities matter more than others. Therefore, it would be preferable to focus on specific irregularities and this could be achieved in the public comment phase.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment :

Kevin Moore, PE, SE, SECB, representing the National Council of Structural Engineers Association (NCSEA); Steven Winkel, FAIA, PE, representing the Federal Emergency Management Agency, BSSC Code Resource Support Committee (FEMA/BSSC CRSC), request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1603.1.5 Earthquake design data. The following information related to seismic design loads shall be shown, regardless of whether seismic loads govern the design of the lateral-force-resisting system of the ~~building~~ structure:

1. Seismic importance factor, *I*, and *occupancy category.*
2. Mapped spectral response accelerations, *SS* and *S1*.
3. *Site class.*
4. Spectral response coefficients, *SDS* and *SD1*.
5. *Seismic design category.*
6. Basic seismic-force-resisting system(s).
7. Design base shear.
8. Seismic response coefficient(s), *CS*.
9. Response modification factor(s), *R*.
10. Analysis procedure used.
11. Where a structure is classified as irregular, identify structural irregularity type(s) in accordance with Tables 12.3-1 and 12.3-2 of ASCE 7.

~~11. Applicable horizontal structural irregularities.~~

~~12. Applicable vertical structural irregularities.~~

Commenter's Reason: An awareness of what structural irregularities are applicable to a structure facilitates quicker plan reviews for building officials (and other reviewers) by increasing the understanding of expected structural response and specific detailing requirements. It also aids designers of future renovations for the same reasons.

All irregularities are important because they represent undesirable aspects of structures that, if ignored, increase the seismic hazard. This information is arguably more important than parameters currently required by Section 1603.1.5 because, in many cases, it cannot be verified without detailed analysis. (In contrast, mapped acceleration parameters are easily verified and not structure dependent, and seismic importance factor is implied because it is dependent on occupancy/risk category.)

Knowledge of applicable structural irregularities is critical to understand the expected seismic response of a structure and the detailing requirements that arise because of them. For example, if a structure contains a discontinuity in the lateral-force-resisting system, then the supporting element is required to be designed for special load combinations. Acknowledging the irregularity in the construction documents is an indication that the condition has been considered in the design. More important, if this proposal is successful, a lack of acknowledgement may indicate that the irregularity has not been considered in the design and should result in an important review comment.

Committee commentary on proposal EB22 alludes to the importance of knowing when irregularities have been created or modified by the renovation of an existing building. This proposal would flag the existence of irregularities for future renovations, which benefits both designers and reviewers.

Reporting these irregularities is not burdensome. Calculations and detailing are required regardless, and late design changes do not excuse the design professional from incorporating requirements into the analysis or design. Requiring the design professional to report structural irregularities facilitates plan review, informs designers of renovations, and helps ensure that design professionals consider irregularities in their design.

In the charging language, the word "building" is proposed to be changed to "structure" to correlate with the intent that the data listed in Section 1603.1.5 apply to structures, in general -not just buildings.

Final Action: AS AM AMPC____ D

S39-09/10
Table 1604.5

Proposed Change as Submitted

Proponent: David R. Badger PE, CBO, Virginia Tech, representing self.

Revise as follows:

TABLE 1604.5
OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

OCCUPANCY CATEGORY	NATURE OF OCCUPANCY
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. • Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250. ~~• Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500.~~ • <u>Buildings and other structures used for the education of adults who are either above the 12th grade or not in a formal educational system; where the teaching is done in classroom settings with an occupant load density equal to or greater than that required for educational classroom areas per Table 1004.1.1; and the aggregate occupant load of all classrooms exceeds 500.</u> • Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities. • Group I-3 occupancies. • Any other occupancy with an occupant load greater than 5,000[a]. • Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV. • Buildings and other structures not included in Occupancy Category IV containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released.

(Portions of table not shown do not change)
(No change to footnote)

Reason: The general language of 1604.5 is ambiguous and misleading. This problem is well recognized, and there have been several proposals to rewrite major portions of this in recent code change cycles. Although a general overhaul of this section is needed, there is a specific problem that needs to be addressed immediately. There is one phrase in Table 1604.5 that is routinely being misinterpreted, resulting in hidden costs which are extremely high, and completely unnecessary. It is a problem primarily for colleges and universities, has been a problem for many years, and must be corrected.

Under 1604.5 the phrase "*Buildings and other structures containing adult education facilities, such as colleges and universities*" is very easily interpreted to require <u>any</u> building on a college or university campus with an occupant load over 500 to be classified as Occupancy Category III, regardless of use. The phrase is so poorly written, it is difficult to not read it this way. The perceived connection to "adult education facilities" occurs simply because the building is located on a college or university campus; not because there is an educational function occurring within the building.

For example, a research laboratory building with 600 occupants located in an industrial research park clearly would be classified under Occupancy Category II. If the exact same building was placed on a university campus, the Occupancy Category should not change. But in fact, many design professionals and code officials would classify the building as Category III since it now sits on campus. A check of several local structural engineering firms confirmed that every one of them interprets 1604.5 as requiring an Occupancy Category III for any building on campus with an occupant load greater than 500. This is very likely occurring on a national level as well. But this is not the intent of 1604.5.
Occupancy Category III addresses the extra risk associated with the presence of a large number of occupants concentrated in small areas, such as classrooms or lecture halls. There is nothing special about the act of teaching that warrants a Category III classification. The only reason it is referenced in 1604.5 is that teaching is usually done in groups, and it is the people in those groups to be protected. University laboratory and office buildings, with no classrooms, should not be subject to the 500 occupant threshold. The occupant load threshold for a Category III classification for a lab building is 5,000 occupants, not 500. Classification is a function of the building occupancy and not the property upon which the building sits.
The proposed new language clarifies the intent of the current regulation in three ways.

It emphasizes that it is the specific use of the building to be evaluated. Reference is made to both higher education, and a catch-all for any other adult educational building, to ensure that a broad scope of coverage is established.
Since the IBC does not define a "classroom," the proposed change uses the basis for occupant load calculations as a handle to indentify spaces to be included in the analysis. Classrooms are calculated at 20 SF per person and this sets the benchmark for "high" occupant densities. Educational spaces with "low" densities such as teaching labs and vocational areas, at 50 SF per person, would not be included in the analysis. There are non-educational uses identified in Table 1004.1.1 which are also at 50 SF per person, and these are not subject to the 500 occupant threshold. Therefore, if the principle is to be applied consistently, this threshold should not apply to low density educational occupancies. Spaces with

densities higher than a classroom will normally be classified as assembly space, but it's possible that a classroom could have a density greater than 20, so this potential is also addressed with the phrase "or greater than."

Since the specific risk being addressed occurs only in the classrooms, it is appropriate to use the summation of the occupant loads of just these rooms as the basis for the analysis, and not the total building occupant load. The limit should apply to those people associated with the higher risk, and should not include other general occupants of the building.

Cost Impact: The change would result in a major savings by minimizing the probability of future misapplication of this section. The cost from this problem isn't immediately apparent; it is buried in the structural engineer's calculations and the resulting overdesign. A recent project cost analysis for a 54,000 square foot laboratory building identified a **$1.2 million savings** ($22.71 / gsf) by changing the Occupancy Category from III to II, as shown in the following.

VBI III Conceptual Estimate on Cost Premium for Category III Construction vs Category II						
Description	**Qty**		**Unit Cost**		**Total**	**Comments**
Increase concrete reinforcing by 40%	147	ton	$ 2,500	/ton	$ 367,000	
Increase perimeter beam size by 20%	28	cyd	$ 1,200	/cyd	$ 33,333	
Increase for pre-cast concrete panel	10,056	sf	$ 4.00	/sf	$ 40,224	
Increase CMU wall reinforcing by 30%	2.93	ton	$ 2,500	/ton	$ 7,313	
Increase grout fill by 30%	88	cyd	$ 175	/cyd	$ 15,381	
Increase for Hokie Stone connections	13,600	sf	$ 10.00	/sf	$ 136,000	
Impact on roof screen	150.00	ton	$ 4,000	/ton	$ 400,000	
Increase for metal panel connections	1,103	sf	$ 3.00	/sf	$ 3,309	
Impact on curtain wall due to wind loading increase	15,935	sf	$ 5.00	/sf	$ 79,675	
Impact on acoustical ceiling supports	23,970	sf	$ 1.50	/sf	$ 35,955	
Impact on elevators and shaft						Possibility?
Impact on MEP for seismic supports	54,000	sf	$ 2.00	/sf	$ 108,000	Equipment associated changes need further discussion
					$1,226,190	
					$ 22.71	/gsf

$1.2 million was saved on just one building. Given how prevalent this misinterpretation is likely being made on colleges and universities nationwide, the net potential savings by correcting the problem is enormous.

ICCFILENAME: DUBE-S1-1604.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The intent to clarify adult education facilities in Occupancy Category III of Table 1604.5 is valid, but the proposal does not recognize the nature of occupancy. The phrase "formal educational system" is not defined which could lead to non uniform application. As worded, it suggests the building has to have classrooms and the classroom occupant load must be greater than 500. This differs from the current provision. If a public comment is submitted wording such as "aggregate classroom occupant load" may be more appropriate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David R. Badger, representing self, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

TABLE 1604.5
OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

OCCUPANCY CATEGORY	NATURE OF OCCUPANCY
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. • Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250. ~~• Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500.~~ • Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities. • Group I-3 occupancies. • Any other occupancy with an occupant load greater than 5,000[a]. • Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV. • Buildings and other structures not included in Occupancy Category IV containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released.

(Portions of table not shown do not change)
(No change to footnote)

Commenter's Reason:

1. The current reference to "adult education facilities" in Chapter 16 is an archaic remnant from older versions of the codes and recommended standards.
2. No other section in the IBC, outside of Chapter 16, has ever contained special provisions just for "adult education facilities."
3. "Adult education facility," "college" and "university" are terms that are not defined in the IBC. Using nothing but these open-ended terms as the sole basis to define something within Occupancy Category III is a serious problem. This category has requirements that can be extremely expensive to meet, and as currently written it is hard to understand what it really means.
4. The IBC recognizes the special needs for occupants in educational settings, but they only apply to the 12th grade down. Adults in educational occupancies do not require the special assistance during a building emergency that high school and elementary school students do. Adults are able to make independent decisions and act accordingly; this concept should not be abandoned in Chapter 16.
5. In the 2003 FEMA / NEHRP Provisions, the problem has already been corrected – there is no longer any reference to "adult educational facilities." Educational facilities are included, but only apply up to 12th grade, which is consistent with the general intent of the non-structural concepts of the IBC.
6. The elimination of "adult education facilities" from the list in 1604.5 will not create any gaps in scope of coverage for this section. Nothing needs to be put back in its place after it is eliminated from the table. The higher risk occupancies that do warrant Occupancy Category III are still in the table, and not affected by this change.
7. College and university buildings with a primary occupancy of large classrooms and lecture halls are already regulated as assembly occupancies with an occupant load limit of 300, above which they are Occupancy Category III.
8. The provision for "adult education facilities" in 1604.5 is vague, ambiguous, and wide open for different interpretations with potentially huge, but unnecessary, cost to owners. Building officials are currently in an unreasonable position of trying to interpret the intent of a very significant code requirement, without it having any relation to the rest of the code or any definitions to use. This provision needs to be eliminated.

Final Action: AS AM AMPC____ D

S40-09/10
Table 1604.5, 1705.3.3, 1707.7

Proposed Change as Submitted

Proponent: Philip Brazil, PE, SE, representing self

Revise as follows:

TABLE 1604.5
OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

OCCUPANCY CATEGORY	NATURE OF OCCUPANCY
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300 Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250 Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500 Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities Group I-3 occupancies Any other occupancy with an occupant load greater than 5,000 [a] Power-generating stations, water treatment for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV Buildings and other structures not included in Occupancy Category IV containing ~~sufficient~~ quantities of toxic or explosive ~~substances~~ materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code*; and Are sufficient to ~~be dangerous~~ pose a threat to the public if released [b]
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2 occupancies having surgery or emergency treatment facilities Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters Designated emergency preparedness, communications, and operations centers and other facilities required for emergency response Power-generating stations and other public utility facilities required as emergency backup facilities for Occupancy Category IV structures Buildings and other structures containing quantities of highly toxic materials ~~as defined by Section 307 where the quantity of the material~~ that: Exceed~~s~~ ~~the~~ maximum allowable quantities ~~of~~ per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code*; and Are sufficient to pose a threat to the public if released [b] Aviation control towers, air traffic control centers and emergency aircraft hangars Buildings and other structures having critical national defense functions Water storage facilities and pump structures required to maintain water pressure for fire suppression

(Portions of table not shown remain unchanged))

(No change to footnote a)

b. Where approved by the building official, the classification of buildings and other structures as Occupancy Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Occupancy Category II, provided it can be demonstrated by a hazard assessment in accordance with Section 1.5.2 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

1705.3.3 Seismic Design Category C. The following additional systems and components in structures assigned to Seismic Design Category C:

1. ~~Heating, ventilating and air-conditioning (HVAC)~~ Ductwork ~~containing~~ designed to carry hazardous materials and anchorage of such ductwork.
2. Piping systems ~~and mechanical units containing flammable, combustible or highly toxic~~ designed to carry hazardous materials and their associated mechanical units.
3. Anchorage of electrical equipment used for emergency or standby power systems.

1707.7 Mechanical and electrical components. Special inspection for mechanical and electrical equipment shall be as follows:

1. Periodic special inspection is required during the anchorage of electrical equipment for emergency or standby power systems in structures assigned to Seismic Design Category C, D, E or F;
2. Periodic special inspection is required during the ~~installation of~~ anchorage of other electrical equipment in structures assigned to Seismic Design Category E or F;
3. Periodic special inspection is required during the installation and anchorage of piping systems ~~intended~~ designed to carry ~~flammable, combustible or highly toxic contents~~ hazardous materials and their associated mechanical units in structures assigned to Seismic Design Category C, D, E or F;
4. Periodic special inspection is required during the installation and anchorage of ~~HVAC~~ ductwork ~~that will contain~~ designed to carry hazardous materials in structures assigned to Seismic Design Category C, D, E or F; and
5. Periodic special inspection is required during the installation and anchorage of vibration isolation systems in structures assigned to Seismic Design Category C, D, E or F where the construction documents require a nominal clearance of 1/4 inch (6.4 mm) or less between the equipment support frame and restraint.

Reason: The purpose for this proposal is to clarify the determination of occupancy category and the requirements for special inspection where hazardous materials are present. It was prepared in conjunction with ASCE 7 Proposal GPSC-5R2, which was approved by the General Subcommittee on March 1, 2009 and is being balloted by the Main Committee (Second Main Committee Ballot on General Requirements). It is expected that the Main Committee will approve the proposal.

Table 1604.5 currently classifies buildings and other structures containing certain quantities of toxic, highly toxic or explosive materials as Occupancy Category III or IV. The Category III classification applies to toxic and explosive materials and the threshold for the classification is subjective: quantities sufficient to be dangerous to the public if released. The Category IV classification applies to highly toxic materials and the threshold is objective: quantities exceeding the maximum allowable quantities of Table 307.1(2). Table 307.1(2) specifies maximum allowable quantities per control area for hazardous materials posing a health hazard.

Explosive materials are classified as posing a “physical hazard.” Toxic and highly toxic materials are classified as posing a “health hazard.” Materials that pose a physical hazard or a health hazard are classified as “hazardous materials.” Refer to IBC Section 307.2 and IFC Section 2702.1 for definitions of these terms. The maximum quantities per control area are given in IBC Table 307.1(1) and IFC Table 2703.1.1(1) for hazardous materials posing a physical hazard and IBC Table 307.1(2) and IFC Table 2703.1.1(2) for hazardous materials posing a health hazard. The maximum quantities per outdoor control area are given in IFC Table 2703.1.1(3) for hazardous materials posing a physical hazard and IFC Table 2703.1.1(4) for hazardous materials posing a health hazard,.

A “control area” is defined in Section 307.2 as a space “within a building where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, used or handled.” The effect of this definition on a Category IV classification is that it is limited to quantities of highly toxic materials within buildings. Not considered in the classification are quantities per “outdoor control area,” which is defined in Section 2702.1 of the *International Fire Code* (IFC) as “an outdoor area that contains hazardous materials in amounts not exceeding the maximum allowable quantities of (IFC) Table 2703.1.1(3) (e.g., explosive materials) or Table 2703.1.1(4) (e.g., toxic and highly toxic materials).”

The intent in classifying buildings and other structures containing certain quantities of toxic, highly toxic or explosive materials as Occupancy Category III or IV is to reduce the potential for catastrophic release of these hazardous materials resulting from the failure of a building or structure (or a component conveying or supporting the materials and supported by a building or structure) to resist the structural demands of a design event, such as an earthquake. The required classification is limited to toxic, highly toxic and explosive materials because they pose the most serious threat to the general public if released. The threat being addressed is related to large-scale impacts on the general public, which can be characterized as global (e.g., beyond the boundaries of the site where the building or structure is located) rather than local (e.g., within those same boundaries).

Table 1604.5 currently classifies the building or structure as Occupancy Category III based on a subjective threshold but as Occupancy Category IV based on an objective threshold. This proposal revises the thresholds for both classifications so that two conditions are met for classification as Occupancy Category III or IV and they are summarized below. These revised thresholds are more consistent with the global threat discussed above. Similar thresholds are found in Table 1-1 of ASCE 7-10.

1. The quantities exceed maximum allowable quantities per control area within buildings or structures or per outdoor control area for outdoor areas; and

2. The quantities are sufficient to pose a threat to the public if released.

The first condition has the effect of exempting buildings or portions thereof from being classified as Occupancy Category III or IV except where they are classified as Group H. Where the quantities of hazardous materials in the control areas of a building or portion thereof are less than the maximum allowable quantities per control area, the occupancy classifications without considering the presence of hazardous materials are not affected by their presence. The first condition has the effect of exempting such buildings or portions thereof because the small quantities of hazardous materials permitted in occupancies other than Group H do not generally pose a global threat.

The second condition is subjective but the global threat posed by toxic, highly toxic and explosive materials is not easily quantified. Footnote (b) is added to Table 1604.5 permitting classification as Occupancy Category II for a building or structure otherwise classified as Occupancy Category III or IV, provided a hazard assessment in accordance with Section 1.5.2 of ASCE 7 is performed and it is demonstrated that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public. Refer to Section 1.5.2 and Commentary Section C1.5.2 of ASCE 7 for further information.

In Table 1604.5, a reference to IBC Table 307.1(1) is specified as well as Table 307.1(2). This is because explosive materials pose a physical hazard as discussed above but toxic and highly toxic materials pose a health hazard.

Also in Table 1604.5, maximum allowable quantities per outdoor control area are specified as well as maximum allowable quantities per control area. Hazardous materials pose physical or health hazards not only from being located in buildings but also from being located in structures not generally considered as buildings, such as tanks, towers, bins, hoppers, silos and similar structures. ASCE 7-10 distinguishes between "building structures" (e.g., buildings) and "nonbuilding structures." Refer to Chapter 11 of ASCE 7-10 for definitions of these terms.

In conjunction with Chapter 13 of ASCE 7-10 and the revisions to Table 1604.5 in this proposal, Sections 1705.3.3 and 1707.7 are also revised. All instances of terms related to hazardous materials in the structural chapters (Chapter 16 through 23) in the 2009 IBC are found in these sections. In Item #1 of Section 1705.3.3 and Item #4 of Section 1707.7, "HVAC" is deleted because HVAC ducts typically convey environmental air, not hazardous materials. At items in both sections, the change to "designed to carry" is for consistency with Chapter 13 of ASCE 7-10. The other revisions are either editorial or are intended to make the intent more clear.

Although Section 1705.3.3 is being modified in this proposal, the deletion of this section is the subject of a separate proposal. Should both proposals be approved by the ICC membership, it is not the intent of the proponent to retain Section 1705.3.3 in the 2012 IBC for the purpose of modifying the section in accordance with this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

FILENAME: Brazil-S1-1604.5

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change provides clarification on the Table 1604.5 Occupancy Category determination where hazardous materials are a factor. Referring to the maximum allowable quantities per control area for the hazardous material tables is an improvement.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, PE, SE, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 1604.5
CLASSIFICATION OF BUILDINGS AND OTHER STRUCTURES FOR IMPORTANCE FACTORS

OCCUPANCY CATEGORY [a]	NATURE OF OCCUPANCY
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300 Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250 Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500 Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities Group I-3 occupancies Any other occupancy with an occupant load greater than 5,000 [a] Power-generating stations, water treatment for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV Buildings and other structures not included in Occupancy Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area ~~in accordance with~~ <u>as given in Table 2703.1(3) or 2703.1(4) of</u> the *International Fire Code*; and Are sufficient to pose a threat to the public if released [b]
IV	Buildings and other structures designated as essential facilities, including but not limited to: Group I-2 occupancies having surgery or emergency treatment facilities Fire, rescue, ambulance and police stations and emergency vehicle garages Designated earthquake, hurricane or other emergency shelters Designated emergency preparedness, communications, and operations centers and other facilities required for emergency response Power-generating stations and other public utility facilities required as emergency backup facilities for Occupancy Category IV structures Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control

OCCUPANCY CATEGORY [a]	NATURE OF OCCUPANCY
	area ~~in accordance with~~ as given in Table 2703.1(3) or 2703.1(4) of the *International Fire Code*; and Are sufficient to pose a threat to the public if released [b] . Aviation control towers, air traffic control centers and emergency aircraft hangars . Buildings and other structures having critical national defense functions . Water storage facilities and pump structures required to maintain water pressure for fire suppression

(Portions of table not shown remain unchanged)

(No change to footnotes)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The purpose for the public comment is to improve the references to the International Fire Code in Table 1604.5 for the determination of the maximum quantities per outdoor control area of toxic, explosive and highly toxic materials. This is done by adding references to IFC Tables 2703.1(3) and 2703.1(4) where the maximum quantities per outdoor control area are specified. This is also being done for consistency with the references to IBC Tables 307.1(1) and 307.1(2) in Table 1604.5 for the determination of the maximum quantities per control area of the same materials. The corresponding tables in the IFC are Tables 2703.1(1) and 2703.1(2). These tables are more fully discussed in the first four paragraphs of the Reason accompanying the original proposal.

Final Action: AS AM AMPC____ D

S44-09/10
1604.8.2, 1613.7

Proposed Change as Submitted

Proponent: Philip Brazil, PE, SE, Reid Middleton, Inc., representing self, Jim Rossberg, SEI of ASCE, representing self

1. Revise as follows:

1604.8.2 Structural walls. Walls that provide vertical load bearing resistance or lateral shear resistance for a portion of the structure shall be anchored to the roof and to all floors~~, roofs~~ and ~~other structural elements~~ members that provide lateral support for the wall or that are supported by the wall. ~~Such anchorage shall provide a positive direct connection~~ The connections shall be capable of resisting the horizontal forces specified in ~~this chapter but not less than the minimum strength design horizontal force specified in~~ Section ~~11.7.3~~ 1.4.4 of ASCE 7~~, substituted for "*E*" in the load combinations of Section 1605.2 or 1605.3~~ for walls of structures assigned to Seismic Design Category A and to Section 12.11 of ASCE 7 for walls of all other structures. Concrete and masonry walls shall be designed to resist bending between anchors where the anchor spacing exceeds 4 feet (1219 mm). Required anchors in masonry walls of hollow units or cavity walls shall be embedded in a reinforced grouted structural element of the wall. See Section 1609 for wind design requirements and see Section 1613 for earthquake design requirements.

2. Delete without substitution:

~~**1613.7 ASCE 7, Section 11.7.5.** Modify ASCE 7, Section 11.7.5 to read as follows:~~

> ~~**11.7.5 Anchorage of walls.** Walls shall be anchored to the roof and all floors and members that provide lateral support for the wall or that are supported by the wall. The anchorage shall provide a direct connection between the walls and the roof or floor construction. The connections shall be capable of resisting the forces specified in Section 11.7.3 applied horizontally, substituted for E in the load combinations of Section 2.3 or 2.4.~~

.

Reason:
(BRAZIL)-The purpose for this proposal is to delete a revision to ASCE 7-05 that will no longer be needed because a similar revision will have been incorporated into the 2010 edition of ASCE 7. Section 1604.8.2 is also revised for consistency with this and other related revisions to ASCE 7. These are being accomplished by ASCE 7 Proposal GPSC-2R2, which was approved by the General Subcommittee on March 1, 2009 and is being balloted by the Main Committee (Item #2 of the Second Main Committee Ballot on General Requirements); and by ASCE 7 Proposal SSC TC-4-CH14-07-R1, which was approved by the Seismic Subcommittee on May 15, 2009 and is being balloted by the Main Committee (Item #1 of the Seventh Main Committee Ballot on Seismic Provisions). It is expected that the Main Committee will approve both proposals.
(ROSSBERG)- This provision has been considered and approved by the Seismic Subcommittee of ASCE 7 for inclusion into the 2010 edition of ASCE 7 hence with the adoption of ASCE 7-10 by reference this provision becomes duplicative. As of the submission date of this code change, the ASCE 7 Standards Committee is completing the committee balloting portion of the 2010 edition of ASCE/SEI 7. The document is designated ASCE/SEI 7-10 *Minimum Design Loads for Buildings and Other Structures* and it is expected that it will be completed and available for purchase prior to the ICC Final Action Hearings in May of 2010 . Any person interested in obtaining a public comment copy of ASCE/SEI 7-10 may do so by contacting the proponent at jrossberg@asce.org.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Brazil-Rossberg-S23-1604.8.2

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

1604.8.2 Structural walls. Walls that provide vertical load bearing resistance or lateral shear resistance for a portion of the structure shall be anchored to the roof and to all floors and members that provide lateral support for the wall or that are supported by the wall. The connections shall be capable of resisting the horizontal forces specified in Section 1.4.4 of ASCE 7 for walls of structures assigned to Seismic Design Category A and to Section 12.11 of ASCE 7 for walls of structures assigned to all other ~~structures~~ seismic design categories. ~~Concrete and masonry walls shall be designed to resist bending between anchors where the anchor spacing exceeds 4 feet (1219 mm).~~ Required anchors in masonry walls of hollow units or cavity walls shall be embedded in a reinforced grouted structural element of the wall. See Section 1609 for wind design requirements and see Section 1613 for earthquake design requirements.

Committee Reason: The proposal removes an ASCE 7 modification in Section 1613.7 that will not be needed, since it will be addressed in the next edition of the standard. It also revises the requirements for anchoring walls to diaphragms for clarity and makes reference to appropriate requirements in ASCE 7. The modification reflects further updates made in the ASCE 7 development process.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, PE, National Association of Home Builders, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1604.8.2 Structural walls. Walls that provide vertical load bearing resistance or lateral shear resistance for a portion of the structure shall be anchored to the roof and to all floors and members that provide lateral support for the wall or that are supported by the wall. The connections shall be capable of resisting the horizontal forces specified in Section 1.4.4 of ASCE 7 for walls of structures assigned to Seismic Design Category A and to Section 12.11 of ASCE 7 for walls of structures assigned to all other seismic design categories. Required anchors in masonry walls of hollow units or cavity walls shall be embedded in a reinforced grouted structural element of the wall. See Section 1609 for wind design requirements and see Section 1613 for earthquake design requirements.

Exceptions:

1. Light-frame wood walls not exceeding 15 pounds per square foot (718 N/m^2) in weight, designed and constructed in accordance with Section 2304 or Section 2308, shall be deemed to comply with the provisions of this section.
2. Cold-formed steel walls not exceeding 15 pounds per square foot (718 N/m^2) in weight, designed and constructed in accordance with Section 2210, shall be deemed to comply with the provisions of this section.
3. In structures assigned to Seismic Design Category A, B, or C, light-frame wood or cold-formed steel walls with stone or masonry veneer, not exceeding 48 pounds per square foot (2298 N/m^2) in weight, designed and constructed in accordance with Section 2304, Section 2308, or Section 2210, shall be deemed to comply with the provisions of this section.

Commenter's Reason: The purpose of this public comment is to provide exemptions for light-frame wood and cold-formed steel walls constructed using prescriptive fastener schedules from the new minimum connection requirements in the IBC and ASCE 7.

NAHB generally supported the removal of the longstanding, overly conservative 280 lb/ft and $400S_{ds}$ minimum anchorage requirements from the IBC and ASCE 7, and their replacement with improved procedures for out-of-plate anchorage of walls. However, the old provisions were only applied to concrete and masonry walls. The new provisions apply to all wall systems, including wood and cold-formed steel stud walls. In Seismic Design Category A, the new provisions require a "check" of 20% of the horizontal load on the wall or 5psf. In Seismic Design Category B and C, the new provisions would now require connections for stud walls to be checked for seismic loading based on the design accelerations, in addition to the wind loading (including the 10psf minimum exterior wall load) they would normally be designed for.

Requiring these additional design checks for light-frame walls is unjustified. It can be clearly shown that the seismic component of the connection check will never govern for the three cases detailed above. To illustrate this, two charts which accompanied the ASCE 7-10 proposal are included below:

Comparison of anchorage forces

All walls single story without parapet; force calculated at the roof

Four levels of S_{DS} compared:

	SDCat B		SDCat C		SDCat D		SDCat E	
	S_{DS} =	0.20	S_{DS} =	0.40	S_{DS} =	1.00	S_{DS} =	1.50
	near middle of category		near middle of category		on the plateau		mod. close to fault	

All comparisons are for importance factor = 1.0

Light-framed Wall Systems

Basic weight = 15 psf

	SDCat B		SDCat C		SDCat D		SDCat E		Wind
Height	ASCE 7-05	Proprosed	ASCE 7-05	Proprosed	ASCE 7-05	Proprosed	ASCE 7-05	Proprosed	(factored)
	Rigid diaphragm								
10	7.5	15	12	15	30	30	45	45	120
15	11.25	22.5	18	22.5	45	45	67.5	67.5	180
20	15	30	24	30	60	60	90	90	240
25	18.75	37.5	30	37.5	75	75	112.5	112.5	300
30	22.5	45	36	45	90	90	135	135	360
	Flexible diaphragm, 100 foot span								
10	7.5	30	12	30	30	60	45	90	120
15	11.25	45	18	45	45	90	67.5	135	180
20	15	60	24	60	60	120	90	180	240
25	18.75	75	30	75	75	150	112.5	225	300
30	22.5	90	36	90	90	180	135	270	360

Brick veneer on framed wall

Basic weight = 50 psf

	SDCat B		SDCat C		SDCat D		SDCat E		Wind
Height	ASCE 7-05	Proprosed	ASCE 7-05	Proprosed	ASCE 7-05	Proprosed	ASCE 7-05	Proprosed	(factored)
	Rigid diaphragm								
10	280	50	280	50	400	100	600	150	120
15	280	75	280	75	400	150	600	225	180
20	280	100	280	100	400	200	600	300	240
25	280	125	280	125	400	250	600	375	300
30	280	150	280	150	400	300	600	450	360
	Flexible diaphragm, 100 foot span								
10	280	100	280	100	400	200	600	300	120
15	280	150	280	150	400	300	600	450	180
20	280	200	280	200	400	400	600	600	240
25	280	250	280	250	500	500	750	750	300
30	280	300	280	300	600	600	900	900	360

We are concerned about the potential for some plan reviewers to require checks for all of the standard prescriptive connections covered by the standard wood and cold-formed steel fastener schedules. Also, we note that small design firms and sole practitioners are already struggling with trying to balance the demands of today's complex codes with limited project budgets and aggressive schedules. They do not need the code to require more burdensome and unnecessary design requirements.

Final Action: AS AM AMPC____ D

S57-09/10-PART I
Table 1607.1

Proposed Change as Submitted

Proponent: Philip Brazil, PE, SE, representing self

Part I—IBC Structural

Revise as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND
MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
27. Residential		
One- and two-family dwellings		
Uninhabitable attics without storage [i]	10	
Uninhabitable attics with ~~limited~~ storage [i, j, k]	20	
Habitable attics and sleeping areas [k]	30	–
All other areas	40	
Hotels and multiple-family dwellings		
Private rooms and corridors serving them	40	
Public rooms and corridors serving them	100	

(No changes to the remaining Table not shown)

(No change to footnotes a through h)

I. Uninhabitable attics without storage are those where the maximum clear height between the joist and rafter is less than 42 inches, or where there are not two or more adjacent trusses with ~~the same~~ web configurations capable of ~~containing a~~ accommodating an assumed rectangle 42 inches ~~high~~ in height by ~~2 feet wide~~ 24 inches in width, or greater, ~~located~~ within the plane of the trusses. ~~For attics without storage~~, This live load need not be assumed to act concurrently with any other live load requirements.

j. ~~For~~ Uninhabitable attics with ~~limited~~ storage ~~and constructed with trusses, this live load need only be applied to those portions of the bottom chord~~ are those where the maximum clear height between the joist and rafter is 42 inches or greater, or where there are two or more adjacent trusses with ~~the same~~ web configurations ~~containing a~~ capable of accommodating an assumed rectangle 42 inches ~~high~~ in height by ~~2 feet wide~~ 24 inches in width, or greater, ~~located~~ within the plane of the trusses. ~~The rectangle shall fit between the top of the bottom chord and the bottom of any other truss member, provided that each of the following criteria is met~~

At the trusses, the live load need only be applied to those portions of the bottom chords where both of the following conditions are met:

i. The attic area is accessible ~~by a pull-down stairway or framed opening in accordance with Section 1209.2~~ from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches; and
ii. The slopes of the truss ~~shall have a~~ bottom chords ~~pitch less than 2:12~~ are no greater than 2 units vertical to 12 units horizontal.
~~iii.~~ The remaining portions of the bottom chords ~~of trusses~~ shall be designed for ~~the greater of actual imposed dead load or 10 psf,~~ a uniformly distributed ~~over the entire span~~ concurrent live load of not less than 10 lb/ft^2.

k. Attic spaces served by ~~a fixed stair~~ stairways other than pull-down type shall be designed to support the minimum live load specified for habitable attics and sleeping rooms.

(No change to footnote l).

Reason: The purpose for this proposal is to correlate the IBC and IRC with the 2010 edition of ASCE 7. The need for correlation is due to ASCE 7 Proposal LLSC-LL-9, which has been approved by the Live Load Subcommittee and is being balloted by the Main Committee (Item #5 of the Second Main Committee Ballot on Live/Dead Load Provisions). It is expected that the Main Committee will approve the proposal.
The changes are seen as largely editorial. In Footnotes (i) and (j), the threshold that is based on a 24-inch by 42-inch rectangular is changed to an assumed condition (rather than an actual one), which is considered more appropriate for a building code requirement.
In Footnote (j), the reference to “a pull-down stairway or framed opening in accordance with Section 1209.2” is replaced with minimum opening dimensions that are consistent with IBC Section 1209.2 on openings to attic areas. These dimensions are objective and considered more appropriate for a building code requirement, whereas “pull-down stairway” and “framed opening” are considered vague and subject to a wide variation in interpretation.

In Footnote (k), the reference to a “fixed stair” is changed to “stairways other than pull-down type” in conjunction with the deletion of “pull-down type stairway” in Footnote (j) and for consistency with the definitions of “stair” and “stairway” in Section 1002.1. These definitions apply to all instances of the terms throughout the IBC. “Stair” is a “change in elevation consisting of one or more risers.” “Stairway” is “one or more flights of stairs…with the necessary landings and platforms connecting them to form a continuous and uninterrupted passage form one level to another” and is the better choice for the footnote. The change will revise the footnote to better convey its intent: require an otherwise uninhabitable attic to be designed for live loads specified for habitable attics where the attic is served by a stairway that could enable it become occupiable. The current threshold of “fixed stair” before design for live loads specified for habitable attics is required is considered vague and subject to a wide variation in interpretation.

In Table 1607.1 and Footnote (j), “limited” at uninhabitable attics with storage is considered superfluous and is deleted. The three categories of uninhabitable attics without storage, uninhabitable attics with storage and habitable attics are sufficiently clear to account for all design conditions. Retaining “limited” begs the question: what is an uninhabitable attic with more than limited storage?

Cost Impact: The code change proposal will not increase the cost of construction.

FILENAME: Brazil-S3-T1607.1

Public Hearing Results

PART I- IBC STRUCTURAL
Committee Action: Approved as Modified

Modify the proposal as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

(No change to footnotes a through h)

I. Uninhabitable attics without storage are those where the maximum clear height between the joists and rafters is less than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

j. Uninhabitable attics with storage are those where the maximum clear height between the joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

~~At the trusses,~~ The live load need only be applied to those portions of the joists or bottom chords where all ~~both~~ of the following conditions are met:

i. The attic area is accessible from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches; and

ii. The slopes of the joists or truss bottom chords are no greater than 2 units vertical to 12 units horizontal.

The remaining portions of the joists or bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 lb/ft^2.

(Portions of proposal not shown are unchanged)

Committee Reason: This proposal makes editorial clarifications to Table 1607.1 footnotes that relate to attic live loads. These changes correspond to updates in the next edition of the ASCE 7 load standard. The modification clarifies the applicability of the uninhabitable attic with storage live load.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), and Philip Brazil, PE, SE, representing self, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

(No change to footnotes a through h)

I. Uninhabitable attics without storage are those where the maximum clear height between the joists and rafters is less than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

j. Uninhabitable attic~~s~~ areas with storage are those where the maximum clear height between the joist~~s~~ and rafter~~s~~ is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

The live load need only be applied to those portions of the joists or bottom chords where all of the following conditions are met:

i. The attic area is accessible from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches; and

ii. The slop~~es~~ of the joists or truss bottom chords is ~~are~~ no greater than 2 units vertical to 12 units horizontal.

The remaining portions of the joists or bottom chords shall be designed for a uniformly distributed non-concurrent live load of not less than 10 lb/ft^2.

(Portions of proposal not shown are unchanged)

Commenter's Reason: In speaking with the original proponent of the change to this section, the requirement for the 10 PSF live load on those portions of the bottom chords not serving as storage areas was intended to reflect the requirement to provide a 10 PSF load per Table 1607.1, for uninhabitable attics without storage. However, footnote "i" clearly indicates that this is a non-concurrent load (intended for occasional access for maintenance). Current truss design methodology also treats this 10 PSF non-storage load as a non-concurrent maintenance load. Furthermore, the intent was to coordinate with ASCE 7-10, Table 4-1. ASCE 7-10 has since been out for public comment and this wording was changed to reflect the intended non-concurrent loading. Therefore, non-storage areas of the joists or truss bottom chords should be loaded for the maintenance load non-concurrent with other live loads.

Final Action: AS AM AMPC____ D

S57-09/10-PART II
IRC Table R301.5

Proposed Change as Submitted

Proponent: Philip Brazil, PE, SE, representing self

Part II: IRC

Revise as follows:

TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
Uninhabitable attics without storage [b]	10
Uninhabitable attics with ~~limited~~ storage [b, g]	20
Habitable attics and attics served with fixed stairs	30

(No changes to the remaining Table not shown)

(No change to footnote a)

b. Uninhabitable attics without storage are those where the maximum clear height between the joist and rafter is less than 42 inches, or where there are not two or more adjacent trusses with ~~the same~~ web configurations capable of ~~containing a~~ accommodating an assumed rectangle 42 inches ~~high~~ in height by ~~2 feet wide~~ 24 inches in width, or greater, ~~located~~ within the plane of the trusses. ~~For attics without storage,~~ This live load need not be assumed to act concurrently with any other live load requirements.

(No change to footnotes c through f)

g. ~~For~~ Uninhabitable attics with ~~limited~~ storage ~~and constructed with trusses, this live load need be applied only to those portions of the bottom chord~~ are those where the maximum clear height between the joist and rafter is 42 inches or greater, or where there are two or more adjacent trusses with ~~the same~~ web configurations ~~containing a~~ capable of accommodating an assumed rectangle 42 inches ~~high or greater~~ in height by ~~2 feet wide~~ 24 inches in width, or greater, ~~located~~ within the plane of the trusses. ~~The rectangle shall fit between the top of the bottom chord and the bottom of any other truss member, provided that each of the following criteria is met~~

At the trusses, the live load need only be applied to those portions of the bottom chords where all of the following conditions are met:

1. The attic area is accessible ~~by a pull-down stairway or framed opening in accordance with Section R807.1~~ from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches.
2. The slopes of the truss ~~has a~~ bottom chords ~~pitch less than 2:12~~ are no greater than 2 units vertical to 12 units horizontal.
3. Required insulation depth is less than the bottom chord member depth.

The remaining portions of the bottom chords ~~of trusses meeting the above criteria for limited storage~~ shall be designed for ~~the greater of the actual imposed dead load or 10 psf,~~ a uniformly distributed ~~over the entire span~~ concurrent live load of not less than 10 lb/ft^2.

(No change to footnote h)

Reason: The purpose for this proposal is to correlate the IBC and IRC with the 2010 edition of ASCE 7. The need for correlation is due to ASCE 7 Proposal LLSC-LL-9, which has been approved by the Live Load Subcommittee and is being balloted by the Main Committee (Item #5 of the Second Main Committee Ballot on Live/Dead Load Provisions). It is expected that the Main Committee will approve the proposal.

The changes are seen as largely editorial. In Footnotes (i) and (j), the threshold that is based on a 24-inch by 42-inch rectangular is changed to an assumed condition (rather than an actual one), which is considered more appropriate for a building code requirement.
In Footnote (j), the reference to “a pull-down stairway or framed opening in accordance with Section 1209.2” is replaced with minimum opening dimensions that are consistent with IBC Section 1209.2 on openings to attic areas. These dimensions are objective and considered more appropriate for a building code requirement, whereas “pull-down stairway” and “framed opening” are considered vague and subject to a wide variation in interpretation.

In Footnote (k), the reference to a “fixed stair” is changed to “stairways other than pull-down type” in conjunction with the deletion of “pull-down type stairway” in Footnote (j) and for consistency with the definitions of “stair” and “stairway” in Section 1002.1. These definitions apply to all instances of the terms throughout the IBC. “Stair” is a “change in elevation consisting of one or more risers.” “Stairway” is “one or more flights of stairs…with the necessary landings and platforms connecting them to form a continuous and uninterrupted passage form one level to another” and is the better choice for the footnote. The change will revise the footnote to better convey its intent: require an otherwise uninhabitable attic to be designed for live loads specified for habitable attics where the attic is served by a stairway that could enable it become occupiable. The current threshold of “fixed stair” before design for live loads specified for habitable attics is required is considered vague and subject to a wide variation in interpretation.

In Table 1607.1 and Footnote (j), “limited” at uninhabitable attics with storage is considered superfluous and is deleted. The three categories of uninhabitable attics without storage, uninhabitable attics with storage and habitable attics are sufficiently clear to account for all design conditions. Retaining “limited” begs the question: what is an uninhabitable attic with more than limited storage?

Cost Impact: The code change proposal will not increase the cost of construction.

FILENAME: Brazil-S3-T1607.1

Public Hearing Results

PART II- IRC B/E
Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
Uninhabitable attics without storage [b]	10
Uninhabitable attics with limited storage [b, g]	20
Habitable attics and attics served with fixed stairs	30

(No changes to the remaining Table not shown)

(No change to footnote a)
b. Uninhabitable attics without storage are those where the maximum clear height between the joists and rafters is less than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.
(No change to footnotes c through f)
g. Uninhabitable attics with limited storage are those where the maximum clear height between the joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

~~At the trusses,~~ The live load need only be applied to those portions of the joists or bottom chords where all of the following conditions are met:

1. The attic area is accessible from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches.
2. The slopes of the joists or truss bottom chords are no greater than 2 units vertical to 12 units horizontal.
3. Required insulation depth is less than the joist or bottom chord member depth.

The remaining portions of the joists or bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 lb/ft^2.
(No change to footnote h)

Committee Reason: This change adds clarity to the code and correlates with ASCE 7-10. The modification clarifies that Note g applies to joists as well as truss bottom chords. Also, the modification retains the term "limited storage".

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association (SBCA), and Philip Brazil, PE, SE, representing self, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

g. Uninhabitable attics with limited storage are those where the maximum clear height between the joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

The live load need only be applied to those portions of the joists or bottom chords where all of the following conditions are met:

1. The attic area is accessible from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches.
2. The slopes of the joists or truss bottom chords are no greater than 2 units vertical to 12 units horizontal.
3. Required insulation depth is less than the joist or bottom chord member depth.

The remaining portions of the joists or bottom chords shall be designed for a uniformly distributed non-concurrent live load of not less than 10 lb/ft^2.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: In speaking with the original proponent of the change to this section, the requirement for the 10 PSF live load on those portions of the bottom chords not serving as storage areas was intended to reflect the requirement to provide a 10 PSF load per Table R301.5, footnote "b" for uninhabitable attics without storage. However, footnote b clearly indicates that this is a non-concurrent load (intended for occasional access for maintenance). Current truss design methodology also treats this 10 PSF non-storage load as a non-concurrent maintenance load. Furthermore, the intent was to coordinate with ASCE 7-10, Table 4-1. ASCE 7-10 has since been out for public comment and this wording was changed to reflect the intended non-concurrent loading. Therefore, non-storage areas of the joists or truss bottom chords should be loaded for the maintenance load non-concurrent with other live loads.

Final Action: AS AM AMPC____ D

S60-09/10
1605.2.1, Table 1607.1, 1607.9.1, 1607.9.1.4, 1607.9.2, 1607.11.2.2

Proposed Change as Submitted

Proponent: Philip Brazil, PE, SE, Reid Middleton, Inc., representing self

1. Revise as follows:

1605.2.1 Basic load combinations. Where strength design or load and resistance factor design is used, structures and portions thereof shall resist the most critical effects from the following combinations of factored loads:

$1.4\ (D + F)$	**(Equation 16-1)**
$1.2\ (D + F + T) + 1.6\ (L + H) + 0.5\ (L_r \text{ or } S \text{ or } R)$	**(Equation 16-2)**
$1.2\ D + 1.6\ (L_r \text{ or } S \text{ or } R) + (f_1\ L \text{ or } 0.8\ W)$	**(Equation 16-3)**
$1.2\ D + 1.6\ W + f_1\ L + 0.5\ (L_r \text{ or } S \text{ or } R)$	**(Equation 16-4)**
$1.2\ D + 1.0\ E + f_1\ L + f_2\ S$	**(Equation 16-5)**
$0.9\ D + 1.6\ W + 1.6\ H$	**(Equation 16-6)**
$0.9\ D + 1.0\ E + 1.6\ H$	**(Equation 16-7)**

where:

f_1 = 1 for floors in ~~places of public~~ assembly areas and recreational uses (see Table 1607.1), for live loads, L, in excess of 100 pounds per square foot (4.79 kN/m^2), and for ~~parking~~ floors in passenger vehicle garages ~~live load~~; and

= 0.5 for other live loads, L.

f_2 = 0.7 for roof configurations (such as saw tooth) that do not shed snow off the structure; and

= 0.2 for other roof configurations.

Exception: Where other factored load combinations are specifically required by the provisions of this code, such combinations shall take precedence.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
3. Armories and drill rooms	150 [m]	–
4. Assembly areas and theaters Fixed seats (fastened to floor) Follow spot, projections and control rooms Lobbies Movable seats Stages and platforms Other assembly areas	 60 [m] 50 100 [m] 100 [m] 125 [m] 100 [m]	–
~~6. Bowling alleys~~	~~75~~	~~–~~
~~10. Dance halls and ballrooms~~	~~100~~	~~–~~
~~11~~ 9. Dining rooms and restaurants	100 [m]	–
~~16~~ 14. Garages (passenger vehicles only) Trucks and buses	40 [m] See	Note a Section 1607.6
~~17. Grandstands (see stadium and arena bleachers)~~	~~–~~	~~–~~
~~18. Gymnasiums, main floors and balconies~~	~~100~~	~~–~~
~~22~~ 18. Libraries Corridors above first floor Reading rooms Stack rooms	 80 60 150 [b, m]	 1,000 1,000 1,000
~~23~~ 19. Manufacturing Heavy Light	 250 [m] 125 [m]	 3,000 2,000
23. Recreational uses: Bowling alleys, poolrooms and similar uses Dance halls and ballrooms Gymnasiums Reviewing stands, grandstands and bleachers Stadiums and arenas with fixed seats (fastened to floor)	 75 [m] 100 [m] 100 [m] 100 [c, m] 60 [c, m]	
~~27~~ 24. Residential One- and two-family dwellings Uninhabitable attics without storage [i] Uninhabitable attics with limited storage [i, j, k] Habitable attics and sleeping areas All other areas Hotels and multiple-family dwellings Private rooms and corridors serving them Public rooms [m] and corridors serving them	 10 20 30 40 40 100	–
~~28. Reviewing stands, grandstands and bleachers~~		~~Note c~~
~~29~~ 25. Roofs: All roof surfaces subject to maintenance workers Awnings and canopies: Fabric construction supported by a lightweight rigid skeleton structure	 5 nonreducible	 300

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
All other construction	20	
Ordinary flat, pitched, and curved roofs	20	
Primary roof members, exposed to a work floor:		
Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages		2,000
All other occupancies		300
Roofs used for other special purposes	Note l	Note l
Roofs used for promenade purposes	60	
Roofs used for roof gardens ~~or~~	100	
Roofs used for assembly purposes	100 [m]	
~~32~~ 28. Sidewalks, vehicular driveways and yards, subject to trucking	250 [d, m]	8,000 [e]
~~33. Skating rinks~~	~~100~~	–
~~34. Stadiums and arenas~~		
~~Bleachers~~	~~100~~ [c]	~~–~~
~~Fixed seats (fastened to floor)~~	~~60~~ [c]	
~~36~~ 30. Storage warehouses (shall be designed for heavier loads if required for anticipated storage)		
Heavy	250 [m]	–
Light	125 [m]	
~~37~~ 32. Stores		
Retail		
First floor	100	1,000
Upper floors	75	1,000
Wholesale, all floors	125 [m]	1,000
~~40~~ 35. Yards and terraces, pedestrian	100 [m]	–

(Portions of table not shown are unchanged)

c. Design in accordance with the ICC 300.
m. Live load reduction is not permitted unless specific exceptions of Section 1607.9 apply.

(Footnotes not shown are unchanged)

1607.9.1 General. Subject to the limitations of Sections 1607.9.1.1 through ~~1607.9.1.4~~ 1607.9.1.3 and Table 1607.1, members for which a value of $K_{LL} A_T$ is 400 square feet (37.16 m^2) or more are permitted to be designed for a reduced live load in accordance with the following equation:

$$L = L_o\left[0.25 + \frac{15}{\sqrt{K_{LL}A_T}}\right]$$ **(Equation 16-22)**

$$\text{In SI: } L = L_o\left[0.25 + \frac{4.57}{\sqrt{K_{LL}A_T}}\right]$$

where:

L = Reduced design live load per square foot (meter) of area supported by the member.
L_o = Unreduced design live load per square foot (meter) of area supported by the member (see Table 1607.1).
K_{LL} = Live load element factor (see Table 1607.9.1).
A_T = Tributary area, in square feet (square meters).

L shall not be less than 0.50 L_o for members supporting one floor and L shall not be less than 0.40 L_o for members supporting two or more floors.

2. Delete without substitution:

~~**1607.9.1.4 Group A occupancies.** Live loads of 100 psf (4.79 kN/m^2) and at areas where fixed seats are located shall not be reduced in Group A occupancies.~~

3. Revise as follows:

1607.9.2 Alternate floor live load reduction. As an alternative to Section 1607.9.1 and subject to the limitations of Table 1607.1, floor live loads are permitted to be reduced in accordance with the following provisions. Such reductions shall apply to slab systems, beams, girders, columns, piers, walls and foundations.

~~1.~~ ~~A reduction shall not be permitted in Group A occupancies.~~
~~2~~ 1. A reduction shall not be permitted when the live load exceeds 100 psf (4.79 kN/m^2) except that the design live load for members supporting two or more floors is permitted to be reduced by 20 percent.

Exception: For uses other than storage, where approved, additional live load reductions shall be permitted where shown by the registered design professional that a rational approach has been used and that such reductions are warranted.

~~3~~ 2. A reduction shall not be permitted in passenger vehicle parking garages except that the live loads for members supporting two or more floors are permitted to be reduced by a maximum of 20 percent.
~~4~~ 3. For live loads not exceeding 100 psf (4.79 kN/m^2), the design live load for any structural member supporting 150 square feet (13.94 m^2) or more is permitted to be reduced in accordance with Equation 16-23.
~~5~~ 4. For one-way slabs, the area, *A*, for use in Equation 16-23 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.

$R = 0.08\,(A - 150)$ **(Equation 16-23)**
For SI: $R = 0.861\,(A - 13.94)$

Such reduction shall not exceed the smallest of:

1. 40 percent for horizontal members,
2. 60 percent for vertical members, or
3. *R* as determined by the following equation:

$R = 23.1\,(1 + D / L_o)$ **(Equation 16-24)**

where:

A = Area of floor supported by the member, square feet (m^2).
D = Dead load per square foot (m^2) of area supported.
L_o = Unreduced live load per square foot (m^2) of area supported.
R = Reduction in percent.

1607.11.2.2 Special-purpose roofs. Roofs used for promenade purposes, roof gardens, assembly purposes or other special purposes, and marquees, shall be designed for a minimum live load, L_o, as specified in Table 1607.1. Such live loads are permitted to be reduced in accordance with Section 1607.9. ~~Live loads of 100 psf or more at areas of roofs classified as Group A occupancies shall not be reduced.~~

Reason: The purpose for this proposal is to correlate the IBC with the 2010 edition of ASCE 7. The need for correlation is due to ASCE 7 Proposals LLSC-LL9 and LLSC-LL11, which were approved by the Live Load Subcommittee and are being balloted by the Main Committee (Items #5 and #6 of the Second Main Committee Ballot on Live/Dead Load Provisions). It is expected that the Main Committee will approve the proposals.

The proposal focuses on correlating the IBC with changes to the provisions of ASCE 7-10 where reduction of live loads at floors and occupied roofs is restricted or prohibited. The applicable provisions in the IBC are currently located in Section 1607.9. Reduction of live loads is typically permitted except for live loads exceeding 100 psf, in passenger vehicle garages, and in Group A occupancies where the live load is 100 psf or where fixed seats are located. There are exceptions for members supporting two or more floors where the live load exceeds 100 psf or in passenger vehicle garages but the reduction is limited to 20 percent. The corresponding provisions in ASCE 7-05 are nearly identical except that Group A occupancies are identified as assembly occupancies.

The proposal adds a footnote to Table 1607.1 that prohibits live load reduction “unless specific exceptions of Section 1607.9 apply.” The footnote is specified at each use or occupancy in Table 1607.1 where live load reduction is to be restricted. With the addition of this footnote, Table 1607.1 will contain limitations on live load reduction and references to Table 1607.1 are added to Sections 1607.9.1 and 1607.9.2 to correlate with the footnote. Section 1607.9.1.4 (basic live load reduction), Item #1 of Section 1607.9.2 (alternative live load reduction), and the last sentence of Section 1607.11.2.2, on Group A occupancies are deleted because their purpose is supplanted by the changes to Table 1607.1. Sections 1607.9.1.2 and 1607.9.1.3 (basic live load reduction) and Items #2 and #3 of Section 1607.9.2 (alternative live load reduction) are retained because they specify exceptions to Section 1607.9 that the proposed footnote of Table 1607.1 references.

These changes will clarify where live load reduction is prohibited or restricted by effectively specifying the requirement at each applicable use or occupancy in Table 1607.1 and they will align the applicable provisions of IBC Section 1607 with the corresponding provisions in Chapter 4 of ASCE 7-10. The change will also eliminate reliance on occupancy classification (Group A), which is not related to structural design but to fire- and life-safety regulations, for determination of whether live load reduction is permitted.

The proposal also consolidates several separately listed items in Table 1607.1 into a single category of recreational use and will align the table with Table 4-1 of ASCE 7-10. This is seen as simplifying the data in the table by grouping similar uses together. With respect to this consolidation, Section 1607.9.1.4 (basic live load reduction) and Item #1 of Section 1607.9.2 (alternative live load reduction) currently prohibit live load reduction in areas of Group A occupancies as noted above. IBC Section 303.1 lists bowling alleys, dance halls, gymnasiums, and pool and billiard parlors as Group A-3 occupancies; arenas and skating rinks as Group A-4 occupancies; and bleachers, grandstands and stadiums as Group A-5 occupancies.

Skating rinks are deleted from Table 1607.1 rather than being an item under "recreational uses" in Table 1607.1 because it is not listed in Table 4-1 of ASCE 7 and it conflicts with Table C4-1 of ASCE-7, which specifies uniform live loads of 250 psf for ice skating rinks and 100 psf for roller skating rinks.

The application of a value of 1.0 for f_1 in Section 1605.2.1 is revised for consistency with the other changes in this proposal. The notation for "L" is added to make it clear that roof live load, L_r, is not intended.

This proposal was prepared in conjunction with a proposal to editorially correlate IBC Section 1607 with Chapter 4 of ASCE 7-10 and is intended to further revise Section 1607 without any overlapping or conflicting changes between the two proposals.

A separate proposal also revises Item 4 of Table 1607.1 with respect to the live loads. These revisions are not repeated in this proposal but, should both proposals be approved by the membership, the proponent intends that Footnote (m) be specified for the uniform live loads at stages and platforms.

A separate proposal also revises Item 29 of Table 1607.1 in conjunction with correlating the IBC with changes to the provisions of ASCE 7-10 where reduction of live loads at floors and occupied roofs is restricted or prohibited. These revisions are not repeated in this proposal but, should both proposals be approved by the membership, the proponent intends that Footnote (m) be specified for the uniform live load at roofs used for assembly purposes but that all other changes to Item 29 in this proposal be disregarded.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Brazil-S45-T1607.1

Public Hearing Results

This code change was contained in the errata posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/09-10ProposedChanges.aspx.

Committee Action: Approved as Modified

Modify the proposal as follows:

1605.2.1 Basic load combinations. Where strength design or load and resistance factor design is used, structures and portions thereof shall resist the most critical effects from the following combinations of factored loads:

$1.4 (D + F)$	**(Equation 16-1)**
$1.2 (D + F + T) + 1.6 (L + H) + 0.5 (L_r \text{ or } S \text{ or } R)$	**(Equation 16-2)**
$1.2 D + 1.6 (L_r \text{ or } S \text{ or } R) + (f_1 L \text{ or } 0.8 W)$	**(Equation 16-3)**
$1.2 D + 1.6 W + f_1 L + 0.5 (L_r \text{ or } S \text{ or } R)$	**(Equation 16-4)**
$1.2 D + 1.0 E + f_1 L + f_2 S$	**(Equation 16-5)**
$0.9 D + 1.6 W + 1.6 H$	**(Equation 16-6)**
$0.9 D + 1.0 E + 1.6 H$	**(Equation 16-7)**

where:

f_1 = 1 for ~~floors in~~ places of public assembly~~,~~ ~~areas and recreational uses (see Table 1607.1), for~~ live loads~~, L,~~ in excess of 100 pounds per square foot (4.79 kN/m^2), and ~~for floors in passenger vehicle~~ parking garages; and
= 0.5 for other live loads~~, L~~.

f_2 = 0.7 for roof configurations (such as saw tooth) that do not shed snow off the structure; and
= 0.2 for other roof configurations.

Exception: Where other factored load combinations are specifically required by the provisions of this code, such combinations shall take precedence.

(Portions of proposal not shown are unchanged)

Committee Reason: This proposal correlates the reduction of live loads at floors and occupied roofs with comparable provisions in the next edition of ASCE 7 load standard. The modification rolls back portions of the proposed revisions to the basic allowable load combination notes that were deemed unnecessary.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, *Lo*, AND MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
23. Recreational uses:		
Bowling alleys, poolrooms and similar uses	75 [m]	
Dance halls and ballrooms	100 [m]	
Gymnasiums	100 [m]	
Reviewing stands, grandstands and bleachers	100 [c, m]	
Stadiums and arenas with fixed seats (fastened to floor)	60 [c, m]	
Roller skating rinks	100 [m]	
Ice skating rinks	250 [m]	

(Portions of table not shown are unchanged)

c. Design in accordance with the ICC 300.
m. Live load reduction is not permitted unless specific exceptions of Section 1607.9 apply.

(Portions of proposal not shown are unchanged)

Commenter's Reason: The proponent of S60 did a good job of aligning Table 1607.1 with the revisions in Chapter 4 of ASCE 7-10. However, S60 removed Line 33, Skating Rinks and the 100 psf uniform live load, because they are only listed in the commentary of ASCE 7. The classification of Skating Rink has been in the IBC since its inception. NCSEA believes it should still be in the Building Code. Unlike ASCE 7, the IBC doesn't have a commentary to Table 1607.1 for suggestions of other loads.

At the Code Development Hearings in Baltimore, NCSEA provided a floor amendment to add Skating Rinks back in, but opposing testimony pointed out that ASCE 7 has different live loads for Roller Skating Rinks (100 psf) and Ice Skating Rinks (250 psf). Thus our Floor Modification would disagree with ASCE 7 and could be unsafe. This Public Comment restores the 100 psf for (Roller) Skating Rinks to the IBC and adds the ASCE 7 Commentary load of 250 psf for (Ice) Skating Rinks.

NCSEA urges your acceptance of this public comment to S35-09/10. Thank you.

Final Action: AS AM AMPC____ D

S63-09/10
202

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Associations- Code Advisory Committee - General Requirements Subcommittee

Revise text as follows:

SECTION 202
DEFINITIONS

AWNING. An architectural projection that provides weather protection, identity or decoration and is partially or wholly supported by the building to which it is attached. An *awning* is comprised of a lightweight frame structure over which a covering is attached.

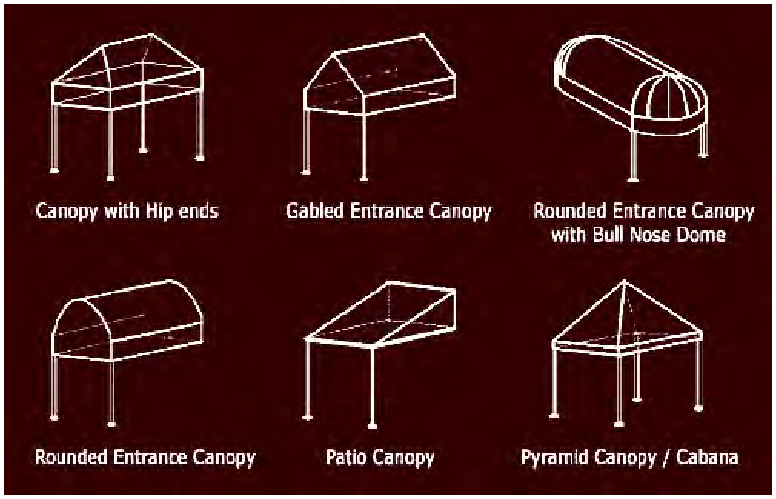
CANOPY. A permanent structure or architectural projection of rigid construction over which a covering is attached that provides weather protection, identity or decoration. ~~,~~ A canopy is permitted to ~~and shall~~ be structurally independent or supported by attachment to a building ~~on one end and by not less than one stanchion on the outer end~~ <u>on one or more sides</u>. Canopies shall be sloped more than 25 degrees from the horizontal or so constructed so as to inhibit access other than for maintenance functions.

<u>**CORNICE.** A projection at the top of a wall or a projecting element over an architectural feature, such as a doorway. Portions of a cornice which are sloped less than 25 degrees from the horizontal and are less than 10 feet (3.05 m) above the ground, more than 10 feet (3.05 m) below an adjacent roof, or located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the cornice, shall be designed for the live load from Table 1607.1.</u>

MARQUEE. A permanent roofed structure attached to and supported by the building <u>on one or more sides</u> ~~and~~ that ~~projects into the public right-of-way~~ <u>has a top surface which is sloped less than 25 degrees from the horizontal</u>. <u>A marquee shall be less than 10 feet (3.05 m) above the ground, more than 10 feet (3.05 m) below an adjacent roof, or located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the marquee.</u>

Reason: The current definitions for Awning, canopy and marquee are not adequate.

Lightweight, fabric covered, frame structures also have stanchion(s), in which case the awning definition would not apply. This doesn't make them canopies. Awnings are listed in Table 1607.1, Item 11 with a live load of 5 psf.



Architectural projections of rigid construction over which a covering is attached don't always have stanchion(s). If they do not, they are not defined in the IBC. What if, instead of a stanchion, the canopy cantilevers from the building, or has a hanger rod, chain or cable suspension system?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Cornices are not defined in the IBC, yet they are listed in Table 1607.1, Item 11 with a live load of 60 psf.

Currently, a Marquee must project over the public right-of-way. It is listed in Table 1607.1, Item 24 with a live load of 75 psf. If it doesn't project over the public right-of-way, what is it and what live load should it be designed for? The chapter-by-chapter synopsis for Chapter 32 on page xii of the 2009 IBC notes that "steps, columns, awnings, canopies, marquees, signs, windows, balconies and similar architectural features above grade" can all encroach into the public right-of-way. This effectively negates the definition of a marquee.

With these problems, the definitions in the IBC are not enforceable.

The definition of an "Awing" is retained. However, it can now have a stanchion. The proposed definition, which is tied to a 5 psf live load in Table 1607.1, is now keyed to the lightweight frame structure.

The definition of a "Canopy" is retained. However, instead of relying on a stanchion for its defining characteristic, it is defined by its permanent, rigid construction and its function of providing weather protection, identity or decoration.

From the position of structural engineers, architects and building officials, these definitions need to be able to be tied to Table 1607.1. The proposed revisions do this and include a discernable intent to allow for better code interpretation for other, undefined situations.

That is, when the canopy is like a roof, it is designed for 20 psf, like a roof structure. If a canopy, marquee or cornice has a reasonably flat surface, and is accessible, such as by a short ladder or an operable opening, so that the public might be inclined to get onto it, then it should be designed for a more robust live load.

Cost Impact: This code change proposal will not increase the cost of construction.

ICCFILENAME: HUSTON-S2-202

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed definitions should not contain requirements. The committee encourages a public comment modifying the definitions of cornice.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202 DEFINITIONS:

AWNING. An architectural projection that provides weather protection, identity or decoration and is partially or wholly supported by the building to which it is attached. An awning is comprised of a lightweight frame structure over which a covering is attached

CANOPY. A permanent structure or architectural projection of rigid construction over which a covering is attached that provides weather protection, identity or decoration.~~,~~ A canopy is permitted to be structurally independent or supported by attachment to a building on one or more sides. ~~Canopies shall be sloped more than 25 degrees from the horizontal or so constructed so as to inhibit access other than for maintenance functions~~.

CORNICE. A projecting horizontal ~~projection at the top of a wall or a projecting~~ molded element located at or near the top of an architectural feature. ~~element over an architectural feature, such as a doorway. Portions of a cornice which are sloped less than 25 degrees from the horizontal and are less than 10 feet (3.05 m) above the ground, more than 10 feet (3.05 m) below an adjacent roof, or located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the cornice, shall be designed for the live load from Table 1607.1.~~

MARQUEE. A ~~permanent roofed structure attached to and supported by the building on one or more sides~~ canopy that has a top surface which is sloped less than 25 degrees from the horizontal and is ~~A marquee shall be less than 10 feet above the ground, more than 10 feet below an adjacent roof, or~~ located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the marquee.

Commenter's Reason: The ICC Structural Committee urged NCSEA to modify S63 and bring it back in a Public Comment and stated that these definitions needed to be updated. NCSEA has worked with AIA and others to address the points raised in the Code Development Hearings.

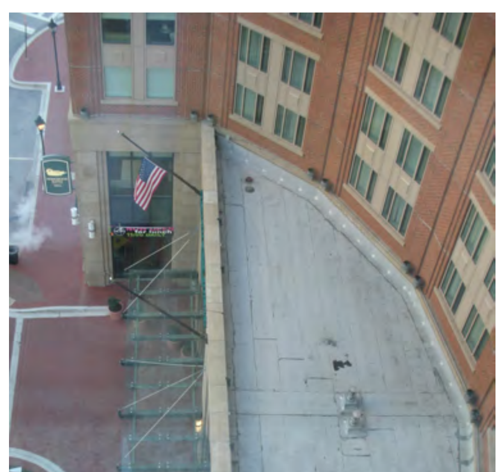
The Current IBC definitions of awning, canopy and marquee are not adequate. Lightweight, fabric covered frame structures also have stanchion(s), in which case the awning definition would not apply. This doesn't make them canopies. Awnings are listed in Table 1607.1, Item 11 with a live load of 5 psf.

Architectural projections of rigid construction over which a covering is attached don't always have stanchion(s). If they do not, they are not defined in the IBC. What if, instead of a stanchion, the canopy cantilevers from the building, or has a hanger rod, chain or cable suspension system?

Cornices are not defined in the IBC, yet they are listed in Table 1607.1, Item 11 with a live load of 60 psf.

Currently, a Marquee must project over the public right-of-way. It is listed in Table 1607.1, Item 24 with a live load of 75 psf. If it doesn't project over the public right-of-way, what is it and what live load should it be designed for? The chapter-by-chapter synopsis for Chapter 32 on page xii of the 2009 IBC notes that "steps, columns, awnings, canopies, marquees, signs, windows, balconies and similar architectural features above grade" can all encroach into the public right-of-way. This effectively negates the definition of a marquee.

The photo at the right was taken during the Code Development Hearings in Baltimore at a nearby hotel which had a Marquee that would not meet the current definition of a Marquee because it is not "project into the public right of way". However, access would be available from the operable windows of the adjacent rooms.



Prior to the Code Development Hearings in Baltimore, Paul McCartney and his band preformed in New York City while standing on the marquee of the Ed Sullivan Theater on July 15, 2009. Access was presumably through the operable windows which can be seen in the background. There are also historic photographs taken on VE day in New York City that show scores of people on marquees looking down on the thousands of people in the streets.

With these problems, the definitions in the IBC are not enforceable.

In this Public Comment, the definition of an "Awing" is retained. However, it can now have a stanchion. The proposed definition, which is tied to a 5 psf live load in Table 1607.1, is now keyed to the lightweight frame structure. The definition of a "Canopy" is retained. However, instead of relying on a stanchion for its defining characteristic, it is defined by its permanent, rigid construction and its function of providing weather protection, identity or decoration.

From the position of structural engineers, architects and building officials, these definitions need to be able to be tied to Table 1607.1. The proposed revisions do this and include a discernable intent to allow for better code interpretation for other, undefined situations.

That is, when the canopy is like a roof, it is designed for 20 psf, like a roof structure. If a canopy is accessible, such as by an operable opening, so that the public might be inclined to get onto it, then it should be designed for a more robust live load.

NCSEA urges your acceptance of this public comment to S63-09/10. Thank you.

Final Action: AS AM AMPC____ D

S70-09/10

1607.6, 1607.6.1, 1607.6.2-1607.6.5 (New), Table 1607.6

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Associations- Code Advisory Committee - General Requirements Subcommittee

1. Delete and Substitute as follows:

~~**1607.6 Truck and bus garages.** Minimum live loads for garages having trucks or buses shall be as specified in Table 1607.6, but shall not be less than 50 psf (2.40 kN/m2), unless other loads are specifically justified and *approved* by the *building official*. Actual loads shall be used where they are greater than the loads specified in the table.~~

~~**1607.6.1 Truck and bus garage live load application.** The concentrated load and uniform load shall be uniformly distributed over a 10-foot (3048 mm) width on a line normal to the centerline of the lane placed within a 12-foot-wide (3658 mm) lane. The loads shall be placed within their individual lanes so as to produce the maximum stress in each structural member. Single spans shall be designed for the uniform load in Table 1607.6 and one simultaneous concentrated load positioned to produce the maximum effect. Multiple spans shall be designed for the uniform load in Table 1607.6 on the spans and two simultaneous concentrated loads in two spans positioned to produce the maximum negative moment effect. Multiple span design loads, for other effects, shall be the same as for single spans.~~

1607.6 Heavy Vehicle Loads. Structures or portions of structures which are subject to heavy vehicle loads shall be designed for the loads from Section 1607.6.1.

1607.6.1 Truck and bus loads. Where any structure does not have provisions to restrict access for trucks and buses that exceed the weight limitations set forth in Table 1607.1 footnote a, those portions of the structure subject to such loads shall be designed using the vehicular live loads, including consideration of impact and fatigue, in accordance with the codes and specifications required by the jurisdiction having authority for the design and construction of the roadways and bridges in the same location of the structure.

2. Add new text as follows:

1607.6.2 Fire truck loading. Where fire department access requires travel over or loading of a structure by fire department vehicles or similar emergency vehicles, the structure shall be designed for the greater of the following loads:

1607.6.2.1 Fire truck operational loads. The actual operational loads (including out rigger reactions and contact areas) of the vehicles as stipulated and / or approved by the local Fire Department or Building Official having jurisdiction for the structure.

1607.6.2.2 Truck and bus loads. The live loading required by section 1607.6.1.

1607.6.3 Truck and bus garages. Garages designed specifically to allow trucks or buses that exceed the weight limitations for passenger vehicles as set forth in Table 1607.1 footnote a, shall be designed using the vehicular live loads, per the Codes and Specifications required by the jurisdiction having authority for the design and construction of the roadways and bridges in the same location of the structure. (Note: design for impact and fatigue in a garage is not required).

Exception: The design live loads and load placement are allowed to be determined using the actual vehicle weights for the vehicles allowed onto the garage floors, provided such loads and placement are based on rational engineering principles and are approved by the Building Official, but shall not be less than 50 psf (this live load shall not be reduced).

1607.6.4 Forklifts and moveable equipment. Where a structure is intended to have forklifts or other moveable equipment present, the structure shall be designed for the total vehicle load and the individual wheel loads for the anticipated vehicles as specified by the owner of the facility. These loads shall be posted per Section 1607.6.5.

1607.6.4.1 Impact and fatigue. Due to the nature of the operations of a facility with forklifts and other moveable equipment, impact loads and fatigue loading must be considered in the design of the supporting structure. This must include consideration for relative stiffness and differential deflections between adjacent framing members; positive and negative moments induced by a moving live load; effects of multiple vehicle loads in the same vicinity; and the punching shear on a slab based on the actual contact area of the wheel loads for the specific vehicle to be used. For the purposes of design, the vehicle and wheel loads shall be increased by 30 percent to account for impact.

1607.6.5 Posting. The maximum weight of the vehicles allowed into or on a garage or other structure shall be conspicuously posted by the owner in accordance with Section 106.1.

3. Delete without substitution:

~~TABLE 1607.6~~
~~UNIFORM AND CONCENTRATED LOADS~~

~~LOADING CLASSa~~	~~UNIFORM LOAD (pounds/linear foot of lane)~~	~~CONCENTRATED LOAD (pounds)b~~	
		~~For moment design~~	~~For shear design~~
~~H20-44 and HS20-44~~	~~640~~	~~18,000~~	~~26,000~~
~~H15-44 and HS15-44~~	~~480~~	~~13,500~~	~~19,500~~

~~For SI: 1 pound per linear foot = 0.01459 kN/m, 1 pound = 0.004448 kN, 1 ton = 8.90 kN.~~

~~a. An H loading class designates a two-axle truck with a semitrailer. An HS loading class designates a tractor truck with a semitrailer. The numbers following the letter classification indicate the gross weight in tons of the standard truck and the year the loadings were instituted.~~

~~b. See Section 1607.6.1 for the loading of multiple spans.~~

Reason: The current Section 1607.6 Truck and bus garages, is addressing truck and bus loads in garages only and does not give direction for heavy vehicle loads in other conditions outside of a "garage". The current section lists loading criteria that appears to be extracted from the live load section from the AASHTO (American Association of State Highway and Transportation Officials) Code. AASHTO is not a referenced standard in the IBC. The current section however does not give other critical loading criteria such as spacing of the concentrated loads or impact requirements. Buildings designed for repair or storage may need to be designed for higher levels of loading than are currently prescribed by Table 1607.6 due to tighter spacing requirements This new section clarifies that for conditions where heavy highway type vehicles have access onto a structure, then that structure will need to be designed using the same code and requirements that the roadways in that jurisdiction are designed under. This loading may in fact be the loading from AASHTO, or the loading for other elements such as lids of large detention tanks or utility vaults. It will likely vary from one Jurisdiction to another. Thus the RDP should consult with the Jurisdiction for design loads for these special conditions. The new language also gives criteria for addressing other heavy vehicle loads (Fire trucks and forklifts), which is currently absent in the current code, and is only mentioned under Section 1607.2 Loads not specified.

Cost Impact: This code change proposal will not increase the cost of construction.

ICCFILENAME: HUSTON-S7-1607.6

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal would provide necessary clarifications of provisions for heavy vehicle loading. Proposed requirements for emergency vehicles need work and it is hoped this can be accomplished in the public comment phase.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

~~**1607.6 Truck and bus garages.** Minimum live loads for garages having trucks or buses shall be as specified in Table 1607.6, but shall not be less than 50 psf (2.40 kN/m2), unless other loads are specifically justified and *approved* by the *building official*. Actual loads shall be used where they are greater than the loads specified in the table.~~

~~**1607.6.1 Truck and bus garage live load application.** The concentrated load and uniform load shall be uniformly distributed over a 10-foot (3048 mm) width on a line normal to the centerline of the lane placed within a 12-foot-wide (3658 mm) lane. The loads shall be placed within their individual lanes so as to produce the maximum stress in each structural member. Single spans shall be designed for the uniform load in Table 1607.6 and one simultaneous concentrated load positioned to produce the maximum effect. Multiple spans shall be designed for the uniform load in Table 1607.6 on the spans and two simultaneous concentrated loads in two spans positioned to produce the maximum negative moment effect. Multiple span design loads, for other effects, shall be the same as for single spans.~~

~~**TABLE 1607.6**~~
~~**UNIFORM AND CONCENTRATED LOADS**~~

1607.6 Heavy vehicle loads. Floors and other surfaces that are intended to support vehicle loads greater than a 10,000 pound gross vehicle weight rating shall comply with Sections 1607.6.1 through 1607.6.5.

1607.6.1 Loads. Where any structure does not restrict access for vehicles that exceed a 10,000 pounds gross vehicle weight rating, those portions of the structure subject to such loads shall be designed using the vehicular live loads, including consideration of impact and fatigue, in accordance with the codes and specifications required by the Jurisdiction having authority for the design and construction of the roadways and bridges in the same location of the structure.

1607.6.2 Fire truck and emergency vehicles. Where a structure or portions of a structure are accessed and loaded by fire department access vehicles and other similar emergency vehicles, the structure shall be designed for the greater of the following loads:

1. The actual operational loads, including out rigger reactions and contact areas of the vehicles as stipulated and approved by the Building Official, or

2. The live loading specified in Section 1607.6.1.

1607.6.3 Heavy vehicle garages. Garages designed to accommodate vehicles that exceed a 10,000 pound gross vehicle weight rating, shall be designed using the live loading specified by Section 1607.6.1. For garages the design for impact and fatigue is not required.

Exception: The vehicular live loads and load placement are allowed to be determined using the actual vehicle weights for the vehicles allowed onto the garage floors, provided such loads and placement are based on rational engineering principles and are approved by the Building Official, but shall not be less than 50 psf. This live load shall not be reduced.

1607.6.4 Forklifts and moveable equipment. Where a structure is intended to have forklifts or other moveable equipment present, the structure shall be designed for the total vehicle or equipment load and the individual wheel loads for the anticipated vehicles as specified by the owner of the facility. These loads shall be posted per Section 1607.6.5.

1607.6.4.1 Impact and fatigue. Impact loads and fatigue loading shall be considered in the design of the supporting structure. For the purposes of design, the vehicle and wheel loads shall be increased by 30 percent to account for impact.

1607.6.5 Posting. The maximum weight of the vehicles allowed into or on a garage or other structure shall be posted by the owner in accordance with Section 106.1.

Commenter's Reason: The current Section 1607.6 Truck and bus garages, addresses truck and bus loads in garages only and does not give direction for heavy vehicle loads in other conditions outside of a "garage". The current section lists loading criteria that appears to be extracted from the live load section from the AASHTO (American Association of State Highway and Transportation Officials) Code. AASHTO is not a referenced standard in the IBC. The current section however does not give other critical loading criteria such as spacing of the concentrated loads or impact requirements. Buildings designed for repair or storage may need to be designed for higher levels of loading than are currently prescribed by Table 1607.6 due to tighter spacing requirements This new section clarifies that for conditions where heavy highway type vehicles have access onto a structure, then that structure will need to be designed using the same code and requirements that the roadways in that jurisdiction are designed under. This loading may in fact be the loading from AASHTO, or the loading for other elements such as lids of large detention tanks or utility vaults. It will likely vary from one Jurisdiction to another. Thus the RDP should consult with the Jurisdiction for design loads for these special conditions. The new language also gives criteria for addressing other heavy vehicle loads such as Fire trucks and forklifts, which is currently absent in the current code, and is only mentioned under Section 1607.2 Loads not specified.

Final Action: AS AM AMPC____ D

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1012.1, 1013.1, 1013.1.1, 1602.1, Table 1607.1, 1607.7, 1607.7.1, 1607.7.1.1, 1607.7.1.2, 1607.7.2, 1607.7.3

Proposed Change as Submitted

Proponent: Philip Brazil, PE, SE, Reid Middleton, Inc., representing self

1. Add new definitions as follows:

1602.1 Definitions. The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

GRAB BAR SYSTEM. A bar and associated anchorages and attachments to the structural system for the support of body weight in locations such as toilets, showers and tub enclosures.

GUARDRAIL SYSTEM. A system of components, including anchorages and attachments to the structural system, near open sides of an elevated surface for the purpose of minimizing the possibility of a fall from the elevated surface by people, equipment or material.

HANDRAIL SYSTEM. A rail grasped by hand for guidance and support, and associated anchorages and attachments to the structural system.

2. Revise as follows:

1602.1 Definitions. The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

VEHICLE BARRIER SYSTEM. A system of ~~building~~ components, including anchorages and attachments to the structural system, near open sides of a garage floor or ramp or building walls that act as restraints for vehicles.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS[g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
19. Handrail, guardrail and grab bar systems ~~Handrails, guards and grab bars~~	See Section 1607.7	

(Portions of table not shown remain unchanged)

1607.7 Loads on handrails, ~~guards~~ guardrail, grab bars, seats and vehicle barrier systems. ~~Handrails~~ Handrail, ~~guards~~ guardrail, grab bar ~~bars~~, accessible seat ~~seats~~, accessible bench ~~benches~~ and vehicle barrier systems shall be designed and constructed to the structural loading conditions set forth in this section.

1607.7.1 Handrails and ~~guards~~ guardrail systems. Handrail ~~Handrails~~ and ~~guards~~ guardrail systems shall be designed to resist a load of 50 plf (0.73 kN/m) applied in any direction at the top ~~and to transfer this load through the supports to the structure~~. Glass handrail ~~assemblies~~ and ~~guards~~ guardrail systems shall also comply with Section 2407.

Exceptions:

1. For one- and two-family dwellings, only the single concentrated load required by Section 1607.7.1.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not accessible to the general public and that have an occupant load less than 50, the minimum load shall be 20 pounds per foot (0.29 kN/m).

1607.7.1.1 Concentrated load. Handrail ~~Handrails~~ and ~~guards~~ guardrail systems shall be able to resist a single concentrated load of 200 pounds (0.89 kN), applied in any direction at any point along the top~~, and to transfer this load through the supports to the structure~~. This load need not be assumed to act concurrently with the loads specified in Section 1607.7.1.

1607.7.1.2 Components. Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds (0.22 kN) on an area equal to 1 square foot ($0.093m^2$), including openings and space between rails. Reactions due to this loading are not required to be superimposed with those of Section 1607.7.1 or 1607.7.1.1.

1607.7.2 Grab bar~~s~~, shower seat~~s~~ and dressing room bench seat~~s~~ systems. Grab bar ~~bars~~, shower seat ~~seats~~ and dressing room bench seat systems shall be designed to resist a single concentrated load of 250 pounds (1.11 kN) applied in any direction at any point.

1607.7.3 Vehicle barrier systems. Vehicle barrier systems for passenger vehicles shall be designed to resist a single load of 6,000 pounds (26.70 kN) applied horizontally in any direction to the barrier system ~~and shall have anchorage or attachment capable of transmitting this load to the structure~~. For design of the system, two loading conditions shall be analyzed. The first condition shall apply the load at a height of 1 foot, 6 inches (457 mm) above the floor or ramp surface. The second loading condition shall apply the load at 2 feet, 3 inches (686 mm) above the floor or ramp surface. The more severe load condition shall govern the design of the vehicle barrier ~~restraint~~ system. The load shall be assumed to act on an area not to exceed 1 square foot ($305 mm^2$), and is not required to be assumed to act concurrently with any handrail or guardrail system loadings specified in Section 1607.7.1. Garages accommodating trucks and buses shall be designed in accordance with an approved method that contains provision for traffic railings.

1012.1 Where required. *Handrails* for *stairways* and *ramps* shall be adequate in strength and attachment in accordance with Section 1607.7 for handrail systems. *Handrails* required for *stairways* by Section 1009.12 shall comply with Sections 1012.2 through 1012.9. *Handrails* required for *ramps* by Section 1010.8 shall comply with Sections 1012.2 through 1012.8.

1013.1 Where required. *Guards* shall be located along open-sided walking surfaces, including *mezzanine*s, *equipment platforms*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.7 for guardrail systems.

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

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including steps leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, ramps and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating where *guards* in accordance with Section 1028.14 are permitted and provided.

1013.1.1 Glazing. Where glass is used to provide a *guard* or as a portion of the *guard* system, the *guard* shall also comply with Section 2407. Where the glazing provided does not meet the strength and attachment requirements of Section 1607.7 for guardrail systems, complying *guards* shall also be located along glazed sides of open-sided walking surfaces.

Reason: The purpose for this proposal is to correlate the IBC with the 2010 edition of ASCE 7. The need for correlation is due to ASCE 7 Proposal LLSC-LL9, which was approved by the Live Load Subcommittee and is being balloted by the Main Committee (Item #5 of the Second Main Committee Ballot on Live/Dead Load Provisions). It is expected that the Main Committee will approve the proposal.

This proposal takes into account the definitions of “guard” and “handrail” in the IBC by limiting the applicability of the proposed definitions in this proposal to Chapter 16, whereas the definitions of “guard” and “handrail” apply throughout the IBC. The definitions in this proposal will establish grab bar, guardrail and handrail systems as structural systems that are required to resist structural design loads and transfer these loads to the supporting structure. This will contrast with guards and handrails whose definitions are primarily utilized in code provisions related to egress and accessibility.

All instances of “guard” in the structural chapters, and all references to Section 1607.7 in the nonstructural chapters, of the 2009 IBC are included in this proposal.

This proposal was prepared in conjunction with a proposal to editorially correlate IBC Section 1607 with Chapter 4 of ASCE 7-10 and is intended to further revise Section 1607 without any overlapping or conflicting changes between the two proposals.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Brazil-S25-1607.7

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed terminology, in trying to distinguish the structural requirements from means of egress requirements, is itself potentially confusing. The currently used term is guard and there's no reason to change it to guardrail.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Scott Beard, City of Tacoma, WA, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1013.1 (IFC [B]1013.1) Where required. Guards shall be located along open-sided walking surfaces, including mezzanines, equipment platforms, stairs, ramps and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Guards shall be adequate in strength and attachment in accordance with Section 1607.7 for guard~~rail~~ systems.

(no proposed changes to exceptions)

1013.1.1 (IFC [B]1013.1.1) Glazing. Where glass is used to provide a guard or as a portion of the guard system, the guard shall also comply with Section 2407. Where the glazing provided does not meet the strength and attachment requirements in Section 1607.7 for guard~~rail~~ systems, complying guards shall also be located along glazed sides of open-sided walking surfaces.

1602.1 Definitions. The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

GUARD~~RAIL~~ SYSTEM. A system of components, including anchorages and attachments to the structural system, near open sides of an elevated surface for the purpose of minimizing the possibility of a fall from the elevated surface by people, equipment or material.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
19. Handrail, guard~~rail~~ and grab bar systems	See Section1607.7	

(Portions of table and footnotes not shown remain unchanged)

1607.7 Loads on handrail, guard~~rail~~, grab bar, seat and vehicle barrier systems. Handrail, guard~~rail~~, grab bar, accessible seat, accessible bench and vehicle barrier systems shall be designed and constructed to the structural loading conditions set forth in this section.

1607.7.1 Handrail and guard~~rail~~ systems. Handrail and guard~~rail~~ systems shall be designed to resist a load of 50 plf (0.73 kN/m) applied in any direction at the top. Glass handrail and guard~~rail~~ systems shall also comply with Section 2407.

Exceptions:
1. For one- and two-family dwellings, only the single concentrated load required by Section 1607.7.1.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not accessible to the general public and that have an occupant load less than 50, the minimum load shall be 20 pounds per foot (0.29 kN/m).

1607.7.1.1 Concentrated load. Handrail and guard~~rail~~ systems shall be ~~able~~ designed to resist a single concentrated load of 200 pounds (0.89 kN), applied in any direction at any point along the top, and to transfer this load through the supports to the structure. This load need not be assumed to act concurrently with the loads specified in Section 1607.7.1.

1607.7.2 Grab bar, shower seat and dressing room bench seat systems. Grab bar, shower seat and dressing room bench seat systems shall be designed to resist a single concentrated load of 250 pounds (1.11 kN) applied in any direction at any point on the grab bar or seat to produce the maximum load effects.

1607.7.3 Vehicle barrier systems. Vehicle barrier systems for passenger vehicles shall be designed to resist a single load of 6,000 pounds (26.70 kN) applied horizontally in any direction to the barrier system. For design of the system, two loading conditions shall be analyzed. The first condition shall apply the load at a height of 1 foot, 6 inches (457 mm) above the floor or ramp surface. The second loading condition shall apply the load at 2 feet, 3 inches (686 mm) above the floor or ramp surface. The more severe load condition shall govern the design of the vehicle barrier system and shall have anchorage or attachment capable of transmitting this load to the structure. The load shall be assumed to act on an area not to exceed 1 square foot (305 mm^2), and is not required to be assumed to act concurrently with any handrail or guard~~rail~~ system loadings specified in Section 1607.7.1. Garages accommodating trucks and buses shall be designed in accordance with an approved method that contains provision for traffic railings.

Commenter's Reason: The public comment completes the correlation of the provisions of the IBC with the corresponding provisions in ASCE 7-10 and adjusts "guardrail system" from ASCE 7-10 to "guard system" for compatibility with the provisions for guards in the IBC.

Public Comment 2:

Philip Brazil, P.E., S.E., representing self, requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

406.2.3 Guards. Guards shall be provided in accordance with Section 1013. Guards serving as vehicle barriers ~~systems~~ shall comply with Sections 406.2.4 and 1013.

406.2.4 Vehicle barriers ~~systems~~. Vehicle barriers ~~systems~~ not less than 2 feet 9 inches (835 mm) high shall be placed at the ends of drive lanes, and at the end of parking spaces where the vertical distance to the ground or surface directly below is greater than 1 foot (305 mm). Vehicle barriers ~~systems~~ shall comply with the loading requirements of Section 1607.7.3.

406.3.3 Construction. Open parking garages shall be of Type I, II or IV construction. Open parking garages shall meet the design requirements of Chapter 16. For vehicle barriers ~~systems~~, see Section 406.2.4.

1602.1 Definitions. The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

~~**GUARD.** See Section 1002.1.~~

VEHICLE BARRIER ~~SYSTEM~~. A component or a system of ~~building~~ components near open sides of a garage floor or ramp or building walls that act as restraints for vehicles.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
19. Handrails, guards and grab bars	See Section	1607.7
38. Vehicle barriers ~~systems~~	See Section	1607.7.3

1607.7 Loads on handrails, guards, grab bars, seats and vehicle barriers ~~systems~~. Handrails, guards, grab bars, accessible seats, accessible benches and vehicle barriers ~~systems~~ shall be designed and constructed to the structural loading conditions set forth in this section.

1607.7.1 Handrails and guards. Handrails and guards shall be designed to resist a linear load of 50 plf (0.73 kN/m) ~~applied in any direction at the top and to transfer this load through the supports to the structure~~ in accordance with Section 4.5.1 of ASCE 7. Glass handrail assemblies and guards shall also comply with Section 2407.

Exceptions:
1. For one- and two-family dwellings, only the single concentrated load required by Section 1607.7.1.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not accessible to the general public and that have an occupant load less than 50, the minimum load shall be 20 pounds per foot (0.29 kN/m).

1607.7.1.1 Concentrated load. Handrails and guards shall also be ~~able~~ designed to resist a ~~single~~ concentrated load of 200 pounds (0.89 kN)~~, applied in any direction at any point along the top, and to transfer this load through the supports to the structure. This load need not be assumed to act concurrently with the loads specified in Section 1607.7.1~~ in accordance with Section 4.5.1 of ASCE 7.

1607.7.1.2 Components. Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to ~~withstand~~ resist a ~~horizontally applied normal~~ concentrated load of 50 pounds (0.22 kN) ~~on an area equal to 1 square foot (0.093m^2), including openings and space between rails. Reactions due to this loading are not required to be superimposed with those of Section 1607.7.1 or 1607.7.1.1~~ in accordance with Section 4.5.1 of ASCE 7.

1607.7.2 Grab bars, shower seats and dressing room bench seats. Grab bars, shower seats and dressing room bench seats ~~systems~~ shall be designed to resist a single concentrated load of 250 pounds (1.11 kN) applied in any direction at any point on the grab bar or seat to produce the maximum load effects.

1607.7.3 Vehicle barriers ~~systems~~. Vehicle barriers ~~systems~~ for passenger vehicles shall be designed to resist a ~~single~~ concentrated load of 6,000 pounds (26.70 kN) ~~applied horizontally in any direction to the barrier system and shall have anchorage or attachment capable of transmitting this load to the structure. For design of the system, two loading conditions shall be analyzed. The first condition shall apply the load at a height of 1 foot, 6 inches (457 mm) above the floor or ramp surface. The second loading condition shall apply the load at 2 feet, 3 inches (686 mm) above the floor or ramp surface. The more severe load condition shall govern the design of the barrier restraint system. The load shall be assumed to act on an area not to exceed 1 square foot (305 mm^2), and is not required to be assumed to act concurrently with any handrail or guard loadings specified in Section 1607.7.1~~ in accordance with Section 4.5.3 of ASCE 7. Garages accommodating trucks and buses shall be designed in accordance with an approved method that contains provision for traffic railings.

Commenter's Reason: Based on the Committee's reason for disapproval, this public comment revises the current provisions in the IBC to be a combination of scoping requirements in the IBC with references to the corresponding technical requirements in ASCE 7-10.
The cross-reference to the definition of "guard" in Section 1602.1 is deleted because a cross-reference already exists in Section 202 and a repetition of it in Section 1602.1 serves no functional purpose. Also, there is no similar cross-reference in Section 1602.1 to the definition of "handrail" in Section 1002.1.

The term for "vehicle barrier system" in Section 1602.1 is changed to "vehicle barrier" for consistency with the defined terms of "guard" and "handrail" in Section 1002.1. All references to "vehicle barrier system" in the IBC are included in this public comment and are also changed to "vehicle barrier." The definition for "vehicle barrier system" in Section 1602.1 is also changed for consistency with the definition of "guard," which is a "building component or a system of building components…" but it is also changed to a component or a system of components…" for consistency with changes to the definition of "vehicle barrier system" in Proposal S31-09/10-AS ("a system of components…").

The provisions in Section 1607.7 are typically revised in this public comment to be scoping requirements and references to technical requirements except for Section 1607.7.2. In this case, scoping and technical requirements are included because corresponding Section 4.5.2 of ASCE 7-10 is limited to grab bars.

Final Action: AS AM AMPC____ D

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1607.9, 1607.9.1.5, 1607.11.2, 1607.11.2.1, 1607.11.2.2, Table 1607.1

<u>Proposed Change as Submitted</u>

Proponent: Philip Brazil, PE, SE, Reid Middleton, Inc., representing self

1. Revise as follows:

1607.9 Reduction in live loads. Except for uniform live loads at roofs, all other minimum uniformly distributed live loads, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.9.1 or 1607.9.2. ~~Roof~~ <u>U</u>niform live loads~~, other than special purpose roofs of Section 1607.11.2.2~~ <u>at roofs</u> are permitted to be reduced in accordance with Section 1607.11.2. ~~Roof uniform live loads of special purpose roofs are permitted to be reduced in accordance with Section 1607.9.1 or 1607.9.2~~.

~~**1607.9.1.5 Roofs members.** Live loads of 100 psf (4.79 kN/m^2) or less shall not be reduced for roof members except as specified in Section 1607.11.2.~~

1607.11.2 ~~Reduction in roof live loads~~ <u>General</u>. The minimum uniformly distributed live loads of roofs and marquees, L_o, in Table 1607.1 are permitted to be reduced in accordance with Section 1607.11.2.1 or 1607.11.2.2.

1607.11.2.1 ~~Flat, pitched and curved~~ <u>Ordinary</u> roofs<u>, awnings and canopies</u>. Ordinary flat, pitched and curved roofs, and awnings and canopies other than of fabric construction supported by lightweight rigid skeleton structures, are permitted to be designed for a reduced <u>uniformly distributed</u> roof live load<u>, L_r,</u> as specified in the following equations or other controlling combinations of loads in Section 1605, whichever produces the greater load.

In structures such as greenhouses, where special scaffolding is used as a work surface for workers and materials during maintenance and repair operations, a lower roof load than specified in the following equations shall not be used unless approved by the building official. Such structures shall be designed for a minimum roof live load of 12 psf (0.58 kN/m^2).

$L_r = L_o R_1 R_2$ **(Equation 16-25)**

where: $12 \leq L_r \leq 20$

For SI: $L_r = L_o R_1 R_2$

where: $0.58 \leq L_r \leq 0.96$

L_r = Reduced live load per square foot (m^2) of horizontal projection in pounds per square foot (kN/m^2).

The reduction factors R_1 and R_2 shall be determined as follows:

$R_1 = 1$ for $A_t \leq 200$ square feet (18.58 m^2) **(Equation 16-26)**

$R_1 = 1.2 - 0.001 A_t$ for 200 square feet < A_t < 600 square feet **(Equation 16-27)**

For SI: $1.2 - 0.011\,A_t$ for 18.58 square meters < A_t < 55.74 square meters

R_1 = 0.6 for $A_t \geq$ 600 square feet (55.74 m^2) **(Equation 16-28)**

where:

A_t = Tributary area (span length multiplied by effective width) in square feet (m^2) supported by any structural member, and

R_2 = 1 for $F \leq 4$ **(Equation 16-29)**

R_2 = $1.2 - 0.05\,F$ for $4 < F < 12$ **(Equation 16-30)**

R_2 = 0.6 for $F \geq 12$ **(Equation 16-31)**

where:

F = For a sloped roof, the number of inches of rise per foot (for SI: F = 0.12 x slope, with slope expressed as a percentage), or for an arch or dome, rise-to-span ratio multiplied by 32.

1607.11.2.2 ~~Special-purpose roofs~~ Roof areas serving occupancy functions. Areas of roofs ~~used for promenade purposes,~~ that serve occupancy functions, such as roof gardens, or for assembly ~~purposes~~ or other ~~special~~ similar purposes, and marquees~~, shall be designed for a minimum live load, L_o, as specified in Table 1607.1. Such live loads~~ are permitted to ~~be~~ have their uniformly distributed live loads reduced in accordance with Section 1607.9. Live loads of 100 psf or more at areas of roofs classified as Group A occupancies shall not be reduced.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
29. Roofs:		
All roof surfaces subject to maintenance workers		300
Awnings and canopies:		
Fabric construction supported by a lightweight rigid skeleton structure	5 nonreduceable	
All other construction	20	
Ordinary flat, pitched, and curved roofs (not serving an occupancy function)	20	
Primary roof members, exposed to a work floor:		
Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages		2,000
All other occupancies		300
~~Roofs used for other special purposes~~	~~Note l~~	~~Note l~~
~~Roofs used for promenade purposes~~	~~60~~	
~~Roofs used for roof gardens or assembly purposes~~	~~100~~	
Roofs serving an occupancy function:		
Roof gardens	60	
Assembly areas	100	
All other similar areas	Note l	Note l

(Portions of Table not show, remain unchanged)

(No change to footnotes a through f)

g. Where snow loads occur that are in excess of the design conditions, the structure shall be designed to support the loads due to the increased loads caused by drift buildup or a greater snow design determined by the building official (see Section 1608). ~~For special-purpose roofs, see Section 1607.11.2.2.~~

(No change to footnotes h through k)

l. ~~Roofs used for other special purposes~~ Areas of roofs serving an occupancy function, other than roof gardens and assembly areas, shall be designed for appropriate loads as approved by the building official.

2. Re-organize Table 1607.1 as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
29. Roofs:		
Ordinary flat, pitched, and curved roofs (not serving an occupancy function)	20	
Awnings and canopies:		
Fabric construction supported by a lightweight rigid skeleton structure	5 nonreducible	
All other construction	20	
~~Roofs used for other special purposes~~	~~Note l~~	~~Note l~~
~~Roofs used for promenade purposes~~	~~60~~	
~~Roofs used for roof gardens or assembly purposes~~	~~100~~	
Roofs serving an occupancy function:		
Roof gardens	60	
Assembly areas	100	
All other similar areas	Note l	Note l
Primary roof members, exposed to a work floor:		
Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages		2,000
All other occupancies		300
All roof surfaces subject to maintenance workers		300

(Portions of Table not show, remain unchanged)

Reason This proposal was prepared in conjunction with a proposal to editorially correlate IBC Section 1607 with the provisions of Chapter 4 of ASCE 7-10 related to floor live load reduction. This proposal focuses on editorial correlation for roof live load reduction and is intended to further align IBC Section 1607 with Chapter 4 of ASCE 7-10 without any overlapping or conflicting changes between the two proposals. The changes in this proposal are seen as largely editorial.

The items under "roofs" in Table 1607.1 are reorganized to align them with Section 1607.11.2 on the reduction of live loads at roofs. Section 1607.11.2 permits reductions in uniform live loads at roofs and marquees "in accordance with Section 1607.11.2.1 or 1607.11.2.2." These sections, in turn, refer to items under "roofs" in Table 1607.1 except for marquees, which are separately listed in the table. The reorganization of the items under "roofs" is intended to reduce confusion over the applicability of roof live load reduction at "ordinary flat, pitched and curved roofs" in Section 1607.11.2.1, which applies to roofs that do not serve an occupancy function but are susceptible to loads from maintenance workers, and at roofs that serve an occupancy function in Section 1607.11.2.2, which are the structural equivalent of floors. Section 1607.11.2.1 also applies to awnings and canopies and the title of the section is changed accordingly. Table 1607.1 is reorganized so that it aligns with these sections.

The changes to Section 1607.9 and the deletion of Section 1607.9.1.5 eliminate superfluous text. Section 1607.9 provides the charging text for reduction of uniformly distributed live loads at floors. The changes retain the reference to Section 1607.11.2 on roof live load reduction but delete the text referring to special purpose roofs in favor of the charging text in Section 1607.11.2.

Section 1607.11.2.2 is changed to align it with the corresponding provisions in Section 4.8.2 of ASCE 7-10. Section 4.9.2 of ASCE 7-05 currently specifies roofs "that have an occupancy function" but the title of the section is "special purpose roofs." The proponent is requesting the title be changed to "roof areas serving an occupancy function" in Section 4.8.2 of ASCE 7-10 and IBC Section 1607.11.2.2 is changed accordingly. Section 4.8.2 of ASCE 7-10 specifies roof gardens and areas used for "assembly or other similar purposes" as examples of roof areas that serve occupancy functions. Section 4.9.2 of ASCE 7-05 is similar. Table 4-1 of ASCE 7-05, however, lists roofs used for promenade purposes along with roofs used for roof gardens or for assembly or other special purposes. This listing of roofs used for promenade purposes is deleted in Table 4-1 of ASCE 7-10 and IBC Table 1607.1 is changed accordingly.

The proponent is requesting "other special purposes" be changed to "other similar purposes" in Section 4.8.2 and Table 4-1 of ASCE 7-10 in conjunction with the requested change in the title of Section 4.8.2 from "special purpose roofs" to "roof areas serving an occupancy function." IBC Section 1607.11.2.2 and Table 1607.1 are changed accordingly. Note that the uniform live load at roofs used for other special purposes in Table 4-1 of ASCE 7-05 and 2009 IBC Table 1607.1, and at other similar areas of roofs serving an occupancy function in IBC Table 1607.1 of this proposal, is not specified in favor of a footnote specifying appropriate loads as approved by the authority having jurisdiction (ASCE 7) or building official (IBC) and is not affected by this proposal.

Footnotes (g) and (l) to Table 1607.1 are revised for consistency with the changes to Section 1607.11.2.2 above. The deletion in Footnote (g) also eliminates a superfluous cross-reference.

A separate proposal correlates the IBC with changes to the provisions of ASCE 7-10 where reduction of live loads at floors and occupied roofs is restricted or prohibited. That proposal adds Footnote (m) to "100 psf" at "roofs used for assembly purposes" in the item for roofs in Table 1607.1. The addition of the footnote is not repeated in this proposal but, should this proposal and the proposal adding the footnote be approved by the membership, the proponent intends that Footnote (m) be specified with "100 psf" at "assembly areas" under "roofs serving an occupancy function" in the item for roofs in Table 1607.1.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Brazil-S14-1607.9

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS [g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
29. Roofs:		
All roof surfaces subject to maintenance workers		300
Awnings and canopies:		
Fabric construction supported by a lightweight rigid skeleton structure	5 nonreduceable	
All other construction	20	
Ordinary flat, pitched, and curved roofs (not serving an occupancy function)	20	
Primary roof members, exposed to a work floor:		
Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages		2,000
All other occupancies		300
Roofs serving an occupancy function:		
Roof gardens	~~60~~ 100	
Assembly areas	100	
All other similar areas	Note l	Note l

(Portions of Table not show, remain unchanged)

Portions of proposal not shown are unchanged

Committee Reason: By deleting duplicate text and reorganizing the roof live load requirements, this code change clarifies this portion of the code. The modification reverses the reorganization of Table 1607.1 in item 2 and also restores roof live loads that were not intended to be included in this code change.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1607.11.2.2 Occupiable roof ~~Roof~~ areas ~~serving occupancy functions~~. Areas of roofs that ~~serve occupancy functions~~ are occupiable, such as roof gardens, or for assembly or other similar purposes, and marquees are permitted to have their uniformly distributed live loads reduced in accordance with Section 1607.9. Live loads of 100 psf or more at areas of roofs classified as Group A occupancies shall not be reduced.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, *Lo*, AND MINIMUM CONCENTRATED LIVE LOADS[g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
29. Roofs:		
All roof surfaces subject to maintenance workers		300
Awnings and canopies<u>:</u>		
Fabric construction supported by a lightweight rigid skeleton structure	5 nonreduceable	
All other construction	20	
Ordinary flat, pitched, and curved roofs (~~not serving an occupancy function~~ <u>that are not occupiable</u>)	20	
Primary roof members, exposed to a work floor:		
Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages		2,000
All other occupancies		300
<u>Occupiable roofs</u> ~~Roofs~~ serving an occupancy function:		
Roof gardens	100	
Assembly areas	100	
All other similar areas	Note l	Note l

(Portions of Table not show, remain unchanged)

l. Areas of <u>occupiable</u> roofs ~~serving an occupancy function~~, other than roof gardens and assembly areas, shall be designed for appropriate loads as approved by the building official.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This proposed modification more clearly states where the roof live loads are intended to be used. "Serving an occupancy function" is not clear—"occupancy function" is not defined, and the phrase is not used elsewhere in the Code. It could be construed to apply to roofs that are accessory to an occupancy (i.e., they "serve" the "occupancy"). The loads for roofs "serving an occupancy function" are intended to apply when the roof can be occupied, not just when it's accessory to another space.

Final Action: AS AM AMPC____ D

S81-09/10
1607.13

<u>Proposed Change as Submitted</u>

Proponent: Stephen Kerr, PE, SE, representing self

Revise as follows:

1607.13 Interior walls and partitions. Interior walls and partitions that exceed 6 feet (1829 mm) in height, including their finish materials, shall have adequate strength to resist the loads to which they are subjected but not less than a horizontal load of 5 psf (0.240 kN/m^2). <u>For the purposes of calculating deflection, the loading of this section shall be treated as a wind load in accordance with Table 1604.3.</u>

> **Exception:** Fabric partitions complying with Section 1607.13.1 shall not be required to resist the minimum horizontal load of 5 psf (0.240 kN/m^2)

Reason: Currently, Table 1604.3 does not have deflection limits for Live Loads on Interior walls. The 5.0 psf requirement in section 1607.13 is classified as a live load and would not require a deflection check. Under the legacy Uniform Building Code this load was treated as an "other load" and was required to meet the defection limits identical to those in IBC Table 1604.3. To avoid confusion for walls, and to require deflection checks on interior walls, the proposed code change is necessary.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KERR-S3-1607.13

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed wording creates confusion as to why the specified partition live load should be considered a wind load when used in Table 1604.3 for determining allowable deflections. It would be preferable to state the deflection limit prescriptively or fix the table. A public comment is encouraged.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Don Allen, Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1607.13 Interior walls and partitions. Interior walls and partitions that exceed 6 feet (1829 mm) in height, including their finish materials, shall have adequate strength to resist the loads to which they are subjected but not less than a horizontal load of 5 psf (0.240 kN/m^2). ~~For the purposes of calculating deflection, the loading of this section shall be treated as a wind load in accordance with Table 1604.3.~~

Exception: Fabric partitions complying with Section 1607.13.1 shall not be required to resist the minimum horizontal load of 5 psf (0.240 kN/m^2).

TABLE 1604.3
DEFLECTION LIMITS[a, b, c, h, i]

CONSTRUCTION	*L*	*S* or W [f]	*D* + *L*[d, g]
Roof members:[e]			
Supporting plaster ceiling	*l*/360	*l*/360	*l*/240
Supporting nonplaster ceiling	*l*/240	*l*/240	*l*/180
Not supporting ceiling	*l*/180	*l*/180	*l*/120
Floor members	*l*/360	—	*l*/240
Exterior walls and interior partitions:			
<u>With plaster or stucco finishes</u>	<u>*l*/360</u>	<u>*l*/360</u>	—
With <u>other</u> brittle finishes	<u>*l*/240</u>	*l*/240	—
With flexible finishes	<u>*l*/120</u>	*l*/120	—
Farm buildings	—	—	*l*/180
Greenhouses	—	—	*l*/120

b. Interior partitions not exceeding 6 feet in height and flexible, folding and portable partitions are not governed by the provisions of this section. The ~~deflection criterion for interior partitions is based on the~~ horizontal load defined in Section 1607.13<u> is permitted to be multiplied by 0.7 for the purpose of determining deflection limits herein</u>.

(No change to footnotes a and c through i)

Commenter's Reason: The IBC does not give deflection limits for Live Loads on Interior walls. Although historically treated as a wind load, the 5.0 psf requirement in section 1607.13 is classified as a live load and does not require a deflection check. Under the Uniform Building Code this 5.0 psf was treated as an "other load" and interior partitions were required to meet L/120 for flexible finishes and L/240 for brittle finishes. This code change is needed to fix an error which permits interior walls to be designed without deflection checks.

The additional language in footnote B would make the interior wall requirements consistent with the exterior wall requirements in footnote F: walls use the load combinations in section 1605 for strength checks, and use a 0.7 load factor for deflection checks. This is a conservative application of chapter C, Appendix C (entitled *Serviceability Considerations*) of the ASCE 7-05 commentary. ASCE 7-05 section CC.1.2 includes the following: "Use of the factored wind load in checking serviceability is excessively conservative. The load combination with an annual probability of 0.05 of being exceeded, which can be used for checking short-term effects, is D + 0.5L + 0.7W." Note that this proposed load factor would not apply to other loads on partitions, such as earthquake loads.

This public comment is in response to the committee action on proposal S81, which specifically encouraged a public comment and suggested fixing table 1604.3. This also addresses the additional line for stucco and plaster added to this table by S35-09/10.

Public Comment 2:

Edwin Huston, National Council of Structural Engineers Association (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1607.13 Interior walls and partitions. Interior walls and partitions that exceed 6 feet (1829 mm) in height, including their finish materials, shall have adequate strength and stiffness to resist the loads to which they are subjected but not less than a horizontal load of 5 psf (0.240 kN/m^2). ~~For the purposes of calculating deflection, the loading of this section shall be treated as a wind load in accordance with Table 1604.3.~~

Exception: Fabric partitions complying with Section 1607.13.1 shall not be required to resist the minimum horizontal load of 5 psf (0.240 kN/m^2).

TABLE 1604.3
DEFLECTION LIMITS[a, ~~b,~~ c, h, i]

CONSTRUCTION	*L*	*S* or W[f]	*D* + *L*[d, g]
Roof members:[e]			
Supporting plaster ceiling	*l*/360	*l*/360	*l*/240
Supporting nonplaster ceiling	*l*/240	*l*/240	*l*/180
Not supporting ceiling	*l*/180	*l*/180	*l*/120
Floor members	*l*/360	—	*l*/240
Exterior walls ~~and interior partitions~~:			
With brittle finishes	—	*l*/240	—
With flexible finishes	—	*l*/120	—
Interior partitions:[b]			
With other brittle finishes	*l*/240		
With flexible finishes	*l*/120		
Farm buildings	—	—	*l*/180
Greenhouses	—	—	*l*/120

(No change to footnotes)

Commenter's Reason: Currently, Table 1604.3 does not have deflection limits for Live Loads on Interior walls. The 5.0 psf requirement in Section 1607.13 is classified as a live load and would not require a deflection check. Under the legacy Uniform Building Code this load was treated as an "other load" and was required to meet the defection limits identical to those in IBC Table 1604.3. To avoid confusion for walls, and to require deflection checks on interior walls, the proposed code change is necessary.

Under the original S81 proposal the intent was to reference the deflection criteria by reclassifying the 5.0psf load as a wind load and using the deflection criteria in the S or W column of Table 1604.3. The proponent understands that this wording may create unwanted confusion. To eliminate the possible confusion, the new item will add the defection criteria in Table 1604.3 for Live Loads on interior partitions.

The ICC Structural Committee urged the proponent to develop a Public Comment and in fact, Mr. Cole Graveen, a member of the ICC Structural Committee worked with the proponent and with NCSEA to correct this issue through this Public Comment.

Final Action: AS AM AMPC____ D

S83-09/10

1602.1, 1608.3 (new), 1611.2

Proposed Change as Submitted

Proponent: Philip Brazil, PE, SE, Reid Middleton, Inc., representing self

1. Add new definition as follows:

1602.1 Definitions. The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

SUSCEPTIBLE BAY. A roof or portion thereof with (1) a slope less than 1/4-inch per foot (0.0208 rad), or (2) where water will be impounded upon it, in whole or in part, and the secondary drainage system is functional but the primary drainage system is not functional. A roof surface with a slope of 1/4-inch per foot (0.0208 rad) or greater towards points of free drainage is not a susceptible bay.

2. Add new text as follows:

1608.3 Ponding instability. Susceptible bays of roofs shall be evaluated for ponding instability in accordance with Section 7.11 of ASCE 7.

3. Revise as follows:

1611.2 Ponding instability. ~~For~~ Susceptible bays of roofs ~~with a slope less than 1/4 inch per foot [1.19 degrees (0.0208 rad)], the design calculations~~ shall ~~include verification of~~ be investigated by structural analysis to ensure that they possess adequate stiffness to preclude progressive deflection in accordance with Section 8.4 of ASCE 7.

Reason: The purpose for the proposal is to correlate the IBC with the 2010 edition of ASCE 7. The need for correlation is due to an ASCE 7 proposal on ponding instability, which was approved by the Snow/Rain Subcommittee and is being balloted by the Main Committee (Item #3 of the ASCE 7 Third Main Committee Ballot on Snow and Rain Provisions). It is expected that the Main Committee will approve the proposal.

Susceptible bays of roofs are required to meet the technical provisions of ASCE 7-10 for precluding progressive deflection. A "susceptible bay" is defined in Section 8.4 of ASCE 7-10 and this definition is being added to the IBC. Having a definition of "susceptible bay" in the IBC will provide a technical basis for determining which bays of a roof are susceptible bays and, thus, are required to meet the technical provisions of ASCE 7-10 for them. All bays of roofs other than susceptible bays are not required to meet these technical provisions.

Without the definition, the IBC will be without effective charging text. IBC Sections 1608.3 and 1611.2 rely on the determination of which bays are susceptible bays in order to determine the need to comply with the applicable provisions of ASCE 7. That determination is not possible unless a definition of "susceptible bay" is included in the IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Brazil-S37-1602.1

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

SUSCEPTIBLE BAY. A roof or portion thereof with (1) a slope less than 1/4-inch per foot (0.0208 rad), or (2) ~~where~~ on which water ~~will be~~ is impounded upon it, in whole or in part, and the secondary drainage system is functional but the primary drainage system is ~~not functional~~ blocked. A roof surface with a slope of 1/4-inch per foot (0.0208 rad) or greater towards points of free drainage is not a susceptible bay.

1611.2 Ponding instability. Susceptible bays of roofs shall be ~~investigated by structural analysis to ensure that they possess adequate stiffness to preclude progressive deflection~~ evaluated for ponding instability in accordance with Section 8.4 of ASCE 7.

(Portions of proposal not shown are unchanged)

Committee Reason: This code change enhances the safety of roofs by correlating the IBC with the ponding instability provisions of ASCE 7. In addition to covering portions of roofs with a slope up to ¼ inch per foot, it also addresses greater slopes that do not drain to a point of free drainage. The modification reflects further updates made in the ASCE 7 development process.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, PE., CBO., City of San Jan Jose, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Chapters), requests Disapproval.

Commenter's Reason: The wording of the proposed new definition for "*Susceptible Bay*", approved as part of the floor modification of item S83 contains very confusing wording that will certainly result in uneven or incorrect application and enforcement. This commenter considered submitting a public comment proposing alternative wording, however, it is impossible to know from the original submittal exactly what was intended, or how to fix it, therefore this public comment is recommending disapproval.

The structural implications (potential collapse) of water ponding on roof surfaces is a longstanding and very important safety issue that must have clear and unambiguous rules for both the design professional and the code enforcement community. The current code Section 1611.2 Ponding instability, achieves that goal because it is a clearly written and easily understood provision that applies to all roofs with a slope less than ¼ inch per foot. We are aware that the proposed new definition is derived from the final ballot draft of ASCE 7-10, but we do not agree that placing confusing language into the building code is an appropriate solution to achieving desired consistency of structural provisions, nor to achieve the important protection the code should provide from ponding induced roof collapses.

The difficulty with new definition is specifically located in its item 2), where it attempts to define portions of roofs that are not sloped less than ¼ inch per foot that must additionally comply with Section 8.4 of ASCE 7. The statement: "*A roof or portion thereof …2) on which water is impounded upon it, in whole or in part, and the secondary drainage system is functional but the primary drainage system is blocked*" is very poorly worded and is simply unclear regarding the intended scope of application.

While it is reasonably clear that the definition intends to address a condition where water ponding occurs due to the the blockage of one or more primary roof drains, the actual extent of what portions of the roof become a *susceptible bay* is anything but clear. As currently written, one could easily conclude that because when any primary drain is blocked water will pond up to the level of the secondary drain serving that portion of the roof, then each and every roof area where water cannot freely drain over an edge becomes a *susceptible bay*. If that was the intent, there certainly must be a better way to explain it. Additional enforcement and design application questions that will arise from the current definition include:

How deep must the water be to trigger this definition? Using the wording "*in whole or in part*" would imply any depth above zero. If that was intended, then even if a secondary drain is a scupper, or a roof edge, and is only 1 inch higher than the inlet of the primary drain, that roof area where the water ponds only one inch deep is still a *susceptible bay*.

Was there a minimum ponding depth threshold considered when drafting this change within the ASCE 7 committee? If there was, why is that depth not included in the definition? If no minimum depth was considered, what substantiation was provided to justify that any depth above zero when a primary drain is blocked creates the susceptible bay that requires additional design analysis?

While the final sentence of the definition appears to be clear, does a "*point of free drainage"* occur where the roof has a slightly raised edge at its perimeter, as is a common construction practice, or only when the flow of water is totally unimpeded on a slope of at least ¼ inch per foot to, and over, that edge?

Final Action: AS AM AMPC____ D

S84-09/10

1602, 1609.1.2.2-1710.3

Proposed Change as Submitted

Proponent: Jim Rossberg, SEI of ASCE, representing self

1. Add new text as follows:

SECTION 1602
DEFINITIONS AND NOTATIONS

NOTATIONS.

V_{asd} = nominal design wind speed (3-sec gust), miles per hour (mph) (km/hr) where applicable.

V_{ult} = ultimate design wind speeds (3-sec gust), miles per hour (mph) (km/hr) determined from Figures 1609A, 1609B, or 1609C or ASCE 7.

2. Revise as follows:

1603.1 General. Construction documents shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

> **Exception:** *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:
>
> 1. Floor and roof live loads.
> 2. Ground snow load, P_g.
> 3. ~~Basic~~ Ultimate design wind speed, V_{ult} , (3-second gust), miles per hour (mph) (km/hr) and nominal design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
> 4. *Seismic design category* and *site class*.
> 5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.
> 6. Design load-bearing values of soils.

1603.1.4 Wind design data. The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral-force-resisting system of the building:

1. ~~Basic~~ Ultimate design wind speed, V_{ult}, (3-second gust), miles per hour (km/hr) and nominal design wind speed, V_{asd} , as determined in accordance with Section 1609.3.1.
2. Wind importance factor, *I*, and *occupancy category*.

3. Wind exposure. Where more than one wind exposure is utilized, the wind exposure and applicable wind direction shall be indicated.
4. The applicable internal pressure coefficient.
5. Components and cladding. The design wind pressures in terms of psf (kN/m_2) to be used for the design of exterior component and cladding materials not specifically designed by the *registered design professional*

TABLE 1604.3
DEFLECTION LIMITS[a,b,c,h,i]
(No change to table)

(No change to footnotes a-e)
f. The wind load is permitted to be taken as 0.42 ~~0.7~~ times the "component and cladding" loads for the purpose of determining deflection limits herein.
(No change to footnotes g-i)

1605.2.1 Basic load combinations. Where strength design or *load and resistance factor design* is used, structures and portions thereof shall resist the most critical effects from the following combinations of factored loads:

$1.4 (D+F)$	**(Equation 16-1)**
$1.2(D + F + T) + 1.6(L + H) + 0.5 (L_r \text{ or } S \text{ or } R)$	**(Equation 16-2)**
$1.2D + 1.6(L_r \text{ or } S \text{ or } R) + (f_1L \text{ or } \cancel{0.8W}\ \underline{0.5W})$	**(Equation 16-3)**
$1.2D + \cancel{1.6}\ \underline{1.0}W + f_1L + 0.5(L_r \text{ or } S \text{ or } R)$	**(Equation 16-4)**
$1.2D + 1.0E + f_1L + f_2S$	**(Equation 16-5)**
$0.9D + \cancel{1.6}\ \underline{1.0}W + 1.6H$	**(Equation 16-6)**
$0.9D + 1.0E + 1.6H$	**(Equation 16-7)**

where:

f_1 = 1 for floors in places of public assembly, for live loads in excess of 100 pounds per square foot (4.79 kN/m^2), and for parking garage live load, and
= 0.5 for other live loads.
f_2 = 0.7 for roof configurations (such as saw tooth) that do not shed snow off the structure, and
= 0.2 for other roof configurations.

Exception: Where other factored load combinations are specifically required by the provisions of this code, such combinations shall take precedence.

1605.3.1 Basic load combinations. Where *allowable stress design* (working stress design), as permitted by this code, is used, structures and portions thereof shall resist the most critical effects resulting from the following combinations of loads:

$D+F$	**(Equation 16-8)**
$D+H+F+ L + T$	**(Equation 16-9)**
$D+H+F+ (L_r \text{ or } S \text{ or } R)$	**(Equation 16-10)**
$D + H + F + 0.75(L + T) + 0.75 (L_r \text{ or } S \text{ or } R)$	**(Equation 16-11)**
$D+H+F+(\underline{0.6}W \text{ or } 0.7E)$	**(Equation 16-12)**
$D + H + F + 0.75(\underline{0.6}W \text{ or } 0.7E) + 0.75L + 0.75 (L_r \text{ or } S \text{ or } R)$	**(Equation 16-13)**
$0.6D + \underline{0.6}W+H$	**(Equation 16-14)**

$0.6D + 0.7E + H$ **(Equation 16-15)**

Exceptions:

1. Crane hook loads need not be combined with roof live load or with more than three-fourths of the snow load or one-half of the wind load.
2. Flat roof snow loads of 30 psf (1.44 kN/m^2) or less and roof live loads of 30 psf or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 psf (1.44 kN/m^2), 20 percent shall be combined with seismic loads.

1605.3.2 Alternative basic load combinations. In lieu of the basic load combinations specified in Section 1605.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. When using these alternative basic load combinations that include wind or seismic loads, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind loads, only two-thirds of the minimum dead load likely to be in place during a design wind event shall be used. Where wind loads are calculated in accordance with Chapters 26 through 31 ~~Chapter 6~~ of ASCE 7, the coefficient . in the following equations shall be taken as 0.78 ~~1.3~~. For other wind loads, shall be taken as 1. When using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. When using these alternative basic load combinations for proportioning foundations for loadings, which include seismic loads, the vertical seismic *load effect*, E_v, in Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero.

$D + L + (L_r \text{ or } S \text{ or } R)$ **(Equation 16-16)**

$D + L + (\omega W)$ **(Equation 16-17)**

$D + L + \omega W + S/2$ **(Equation 16-18)**

$D + L + S + \omega W/2$ **(Equation 16-19)**

$D + L + S + E/1.4$ **(Equation 16-20)**

$0.9D + E/1.4$ **(Equation 16-21)**

Exceptions:

1. Crane hook loads need not be combined with roof live loads or with more than three-fourths of the snow load or one-half of the wind load.
2. Flat roof snow loads of 30 psf (1.44 kN/m^2) or less and roof live loads of 30 psf or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 psf (1.44 kN/m^2), 20 percent shall be combined with seismic loads.

1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 ~~6~~ of ASCE 7 ~~or provisions of the alternate all-heights method in Section 1609.6~~. The type of opening protection required, the ~~basic~~ ultimate design wind speed, V_{ult}, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of the AF&PA WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas.
6. Wind tunnel tests in accordance with Chapter 31 ~~Section 6.6~~ of ASCE 7~~, subject to the limitations in Section 1609.1.1.2~~.

The wind speeds in Figure 1609A, 1609B and 1609C are ultimate design wind speeds, V_{ult}, and shall be converted in accordance with Section 1609.3.1 to nominal design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 1 through 5 are used.

4. Delete without substitution as follows:

~~**1609.1.1.2 Wind tunnel test limitations.** The lower limit on pressures for main wind-force-resisting systems and components and cladding shall be in accordance with Sections 1609.1.1.2.1 and 1609.1.1.2.2.~~

~~**1609.1.1.2.1 Lower limits on main wind-force-resisting system.** Base overturning moments determined from wind tunnel testing shall be limited to not less than 80 percent of the design base overturning moments determined in accordance with Section 6.5 of ASCE 7, unless specific testing is performed that demonstrates it is the aerodynamic coefficient of the building, rather than shielding from other structures, that is responsible for the lower values.~~
~~The 80-percent limit shall be permitted to be adjusted by the ratio of the frame load at critical wind directions as determined from wind tunnel testing without specific adjacent buildings, but including appropriate upwind roughness, to that determined in Section 6.5 of ASCE 7.~~

~~**1609.1.1.2.2 Lower limits on components and cladding.** The design pressures for components and cladding on walls or roofs shall be selected as the greater of the wind tunnel test results or 80 percent of the pressure obtained for Zone 4 for walls and Zone 1 for roofs as determined in Section 6.5 of ASCE 7, unless specific testing is performed that demonstrates it is the aerodynamic coefficient of the building, rather than shielding from nearby structures, that is responsible for the lower values. Alternatively, limited tests at a few wind directions without specific adjacent buildings, but in the presence of an appropriate upwind roughness, shall be permitted to be used to demonstrate that the lower pressures are due to the shape of the building and not to shielding.~~

5. Revise as follows:

1609.1.2 Protection of openings. In *wind-borne debris regions*, glazing in buildings shall be impact resistant or protected with an impact-resistant covering meeting the requirements of an *approved* impact-resistant standard or ASTM E 1996 and ASTM E 1886 referenced herein as follows:

1. Glazed openings located within 30 feet (9144 mm) of grade shall meet the requirements of the Large Missile Test of ASTM E 1996.
2. Glazed openings located more than 30 feet (9144 mm) above grade shall meet the provisions of the small missile test of ASTM E 1996.

Exceptions:

1. Wood structural panels with a minimum thickness of 7/16 inch (11.1 mm) and maximum panel span of 8 feet (2438 mm) shall be permitted for opening protection in one- and two-story buildings classified as Group R-3 or R-4 occupancy. Panels shall be precut so that they shall be attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the components and cladding loads determined in accordance with the provisions of ASCE 7, with corrosion-resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table 1609.1.2 with corrosion-resistant attachment hardware provided and anchors permanently installed on the building is permitted for buildings with a mean roof height of 45 feet (13 716 mm) or less where V_{asd} determined in accordance with Section 1609.3.1 ~~wind speeds do~~ does not exceed 140 mph (63 m/s).
2. Glazing in *Occupancy Category* I buildings as defined in Section 1604.5, including greenhouses that are occupied for growing plants on a production or research basis, without public access shall be permitted to be unprotected.
3. Glazing in *Occupancy Category* II, III or IV buildings located over 60 feet (18 288 mm) above the ground and over 30 feet (9144 mm) above aggregate surface roofs located within 1,500 feet (458 m) of the building shall be permitted to be unprotected.

6. Add new text as follows:

1609.1.2.2. Modifications to ASTM E 1996. Section 6.2.2 of ASTM E 1996 shall be modified as follows:

6.2.2 Unless otherwise specified, select the wind zone based on the strength design wind speed, V_{ult}, as follows:
6.2.2.1 *Wind Zone 1* - 130 mph ≤ ultimate design wind speed, V_{ult} < 140 mph.
6.2.2.2 *Wind Zone 2* - 140 mph ≤ ultimate design wind speed, V_{ult} < 150 mph at greater than 1.6 km (one mile) from the coastline. The coastline shall be measured from the mean high water mark.
6.2.2.3 *Wind Zone 3* - ultimate design wind speed, V_{ult} ≥ 150 mph, or the ultimate design wind speed, V_{ult} ≥ 140 mph and within 1.6 km (one mile) of the coastline. The coastline shall be measured from the mean high water mark.

7. Revise as follows:

1609.2 Definitions. The following words and terms shall, for the purposes of Section 1609, have the meanings shown herein.

HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes defined as:

1. The U. S. Atlantic Ocean and Gulf of Mexico coasts where the ~~basic~~ ultimate design wind speed, V_{ult}, for Occupancy Category II buildings is greater than 115 ~~90~~ mph (40 m/s) and
2. Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa.

WIND-BORNE DEBRIS REGION. Areas within ~~Portions of~~ *hurricane- prone regions* located: ~~that are~~

1. W~~w~~ithin 1 mile (1.61 km) of the coastal mean high water line where the ~~basic~~ ultimate design wind speed V_{ult} is 130 ~~110 mph~~ (48 m/s) or greater; or
2. In areas ~~portions of *hurricane-prone regions*~~ where the ~~basic~~ ultimate design wind speed is V_{ult} 140 ~~120~~ mph (53 m/s) or greater~~; or Hawaii.~~

For Occupancy Category II buildings and structures and Occupancy Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure 1609b. For Occupancy Category IV buildings and structures and Occupancy Category III health care facilities, the windborne debris region shall be based on Figure 1609c.

8. Add new definitions as follows:

1609.2 Definitions.

WIND SPEED, V_{ult}. Ultimate design wind speeds.

WIND SPEED, V_{asd}. Nominal design wind speeds.

9. Revise as follows:

1609.3 Basic wind speed. The ~~basic~~ ultimate design wind speed V_{ult}, in mph, for the determination of the wind loads shall be determined by ~~Figure 1609~~ Figures 1609A, 1609B and 1609C. The ultimate design wind speed, V_{ult}, for use in the design of Occupancy Category II buildings and structures shall be obtained from Figure 1609A. The ultimate design wind speed, V_{ult}, for use in the design of Occupancy Category III and IV buildings and structures shall be obtained from Figure 1609B. The ultimate design wind speed, V_{ult}, for use in the design of Occupancy Category I buildings and structures shall be obtained from Figure 1609C. ~~Basic~~ The ultimate design wind speed, V_{ult}, for the special wind regions indicated, near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. ~~Basic~~ The ultimate design wind speeds, V_{ult}, determined by the local jurisdiction shall be in accordance with Section 26.5.1 ~~6.5.4~~ of ASCE 7.

In nonhurricane-prone regions, when the ~~basic~~ ultimate design wind speed, V_{ult}, is estimated from regional climatic data, the ~~basic~~ ultimate design wind speed, V_{ult}, shall be ~~not less than the wind speed associated with an annual probability of 0.02 (50-year mean recurrence interval), and the estimate shall be adjusted for equivalence to a 3-second gust wind speed at 33 feet (10 m) above ground in Exposure Category C. The data analysis shall be performed~~ determined in accordance with Section 26.5.3 ~~6.5.4.2~~ of ASCE 7.

10. Delete and substitute as follows:

~~**FIGURE 1609**~~
~~**BASIC WIND SPEED (3-SECOND GUST)**~~

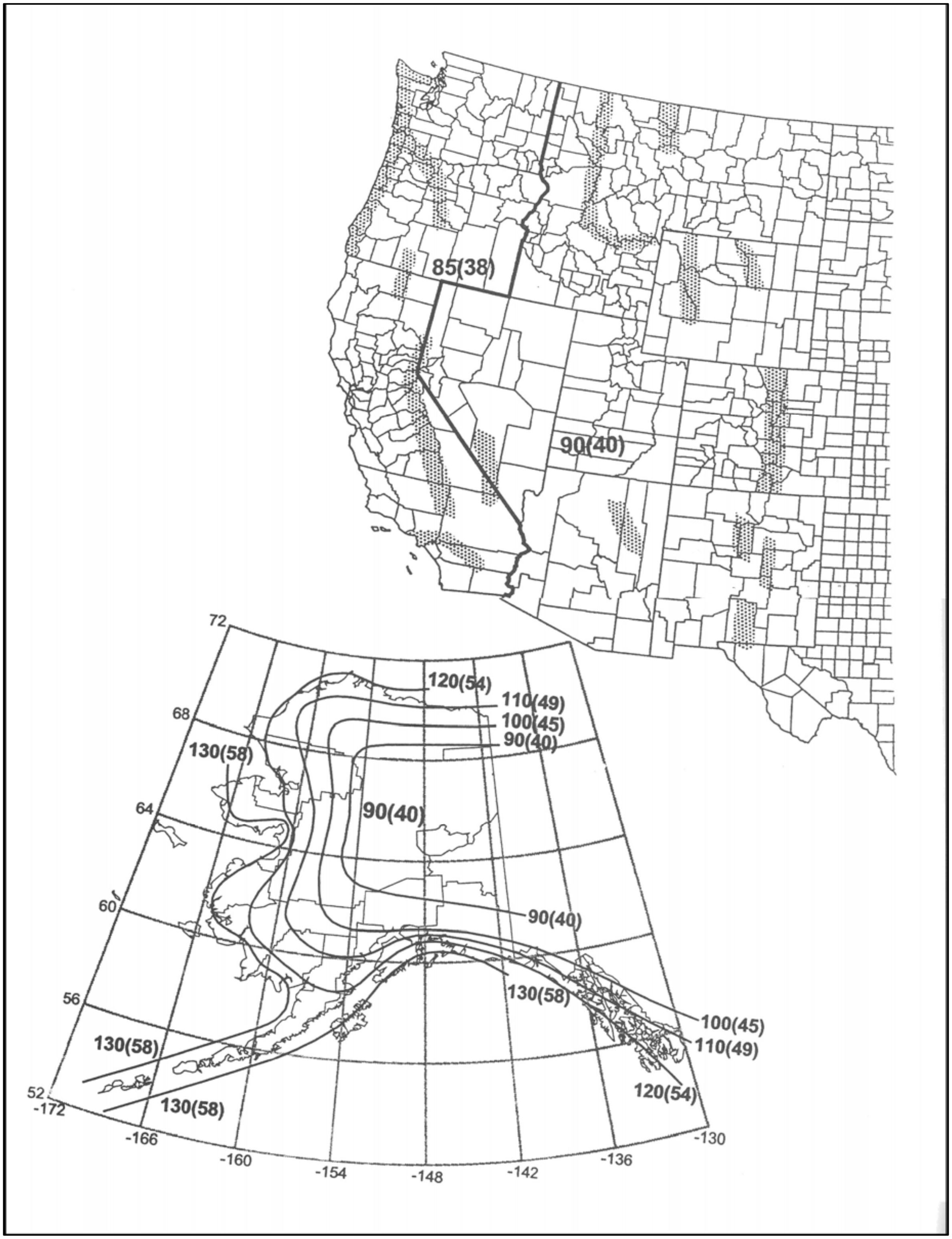
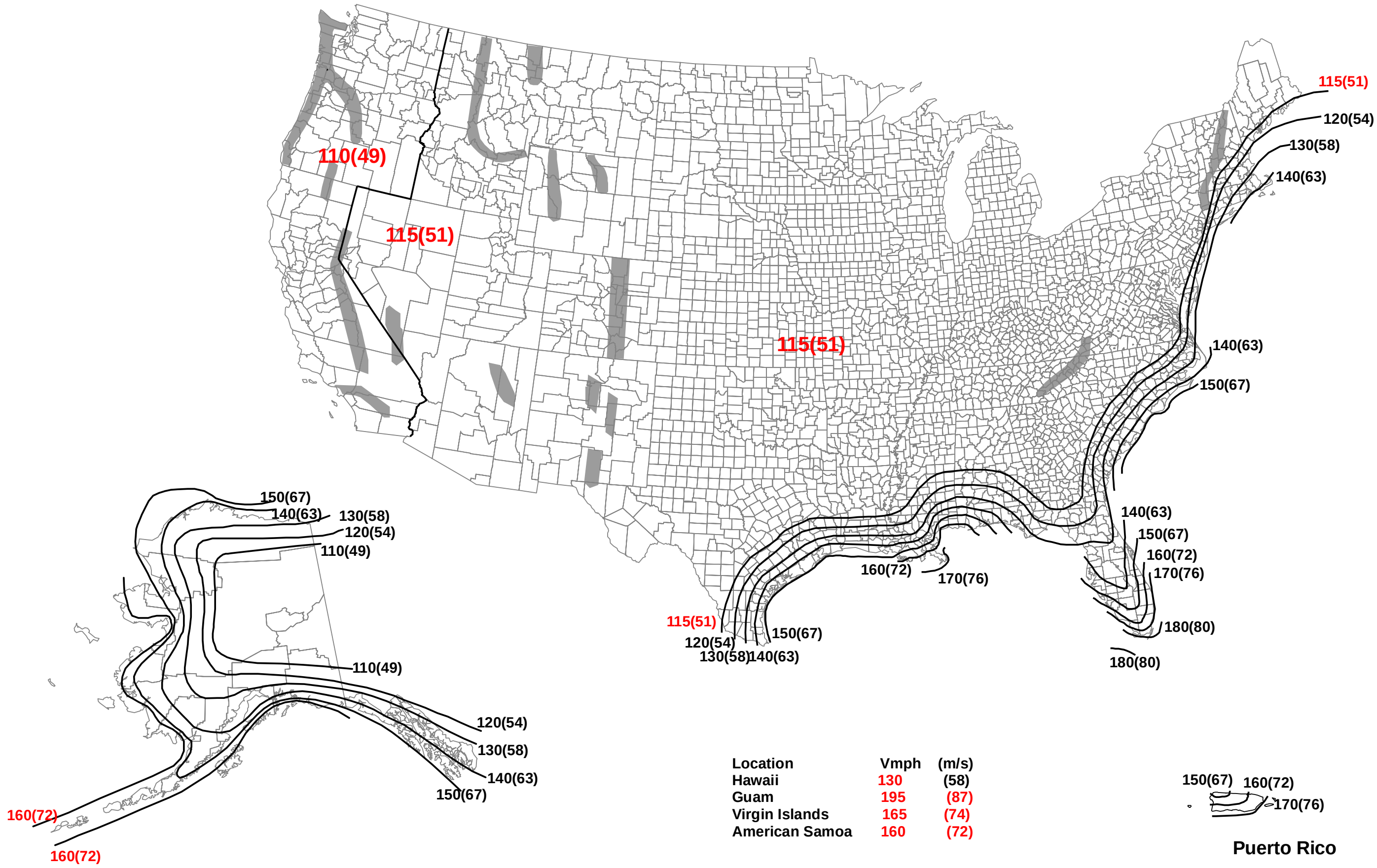


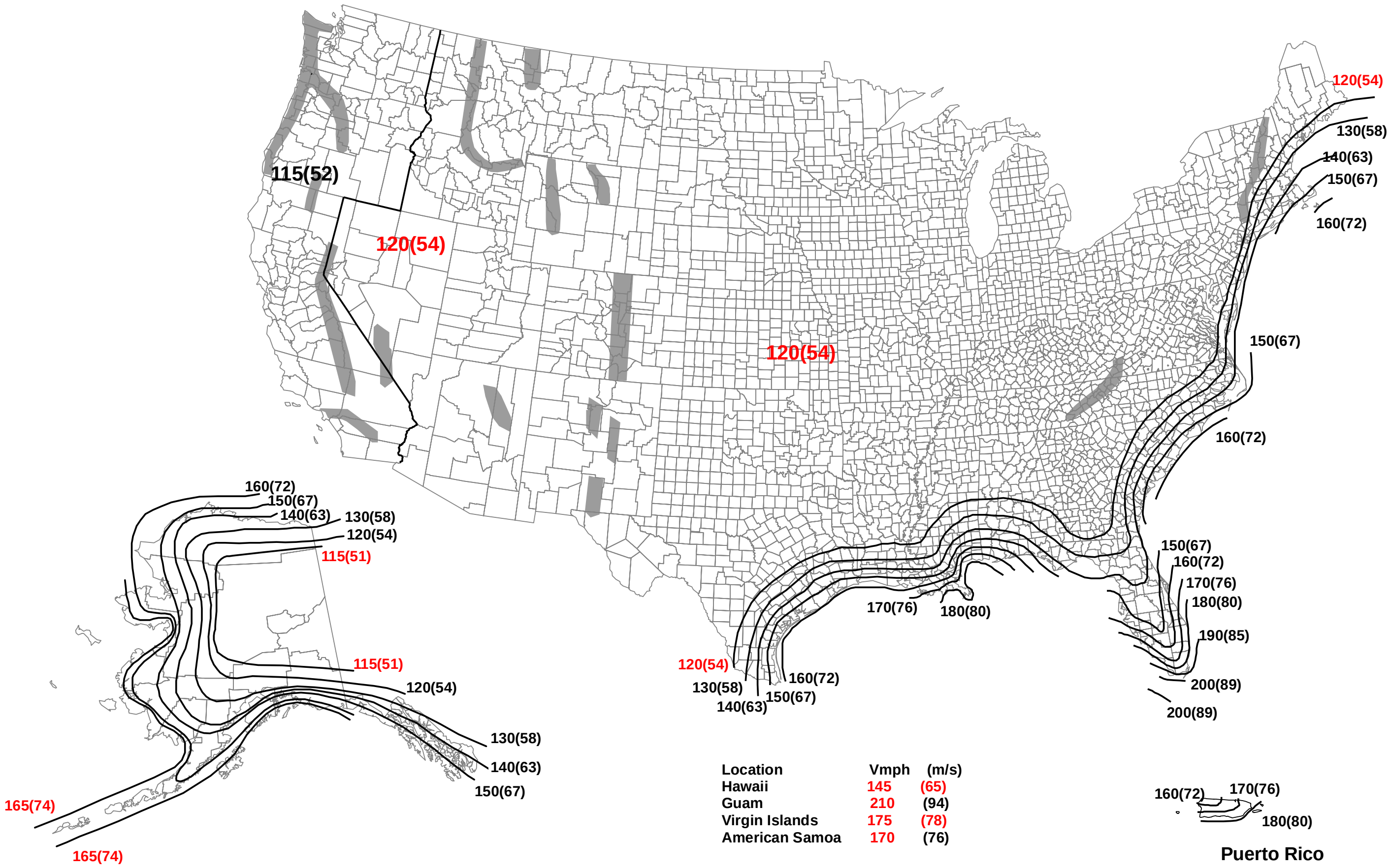
FIGURE 1609A
ULTIMATE DESIGN WIND SPEEDS, V_{ULT}, FOR OCCUPANCY CATEGORY II BUILDINGS AND OTHER STRUCTURES



Notes:
1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.
2. Linear interpolation between contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.
5. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years.

Location	V mph	(m/s)
Hawaii - <u>Special Wind Region Statewide</u>	130	(58)
Guam	195	(87)
Virgin Islands	165	(74)
American Samoa	160	(72)

FIGURE 1609B
ULTIMATE DESIGN WIND SPEEDS, V_{ULT}, FOR OCCUPANCY CATEGORY III AND IV BUILDINGS AND OTHER STRUCTURES

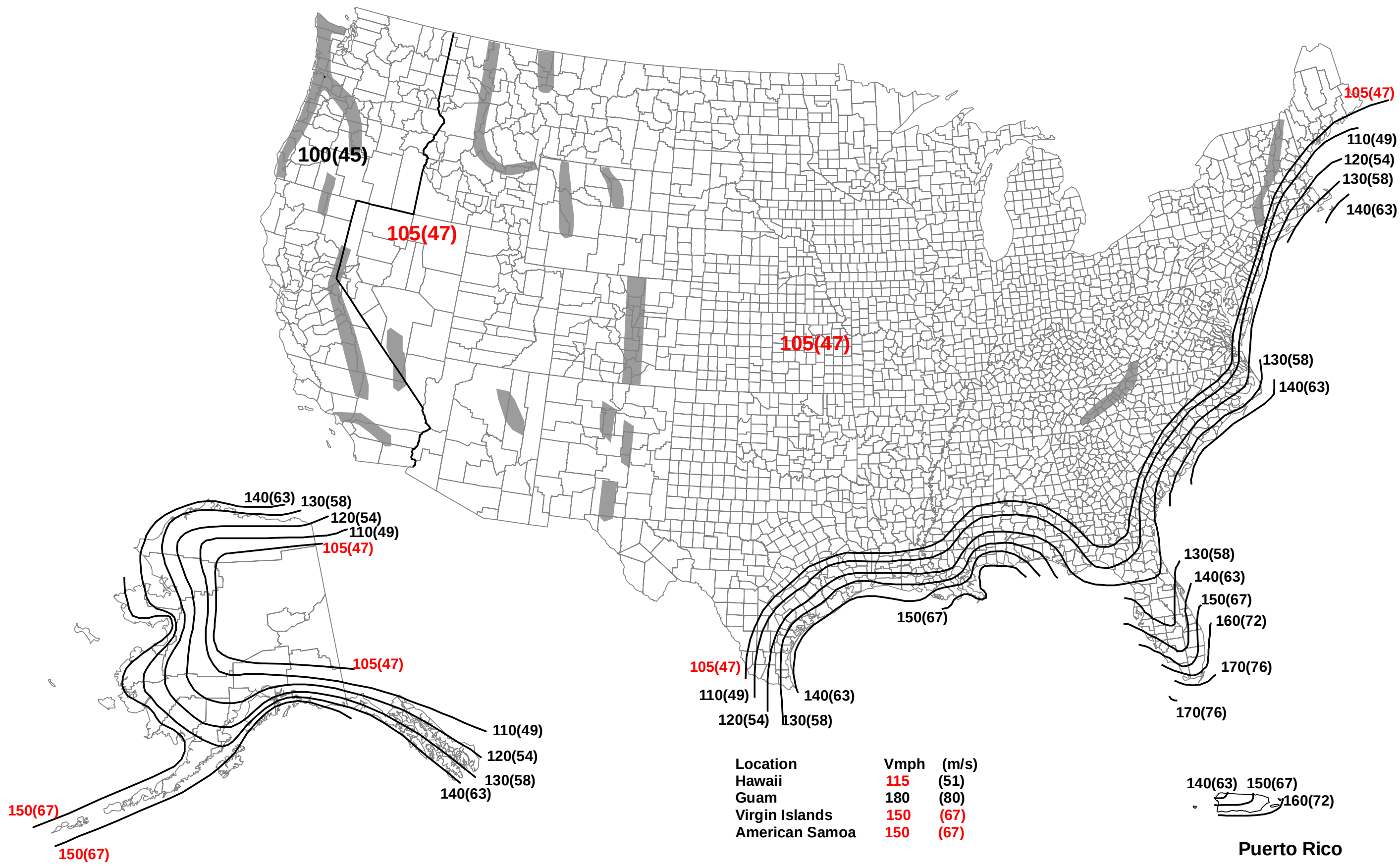


Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.
2. Linear interpolation between contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.
5. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years.

Location	V mph	(m/s)
Hawaii - Special Wind Region Statewide	145	(65)
Guam	210	(94)
Virgin Islands	175	(78)
American Samoa	170	(76)

FIGURE 1609C
ULTIMATE DESIGN WIND SPEEDS, V_{ULT}, FOR OCCUPANCY CATEGORY I BUILDINGS AND OTHER STRUCTURES



Notes:
1. **Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.**
2. **Linear interpolation between contours is permitted.**
3. **Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.**
4. **Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.**
5. **Wind speeds correspond to approximately a 15% probability of exceedance in 50 years.**

Location	V mph	(m/s)
Hawaii - Special Wind Region Statewide	115	(51)
Guam	180	(80)
Virgin Islands	150	(67)
American Samoa	150	(67)

11. Revise as follows:

1609.3.1 Wind speed conversion. When required, the ~~3-second gust basic~~ ultimate design wind speeds of Figure 1609A, B and C shall be converted to nominal design wind speeds, V_{asd}, ~~fastest-mile wind speeds, V_{fm}~~, using Table 1609.3.1 or Equation 16-32.

$$\cancel{V_{fm} = \frac{V_{3S} - 10.5}{1.05}}$$ **(Equation 16-32)**

~~where:~~

~~V_{3S} = 3-second gust basic wind speed from Figure 1609.~~

$V_{asd} = V_{ult}\sqrt{0.6}$

Where:
V_{asd} = nominal design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1
V_{ult} = ultimate design wind speeds determined from Figures 1609A, 1609B, or 1609C

12. Delete and substitute as follows:

~~TABLE 1609.3.1~~
~~EQUIVALENT BASIC WIND SPEEDS~~[~~a,b,c~~]

~~V_{3S}~~	~~85~~	~~90~~	~~100~~	~~105~~	~~110~~	~~120~~	~~125~~	~~130~~	~~140~~	~~145~~	~~150~~	~~160~~	~~170~~
~~V_{fm}~~	~~71~~	~~76~~	~~85~~	~~90~~	~~95~~	~~104~~	~~109~~	~~114~~	~~123~~	~~128~~	~~133~~	~~142~~	~~152~~

~~For SI: 1 mile per hour = 0.44 m/s.~~
~~a. Linear interpolation is permitted.~~
~~b. *V3S* is the 3-second gust wind speed (mph).~~
~~c. *Vfm* is the fastest mile wind speed (mph).~~

TABLE 1609.3.1
WIND SPEED CONVERSIONS[a,b,c]

V_{ul}	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

a. Linear interpolation is permitted
b. V_{asd} = nominal design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1
c. V_{ult} = ultimate design wind speeds determined from Figures 1609A, 1609B, or 1609C

13. Revise as follows:

1609.4.2 Surface roughness categories. A ground surface roughness within each 45-degree (0.79 rad) sector shall be determined for a distance upwind of the site as defined in Section 1609.4.3 from the categories defined below, for the purpose of assigning an exposure category as defined in Section 1609.4.3.

Surface Roughness B. Urban and suburban areas, wooded areas or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger.

Surface Roughness C. Open terrain with scattered obstructions having heights generally less than 30 feet (9144 mm). This category includes flat open country~~,~~ and grasslands~~, and all water surfaces in *hurricane-prone regions*~~.

Surface Roughness D. Flat, unobstructed areas and water surfaces ~~outside *hurricane-prone regions*~~. This category includes smooth mud flats, salt flats and unbroken ice.

1609.4.3 Exposure categories. An exposure category shall be determined in accordance with the following:

Exposure B. For buildings with a mean roof height of less than or equal to 30 feet, Exposure B shall apply where the ground surface roughness ~~condition~~, as defined by Surface Roughness B, prevails in the upwind direction for a distance of at least 1,500 feet (457 m). For buildings with a mean roof height greater than 30 feet, Exposure B shall apply where Surface Roughness B prevails in the upwind direction for a distance of at least 2,600 feet (792 m) or 20 times the height of the building, whichever is greater.

~~**Exception:** For buildings whose mean roof height is less than or equal to 30 feet (9144 mm), the upwind distance is permitted to be reduced to 1,500 feet (457 m).~~

Exposure C. Exposure C shall apply for all cases where Exposures B or D do not apply.

Exposure D. Exposure D shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance of at least 5,000 feet (1524 m) or 20 times the height of the building, whichever is greater. Exposure D shall also apply where the ground surface roughness immediately upwind of the site is B or C, and the site is within a distance of 600 feet (183 m) or 20 times the building height, whichever is greater, from an exposure D condition as defined in the previous sentence. ~~Exposure D shall extend inland from the shoreline for a distance of 600 feet (183 m) or 20 times the height of the building, whichever is greater.~~

1609.5.3 Rigid tile. Wind loads on rigid tile roof coverings shall be determined in accordance with the following equation:

$$M_a = q_h C_L b L L_a [1.0 - GC_p] \qquad \textbf{(Equation 16-33)}$$

$$\text{For SI: } M_a = \frac{q_h C_L b L L_a \left[1.0 - GC_p\right]}{1{,}000}$$

where:

b	=	Exposed width, feet (mm) of the roof tile.
CL	=	Lift coefficient. The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined by test in accordance with Section 1716.2.
GC_p	=	Roof pressure coefficient for each applicable roof zone determined from Chapter 30 ~~6~~ of ASCE 7. Roof coefficients shall not be adjusted for internal pressure.
L	=	Length, feet (mm) of the roof tile.
L_a	=	Moment arm, feet (mm) from the axis of rotation to the point of uplift on the roof tile. The point of uplift shall be taken at 0.76*L* from the head of the tile and the middle of the exposed width. For roof tiles with nails or screws (with or without a tail clip), the axis of rotation shall be taken as the head of the tile for direct deck application or as the top edge of the batten for battened applications. For roof tiles fastened only by a nail or screw along the side of the tile, the axis of rotation shall be determined by testing. For roof tiles installed with battens and fastened only by a clip near the tail of the tile, the moment arm shall be determined about the top edge of the batten with consideration given for the point of rotation of the tiles based on straight bond or broken bond and the tile profile.
Ma	=	Aerodynamic uplift moment, feet-pounds (N-mm) acting to raise the tail of the tile.
q_h	=	Wind velocity pressure, psf (kN/m^2) determined from Section 27.3.2 ~~6.5.10~~ of ASCE 7.

Concrete and clay roof tiles complying with the following limitations shall be designed to withstand the aerodynamic uplift moment as determined by this section.

1. The roof tiles shall be either loose laid on battens, mechanically fastened, mortar set or adhesive set.
2. The roof tiles shall be installed on solid sheathing which has been designed as components and cladding.
3. An underlayment shall be installed in accordance with Chapter 15.
4. The tile shall be single lapped interlocking with a minimum head lap of not less than 2 inches (51 mm).
5. The length of the tile shall be between 1.0 and 1.75 feet (305 mm and 533 mm).
6. The exposed width of the tile shall be between 0.67 and 1.25 feet (204 mm and 381 mm).
7. The maximum thickness of the tail of the tile shall not exceed 1.3 inches (33 mm).
8. Roof tiles using mortar set or adhesive set systems shall have at least two-thirds of the tile's area free of mortar or adhesive contact.

14. Delete without substitution:

~~**1609.6 Alternate all-heights method.** The alternate wind design provisions in this section are simplifications of the ASCE 7 Method 2—Analytical Procedure.~~

~~**1609.6.1 Scope.** As an alternate to ASCE 7 Section 6.5, the following provisions are permitted to be used to determine the wind effects on regularly shaped buildings, or other structures that are regularly shaped, which meet all of the following conditions:~~

1. ~~The building or other structure is less than or equal to 75 feet (22 860 mm) in height with a height-to-leastwidth ratio of 4 or less, or the building or other structure has a fundamental frequency greater than or equal to 1 hertz.~~
2. ~~The building or other structure is not sensitive to dynamic effects.~~
3. ~~The building or other structure is not located on a site for which channeling effects or buffeting in the wake of upwind obstructions warrant special consideration.~~
4. ~~The building shall meet the requirements of a simple diaphragm building as defined in ASCE 7 Section 6.2, where wind loads are only transmitted to the main wind-force-resisting system (MWFRS) at the diaphragms.~~

5. ~~For open buildings, multispan gable roofs, stepped roofs, sawtooth roofs, domed roofs, roofs with slopes greater than 45 degrees (0.79 rad), solid free-standing walls and solid signs, and rooftop equipment, apply ASCE 7 provisions.~~

~~**1609.6.1.1 Modifications.** The following modifications shall be made to certain subsections in ASCE 7: in Section 1609.6.2, symbols and notations that are specific to this section are used in conjunction with the symbols and notations in ASCE 7 Section 6.3.~~

~~**1609.6.2 Symbols and notations.** Coefficients and variables used in the alternate all-heights method equations are as follows:~~

~~*Cnet*~~	~~=~~	~~Net-pressure coefficient based on *Kd* [(*G*) (*Cp*) – (*GCpi*)], in accordance with Table 1609.6.2(2).~~
~~*G*~~	~~=~~	~~Gust effect factor for rigid structures in accordance with ASCE 7 Section 6.5.8.1.~~
~~*Kd*~~	~~=~~	~~Wind directionality factor in accordance with ASCE 7 Table 6-4.~~
~~*Pnet*~~	~~=~~	~~Design wind pressure to be used in determination of wind loads on buildings or other structures or their components and cladding, in psf (kN/m2).~~
~~*qs*~~	~~=~~	~~Wind stagnation pressure in psf (kN/m2) in accordance with Table 1609.6.2(1).~~

~~**1609.6.3 Design equations.** When using the alternate all-heights method, theMWFRS,and components and cladding of every structure shall be designed to resist the effects of wind pressures on the building envelope in accordance with Equation 16-34.~~

~~*Pnet* = *qsKzCnet* [*IKzt*]~~ ~~**(Equation 16-34)**~~

~~Design wind forces for theMWFRSshall not be less than 10 psf (0.48 kN/m2) multiplied by the area of the structure projected on a plane normal to the assumed wind direction (see ASCE 7 Section 6.1.4 for criteria). Design net wind pressure for components and cladding shall not be less than 10 psf (0.48 kN/m2) acting in either direction normal to the surface.~~

~~**1609.6.4 Design procedure.** The MWFRS and the components and cladding of every building or other structure shall be designed for the pressures calculated using Equation 16-34.~~

~~**1609.6.4.1 Main wind-force-resisting systems.** The MWFRS shall be investigated for the torsional effects identified in ASCE 7 Figure 6-9.~~

~~**1609.6.4.2 Determination of *Kz* and *Kzt*.** Velocity pressure exposure coefficient, *Kz,* shall be determined in accordance with ASCE 7 Section 6.5.6.6 and the topographic factor, *Kzt*, shall be determined in accordance with ASCE 7 Section 6.5.7.~~

1. ~~For the windward side of a structure, *Kzt* and *Kz* shall be based on height *z*.~~
2. ~~For leeward and sidewalls, and for windward and leeward roofs, *Kzt* and *Kz* shall be based on mean roof height *h*.~~

~~**1609.6.4.3 Determination of net pressure coefficients, *Cnet*.** For the design of the MWFRS and for components and cla~~dding, the sum of the internal and external net pressure shall be based on the net pressure coefficient, *Cnet*.

1. ~~The pressure coefficient, *Cnet*, for walls and roofs shall be determined from Table 1609.6.2(2).~~
2. ~~Where *Cnet* has more than one value, the more severe wind load condition shall be used for design.~~

~~**1609.6.4.4 Application of wind pressures.** When using the alternate all-heights method, wind pressures shall be applied simultaneously on, and in a direction normal to, all building envelope wall and roof surfaces.~~

~~**1609.6.4.4.1 Components and cladding.**Wind pressure for each component or cladding element is applied as follows using *Cnet* values based on the effective wind area, *A*, contained within the zones in areas of discontinuity of width and/or length "a," "2a" or "4a" at: corners of roofs and walls; edge strips for ridges, rakes and eaves; or field areas onwalls or roofs as indicated in figures in tables in ASCE 7 as referenced in Table 1609.6.2(2) in accordance with the following:~~

1. ~~Calculated pressures at local discontinuities acting over specific edge strips or corner boundary areas.~~
2. ~~Include "field" (Zone 1, 2 or 4, as applicable) pressures applied to areas beyond the boundaries of the areas of discontinuity.~~

~~3. Where applicable, the calculated pressures at discontinuities (Zones 2 or 3) shall be combined with design pressures that apply specifically on rakes or eave overhangs.~~

15. Revise as follows:

1405.14 Vinyl siding. Vinyl siding conforming to the requirements of this section and complying with ASTM D 3679 shall be permitted on exterior walls of buildings located in areas where ~~the~~ V_{asd} as determined in accordance with Section 1609.3.1 ~~basic wind speed specified in Chapter 16~~ does not exceed 100 miles per hour (45 m/s) and the *building height* is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where ~~the~~ V_{asd} as determined in accordance with Section 1609.3.1 ~~basic wind speed~~ exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Vinyl siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1504.5 Edge securement for low-slope roofs. Low-slope membrane roof system metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with ANSI/SPRI ES-1, except ~~the basic~~ V_{ult} wind speed shall be determined from Figure 1609A, 1609B, or 1609C as applicable.

TABLE 1504.8
MAXIMUM ALLOWABLE MEAN ROOF HEIGHT PERMITTED FOR BUILDINGS WITH AGGREGATE ON THE ROOF IN AREAS OUTSIDE A HURRICANE-PRONE REGION

V_{asd} determined in accordance with Section 1609.3.1 ~~BASIC WIND SPEED FROM FIGURE 1609 (mph)b~~	MAXIMUM MEAN ROOF HEIGHT (ft)a,c		
	Exposure category		
	B	C	D
85	170	60	30
90	110	35	15
95	75	20	NP
100	55	15	NP
105	40	NP	NP
110	30	NP	NP
115	20	NP	NP
120	15	NP	NP
Greater than 120	NP	NP	NP

a. Mean roof height as defined in ASCE 7.
b. For intermediate values of V_{asd} ~~basic wind speed~~, the height associated with the next higher value of V_{asd} ~~wind speed~~ shall be used, or direct interpolation is permitted.
c. NP = gravel and stone not permitted for any roof height.

TABLE 1507.2.7.1(1)
CLASSIFICATION OF ASPHALT ROOF SHINGLES PER ASTM D 7158[a]

V_{asd} determined in accordance with Section 1609.3.1 ~~MAXIMUM BASIC WIND SPEED FROM FIGURE 1609~~	CLASSIFICATION REQUIREMENT

(Portions of Table not shown, remain unchanged)

TABLE 1507.2.7.1(2)
CLASSIFICATION OF ASPHALT SHINGLES PER ASTM D 3161

V_{asd} determined in accordance with Section 1609.3.1 ~~MAXIMUM BASIC WIND SPEED FROM FIGURE 1609~~	CLASSIFICATION REQUIREMENT

(Portions of Table now shown, remain unchanged)

1507.2.8.1 High wind attachment. Underlayment applied in areas subject to high winds (V_{asd} greater than 110 mph as determined in accordance with Section 1609.3.1 ~~in accordance with Figure 1609~~) shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

TABLE 1507.3.7
CLAY AND CONCRETE TILE ATTACHMENT[a, b, c]

GENERAL — CLAY OR CONCRETE ROOF TILE				
Maximum V_{asd} determined in accordance with Section 1609.3.1 ~~basic~~ ~~wind speed (mph)~~	**Mean roof height (feet)**	**Roof slope up to < 3:12**	**Roof slope 3:12 and over**	
INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS[d, e] (Installations on spaced/solid sheathing with battens or spaced sheathing)				
Maximum V_{asd} determined in accordance with Section 1609.3.1 ~~basic~~ ~~wind speed (mph)~~	**Mean roof height (feet)**	**Roof slope up to <5:12**	**Roof slope 5:12 < 12:12**	**Roof slope 12:12 and over**
INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS (Installations on solid sheathing without battens)				
Maximum V_{asd} determined in accordance with Section 1609.3.1 ~~basic~~ ~~wind speed (mph)~~	**Mean roof height (feet)**	**All roof slopes**		

(Portions of Table not shown, remain unchanged)

1705.4 Wind resistance. The statement of special inspections shall include wind requirements for structures constructed in the following areas:

1. In wind Exposure Category B, where ~~the~~ V_{asd} as determined in accordance with Section 1609.3.1 ~~3-second-gust basic wind speed~~ is 120 miles per hour (mph) (52.8 m/s) or greater.
2. In wind Exposure Category C or D, where ~~the~~ V_{asd} as determined in accordance with Section 1609.3.1 ~~3-second- gust basic wind speed~~ is 110 mph (49 m/s) or greater.

1706.1 Special inspections for wind requirements. *Special inspections* itemized in Sections 1706.2 through 1706.4, unless exempted by the exceptions to Section 1704.1, are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where ~~the~~ V_{asd} as determined in accordance with Section 1609.3.1 ~~3-second-gust basic wind speed~~ is 120 miles per hour (52.8 m/sec) or greater.
2. In wind Exposure Categories C or D, where ~~the~~ V_{asd} as determined in accordance with Section 1609.3.1 ~~3-second-gust basic wind speed~~ is 110 mph (49 m/sec) or greater.

1710.3 Structural observations for wind requirements. Structural observations shall be provided for those structures sited where ~~the~~ V_{asd} as determined in accordance with Section 1609.3.1 ~~basic wind speed~~ exceeds 110 mph (49 m/sec) ~~determined from Figure 1609~~, where one or more of the following conditions exist:

1. The structure is classified as *Occupancy Category* III or IV in accordance with Table 1604.5.
2. The *building height* of the structure is greater than 75 feet (22 860 mm).
3. When so designated by the *registered design professional* responsible for the structural design.
4. When such observation is specifically required by the *building official*.

2109.1.1 Limitations. The use of empirical design of masonry shall be limited as noted in Section 5.1.2 of TMS 402/ACI 530/ASCE 5. The use of dry-stacked, surface-bonded masonry shall be prohibited in *Occupancy Category* IV structures. In buildings that exceed one or more of the limitations of Section 5.1.2 of TMS 402/ACI 530/ASCE 5,

masonry shall be designed in accordance with the engineered design provisions of Section 2101.2.1, 2101.2.2 or 2101.2.3 or the foundation wall provisions of Section 1807.1.5.
Section 5.1.2.2 of TMS 402/ACI 530/ASCE 5 shall be modified as follows:

5.1.2.2 *Wind* – Empirical requirements shall not apply to the design or construction of masonry for buildings, parts of buildings, or other structures to be located in areas where V_{asd} as determined in accordance with Section 1609.3.1 of the *International Building Code* exceeds 110 mph.

TABLE 2304.6.1
MAXIMUM V_{asd} determined in accordance with Section 1609.3.1
~~BASIC WIND SPEED~~ (mph) (3-SECOND GUST) PERMITTED FOR
WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURESa,b,c

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM V_{asd} DETERMINED IN ACCORDANCE WITH SECTION 1609.3.1 ~~WIND SPEED (MPH)~~		
							Wind exposure category		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	B	C	D

(Portions of Table not shown, remain unchanged)

a. Panel strength axis shall be parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.
b. The table is based on wind pressures acting toward and away from building surfaces in accordance with Section 30.7 ~~6.4.2.2~~ ofASCE7. Lateral requirements shall be in accordance with Section 2305 or 2308.
c. Wood structural panels with span ratings ofwall-16 orwall-24 shall be permitted as an alternate to panels with a 24/0 span rating. Plywood siding rated 16 o.c. or 24 o.c. shall be permitted as an alternate to panels with a 24/16 span rating.Wall-16 and plywood siding 16 o.c. shall be used with studs spaced a maximum of 16 inches o.c.

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the following limitations, and to further limitations of Sections 2308.11 and 2308.12.

1. Buildings shall be limited to a maximum of three *stories above grade plane*. For the purposes of this section, for buildings in *Seismic Design Category* D or E as determined in Section 1613, cripple stud walls shall be considered to be a *story*.

   Exception: Solid blocked cripplewalls not exceeding 14 inches (356 mm)in height need not be considered a *story*.

2. Maximum floor-to-floor height shall not exceed 11 feet, 7 inches (3531 mm). Bearing wall height shall not exceed a stud height of 10 feet (3048 mm).
3. Loads as determined in Chapter 16 shall not exceed the following:
   3.1. Average dead loads shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, exterior walls, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Sections 2308.11.2 and 2308.12.2, stone or masonry veneer up to the lesser of 5 inches (127 mm) thick or 50 psf (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2438 mm) permitted for gable ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

   3.2. Live loads shall not exceed 40 psf (1916 N/m^2) for floors.
   3.3. Ground snow loads shall not exceed 50 psf (2395 N/m^2).

4. V_{asd} as determined in accordance with Section 1609.3.1 ~~Wind speeds~~ shall not exceed 100 miles per hour (mph) (44 m/s) (3-second gust).

   Exception: V_{asd} as determined in accordance with Section 1609.3.1 ~~Wind speeds~~ shall not exceed 110 mph (48.4 m/s) (3-second gust) for buildings in Exposure Category B that are not located in a *hurricane-prone region*.

5. Roof trusses and rafters shall not span more than 40 feet (12 192 mm) between points of vertical support.
6. The use of the provisions for *conventional light-frame construction* in this section shall not be permitted for *Occupancy Category* IV buildings assigned to *Seismic Design Category* B, C, D, E or F, as determined in Section 1613.
7. *Conventional light-frame construction* is limited in irregular structures in *Seismic Design Category* D or E, as specified in Section 2308.12.6.

2308.2.1 Basic wind speed greater than 100 mph (3-second gust). Where the V_{asd} as determined in accordance with Section 1609.3.1 ~~basic wind speed~~ exceeds 100 mph (3-second gust), the provisions of either AF&PAWFCM, or the ICC 600 are permitted to be used. Wind speeds in Figure 1609A, 1609B, and 1609C shall be converted in accordance with Section 1609.3.1 for use with AF&PAWFCM or ICC 600.

TABLE 2308.10.1
REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a,b,c,e,f,g,h,I]

V_{asd} determined in accordance with Section 1609.3.1 ~~**BASIC WIND SPEED (3-second gust)**~~	**ROOF SPAN (feet)**							**OVERHANGS (pounds/feet)d**
	12	**20**	**24**	**28**	**32**	**36**	**40**	**OVERHANGS (pounds/feet)[d]**

(Portions of Table not shown, remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 1.61 km/hr, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

a. The uplift connection requirements are based on a 30-foot mean roof height located in Exposure B. For ExposureC orD and for other mean roof heights, multiply the above loads by the adjustment coefficients below.

	Mean Roof Height (feet)									
EXPOSURE	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
B	**1.00**	**1.00**	**1.00**	**1.00**	**1.05**	**1.09**	**1.12**	**1.16**	**1.19**	**1.22**
C	**1.21**	**1.29**	**1.35**	**1.40**	**1.45**	**1.49**	**1.53**	**1.56**	**1.59**	**1.62**
D	**1.47**	**1.55**	**1.61**	**1.66**	**1.70**	**1.74**	**1.78**	**1.81**	**1.84**	**1.87**

b. he uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.
c. The uplift connection requirements include an allowance for 10 pounds of dead load.
d. The uplift connection requirements do not account for the effects of overhangs. The magnitude of the above loads shall be increased by adding the overhang loads found in the table. The overhang loads are also based on framing spaced 24 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.
e. The uplift connection requirements are based upon wind loading on end zones as defined in Figure 28.6.3 ~~6-2~~ of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal dimension of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.7 and multiplying the overhang load by 0.8.
f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down).
g. Interpolation is permitted for intermediate values of V_{asd} ~~basic wind speeds~~ and roof spans.
h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications.

CHAPTER 35
REFERENCED STANDARDS

ASCE/SEI
American Society of Civil Engineers/Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191-440

7-10 ~~7-05~~ Minimum Design Loads for Buildings and Other Structures ~~including Supplements No. 1 and 2, excluding Chapter 14 and Appendix 11A.~~

Reason: The purpose of ths proposal is to update and coordinate the provisions of the 2012 IBC with those of the 2010 edition of ASCE 7 for the determination of wind loads. Although consisting of 30 small parts, the underlying reason for this change is to adopt into the 2012 IBC the new wind speed maps that have been adopted into ASCE 7.

Over the past 10 years, new data and research has been performed that indicates that the hurricane wind speeds provided in the current maps of the IBC-09 and ASCE-05 are too conservative and need to be adjusted downward. Significantly more hurricane data have become available thereby allowing for substantial improvements in the hurricane simulation model that is used to create the wind speed maps.
These new data have resulted in an improved representation of the hurricane wind field, including the modeling of the sea-land transition and the hurricane boundary layer height; new models for hurricane weakening after landfall; and an improved statistical model for the Holland *B* parameter which controls the wind pressure relationship. The new hurricane hazard model yields hurricane wind speeds that are lower than those given in ASCE 7-05 and IBC-09 even though the overall rate of intense storms (as defined by central pressure) produced by the new model is increased compared to those produced by the hurricane simulation model used to develop previous maps.

In preparing the new maps, the ASCE 7 standards committee decided to use multiple ultimate event or strength design maps in conjunction with a wind load factor of 1.0 for strength design – for allowable stress design, the factor was reduced from 1.0 to 0.6. Several factors that are important to an accurate wind load standard led to this decision:

(i) An ultimate event or strength design wind speed map makes the overall approach consistent with that used in seismic design in that they both map ultimate events and use a load factor of 1.0 for strength design.

(ii) Utilizing different maps for the different Occupancy Categories eliminates the problems associated with using "importance factors" that vary with category. The difference in the importance factors in hurricane prone and non-hurricane prone regions for Category I structures prompted many questions and have been removed from ASCE 7-10.

(iii) The use of multiple maps eliminates the confusion associated with the recurrence interval associated with the existing map - the map was not a uniform fifty year return period map. This therefore created a situation where the level of safety provided for within the overall design was not consistent along the hurricane coast.

Utilizing the new wind speed maps and integrating their use into the IBC necessitated the introduction of the terms V_{ult} and V_{asd} to be associated with the "ultimate" design wind speed and the "nominal" design wind speed. Because of the number of different provisions which use the wind speed map to "trigger" different requirements it was necessary to modify the conversion section (1609.3.1) so that those provisions were not changed. The terms "ultimate design wind speed" and "nominal design wind speed" were incorporate in numerous locations to aid in drawing the users attention to the different types of wind speeds – similar to what was done with the change from fastest mile to 3-second gust wind speeds.

Beyond the adoption of the new strength design wind speed maps, the 2010 edition of ASCE 7 also includes a new simplified method for use in the determination of wind loads for buildings up to 160' in height. In addition, the wind load calculation provisions have been removed from Chapter 6 of ASCE 7 and been reorganized into 6 separate chapters (26 thru 31) for the sake of clarity and ease of use. This of course necessitated multiple coordination revisions with the IBC text.

ASCE/SEI 7 has been a referenced standard of the IBC since its inception and as such it is well known to the building community. ASCE/SEI 7 is published and maintained by the Structural Engineering Institute of the American Society of Civil Engineers (SEI/ASCE). The document is a nationally recognized consensus standard developed in full compliance with the ASCE *Rules for Standards Committees*. The ASCE standards process is fully accredited by the American National Standards Institute (ANSI).

As of the submission date of this code change, the ASCE 7 Standards Committee is completing the committee balloting portion of the 2010 edition of ASCE/SEI 7. The document is designated ASCE/SEI 7-10 *Minimum Design Loads for Buildings and Other Structures* and it is expected that it will be completed and available for purchase prior to the ICC Final Action Hearings in May of 2010 . Any person interested in obtaining a public comment copy of ASCE/SEI 7-10 may do so by contacting the proponent at jrossberg@asce.org .

Cost Impact: The overall, national cost impact is believed to be neutral.

ICCFILENAME: ROSSBERG-S1-1602 NOTATIONS

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

1609.6 Alternate all-heights method. The alternate wind design provisions in this section are simplifications of the ASCE 7 Directional Procedure.

1609.6.1 Scope. As an alternate to ASCE 7 Chapters 27 and 30, the following provisions are permitted to be used to determine the wind effects on regularly shaped buildings, or other structures that are regularly shaped, which meet all of the following conditions:

1. The building or other structure is less than or equal to 75 feet (22 860 mm) in height with a height-to-least width ratio of 4 or less, or the building or other structure has a fundamental frequency greater than or equal to 1 hertz.
2. The building or other structure is not sensitive to dynamic effects.
3. The building or other structure is not located on a site for which channeling effects or buffeting in the wake of upwind obstructions warrant special consideration.
4. The building shall meet the requirements of a simple diaphragm building as defined in ASCE 7 Section 26.2, where wind loads are only transmitted to the main wind-force-resisting system (MWFRS) at the diaphragms.
5. For open buildings, multispan gable roofs, stepped roofs, sawtooth roofs, domed roofs, roofs with slopes greater than 45 degrees (0.79 rad), solid free-standing walls and solid signs, and rooftop equipment, apply ASCE 7 provisions.

1609.6.1.1 Modifications. The following modifications shall be made to certain subsections in ASCE 7: in Section 1609.6.2, symbols and notations that are specific to this section are used in conjunction with the symbols and notations in ASCE 7 Section 26.3.

1609.6.2 Symbols and notations. Coefficients and variables used in the alternate all-heights method equations are as follows:

C_{net} = Net-pressure coefficient based on K_d [(G) (Cp) – (GC_{pi})], in accordance with Table 1609.6.2.

G = Gust effect factor for rigid structures in accordance with ASCE 7 Section 26.9.3.
K_d = Wind directionality factor in accordance with ASCE 7 Table 26-6.
P_{net} = Design wind pressure to be used in determination of wind loads on buildings or other structures or their components and cladding, in psf (kN/m^2).

TABLE 1609.6.2
NET PRESSURE COEFFICIENTS, C_{NET}[a,b]

STRUCTURE OR PART THEREOF	DESCRIPTION		C_{net} FACTOR			
1. Main Wind Force Resisting Frames and Systems	WALLS:		Enclosed		Partially Enclosed	
			+ Internal Pressure	- Internal Pressure	+ Internal Pressure	- Internal Pressure
	Windward Wall		0.43	0.73	0.11	1.05
	Leeward Wall		-0.51	-0.21	-0.83	0.11
	Side Wall		-0.66	-0.35	-0.97	-0.04
	Parapet Wall	Windward	1.28		1.28	
		Leeward	-0.85		-0.85	
	ROOFS:		Enclosed		Partially Enclosed	
	Wind perpendicular to ridge		+ Internal Pressure	- Internal Pressure	+ Internal Pressure	- Internal Pressure
	Leeward roof or flat roof		-0.66	-0.35	-0.97	-0.04
	Windward roof slopes:					
	Slope < 2:12 (10°)	Condition 1	-1.09	-0.79	-1.41	-0.47
		Condition 2	-0.28	0.02	-0.60	0.34
	Slope = 4:12 (18°)	Condition 1	-0.73	-0.42	-1.04	-0.11
		Condition 2	-0.05	0.25	-0.37	0.57
	Slope = 5:12 (23°)	Condition 1	-0.58	-0.28	-0.90	0.04
		Condition 2	0.03	0.34	-0.29	0.65
	Slope = 6:12 (27°)	Condition 1	-0.47	-0.16	-0.78	0.15
		Condition 2	0.06	0.37	-0.25	0.68
	Slope = 7:12 (30°)	Condition 1	-0.37	-0.06	-0.68	0.25
		Condition 2	0.07	0.37	-0.25	0.69
	Slope = 9:12 (37°)	Condition 1	-0.27	0.04	-0.58	0.35
		Condition 2	0.14	0.44	-0.18	0.76
	Slope = 12:12 (45°)		0.14	0.44	-0.18	0.76
	Wind parallel to ridge and flat roofs		-1.09	-0.79	-1.41	-0.47
	Non Building Structures: Chimneys, Tanks and Similar Structures:					
			h/D			
			1	7	25	
	Square (Wind normal to face)		0.99	1.07	1.53	
	Square (Wind on diagonal)		0.77	0.84	1.15	
	Hexagonal or Octagonal		0.81	0.97	1.13	
	Round		0.65	0.81	0.97	
	Open Signs and Lattice Frameworks		Ratio of solid to gross area			
			< 0.1	0.1 to 0.29	0.3 to 0.7	
	Flat		1.45	1.30	1.16	
	Round		0.87	0.94	1.08	
2.Components and cladding not in areas of discontinuity – Roofs and overhangs	Roof Elements and slopes		Enclosed		Partially Enclosed	
	Gable or hipped configurations (Zone 1)					
	Flat < Slope < 6:12 (27°) See ASCE 7 Figure 6-11C Zone 1					

	Positive	10 SF or less	0.58	0.89
		100 SF or more	0.41	0.72
	Negative	10 SF or less	-1.00	-1.32
		100 SF or more	-0.92	-1.23
	Overhang: Flat < Slope < 6:12 (27°) See ASCE 7 Figure 6-11B Zone 1			
	Negative	10 SF or less	-1.45	
		100 SF or more	-1.36	
		500 SF or more	-0.94	
	6:12 (27°) < Slope < 12:12 (45°) See ASCE 7 Figure 6-11D Zone 1			
	Positive	10 SF or less	0.92	1.23
		100 SF or more	0.83	1.15
	Negative	10 SF or less	-1.00	-1.32
		100 SF or more	-0.83	-1.15
	Monosloped Configurations (Zone 1)		Enclosed	Partially Enclosed
	Flat < Slope < 7:12 (30°) See ASCE 7 Figure 6-14B Zone 1			
	Positive	10 SF or less	0.49	0.81
		100 SF or more	0.41	0.72
	Negative	10 SF or less	-1.26	-1.57
		100 SF or more	-1.09	-1.40
	Tall flat topped roofs h> 60'		Enclosed	Partially Enclosed.
	Flat <slope < 2:12 (10°) (Zone 1) See ASCE 7 Figure 6-17 Zone 1			
	Negative	10 SF or less	-1.34	-1.66
		500 SF or more	-0.92	-1.23
3. Components and cladding in areas of discontinuities – roofs and overhangs	Roof Elements and slopes		Enclosed	Partially Enclosed.
	Gable or Hipped Configurations at Ridges, Eaves and Rakes (Zone 2)			
	Flat < Slope < 6:12 (27°) See ASCE 7 Figure 6-11C Zone 2			
	Positive	10 SF or less	0.58	0.89

		100 SF or more	0.41	0.72
	Negative	10 SF or less	-1.68	-2.00
		100 SF or more	-1.17	-1.49
	Overhang for Slope Flat < Slope < 6:12 (27°) See ASCE 7 Figure 6-11C Zone 2			
	Negative	10 SF or less	-1.87	
		100 SF or more	-1.87	
	6:12 (27°) < Slope < 12:12 (45°) Figure 6-11D		Enclosed	Partially Enclosed
	Positive	10 SF or less	0.92	1.23
		100 SF or more	0.83	1.15
	Negative	10 SF or less	-1.17	-1.49
		100 SF or more	-1.00	-1.32
	Overhang for 6:12 (27°) < Slope < 12:12 (45°) See ASCE 7 Figure 6-11D Zone 2			
	Negative	10 SF or less	-1.70	
		100 SF or more	-1.53	
	Monosloped Configurations at Ridges, Eaves and Rakes (Zone 2)			
	Flat < Slope < 7:12 (30°) See ASCE 7 Figure 6-14B Zone 2			
	Positive	10 SF or less	0.49	0.81
		100 SF or more	0.41	0.72
	Negative	10 SF or less	-1.51	-1.83
		100 SF or more	-1.43	-1.74
	Tall flat topped roofs h> 60'		Enclosed	Partially Enclosed
	Flat <slope < 2:12 (10°) (Zone 2) See ASCE 7 Figure 6-17 Zone 2			
	Negative	10 SF or less	-2.11	-2.42
		500 SF or more	-1.51	-1.83
	Gable or Hipped Configurations at Corners (Zone 3) See ASCE 7 Figure 6-11C Zone 3			
	Flat < Slope < 6:12 (27°)		Enclosed	Partially Enclosed
	Positive	10 SF or less	0.58	0.89
		100 SF or more	0.41	0.72

		10 SF or less	-2.53	-2.85
	Negative	100 SF or more	-1.85	-2.17
	Overhang for Slope Flat < Slope < 6:12 (27°) See ASCE 7 Figure 6-11C Zone 3			
		10 SF or less	-3.15	
	Negative	100 SF or more	-2.13	
	6:12 (27°) < Slope < 12:12 (45°) See ASCE 7 Figure 6-11D Zone 3			
	Positive	10 SF or less	0.92	1.23
		100 SF or more	0.83	1.15
		10 SF or less	-1.17	-1.49
	Negative	100 SF or more	-1.00	-1.32
	Overhang for 6:12 (27°) < Slope < 12:12(45°)		Enclosed	Partially Enclosed.
		10 SF or less	-1.70	
	Negative	100 SF or more	-1.53	
	Monosloped Configurations at corners (Zone 3) See ASCE 7 Figure 6-14B Zone 3			
	Flat < Slope < 7:12 (30°)			
	Positive	10 SF or less	0.49	0.81
		100 SF or more	0.41	0.72
		10 SF or less	-2.62	-2.93
	Negative	100 SF or more	-1.85	-2.17
	Tall flat topped roofs h> 60'		Enclosed	Partially Enclosed
	Flat < slope < 2:12 (10°) (Zone 3) See ASCE 7 Figure 6-17 Zone 3			
	Negative	10 SF or less	-2.87	-3.19
		500 SF or more	-2.11	-2.42
4. Components and Cladding not in areas of discontinuity - Walls and parapets	Wall Elements: h ≤ 60' (Zone 4) Figure 6-11A		Enclosed	Partially Enclosed
		10 SF or less	1.00	1.32
	Positive	500 SF or more	0.75	1.06
		10 SF or less	-1.09	-1.40
	Negative	500 SF or more	-0.83	-1.15

	Wall Elements: h > 60' (Zone 4) See ASCE 7 Figure 6-17 Zone 4			
	Positive	20 SF or less	0.92	1.23
		500 SF or more	0.66	0.98
	Negative	20 SF or less	-0.92	-1.23
		500 SF or more	-0.75	-1.06
	Parapet Walls			
	Positive		2.87	3.19
	Negative		-1.68	-2.00
5. Components and Cladding in areas of discontinuity - Walls and parapets	Wall Elements: h ≤ 60' (Zone 5) Figure 6-11A		Enclosed	Partially Enclosed
	Positive	10 SF or less	1.00	1.32
		500 SF or more	0.75	1.06
	Negative	10 SF or less	-1.34	-1.66
		500 SF or more	-0.83	-1.15
	Wall Elements: h > 60' (Zone 5) See ASCE 7 Figure 6-17 Zone 4			
	Positive	20 SF or less	0.92	1.23
		500 SF or more	0.66	0.98
	Negative	20 SF or less	-1.68	-2.00
		500 SF or more	-1.00	-1.32
	Parapet Walls			
	Positive		3.64	3.95
	Negative		-2.45	-2.76

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 degree = 0.0175 radians

a. Linear interpolation between values in the table is permitted.

b. Some C_{net} values have been grouped together. Less conservative results may be obtained by applying ASCE 7 provisions.

1609.6.3 Design equations. When using the alternate all-heights method, the MWFRS, and components and cladding of every structure shall be designed to resist the effects of wind pressures on the building envelope in accordance with Equation 16-34.

$P_{net} = 0.00256V^2 K_z C_{net} K_{zt}$ **(Equation 16-34)**

Design wind forces for the MWFRS shall not be less than 16 psf (0.77 kN/m^2) multiplied by the area of the structure projected on a plane normal to the assumed wind direction (see ASCE 7 Section 27.4.7 for criteria). Design net wind pressure for components and cladding shall not be less than 16 psf (0.77 kN/m^2) acting in either direction normal to the surface.

1609.6.4 Design procedure. The MWFRS and the components and cladding of every building or other structure shall be designed for the pressures calculated using Equation 16-34.

1609.6.4.1 Main wind-force-resisting systems. The MWFRS shall be investigated for the torsional effects identified in ASCE 7 Figure 27.4.6.

1609.6.4.2 Determination of K_z and K_{zt}. Velocity pressure exposure coefficient, K_z, shall be determined in accordance with ASCE 7 Section 27.3.1 and the topographic factor, K_{zt}, shall be determined in accordance with ASCE 7 Section 26.8.

1. For the windward side of a structure, K_{zt} and K_z shall be based on height *z*.
2. For leeward and sidewalls, and for windward and leeward roofs, K_{zt} and K_z shall be based on mean roof height *h*.

1609.6.4.3 Determination of net pressure coefficients, C_{net}. For the design of the MWFRS and for components and cladding, the sum of the internal and external net pressure shall be based on the net pressure coefficient, C_{net}.

1. The pressure coefficient, C_{net}, for walls and roofs shall be determined from Table 1609.6.2.
2. Where C_{net} has more than one value, the more severe wind load condition shall be used for design.

1609.6.4.4 Application of wind pressures. When using the alternate all-heights method, wind pressures shall be applied simultaneously on, and in a direction normal to, all building envelope wall and roof surfaces.

1609.6.4.4.1 Components and cladding. Wind pressure for each component or cladding element is applied as follows using C_{net} values based on the effective wind area, *A*, contained within the zones in areas of discontinuity of width and/or length "a," "2a" or "4a" at: corners of roofs and walls; edge strips for ridges, rakes and eaves; or field areas on walls or roofs as indicated in figures in tables in ASCE 7 as referenced in Table 1609.6.2 in accordance with the following:

1. Calculated pressures at local discontinuities acting over specific edge strips or corner boundary areas.
2. Include "field" (Zone 1, 2 or 4, as applicable) pressures applied to areas beyond the boundaries of the areas of discontinuity.
3. Where applicable, the calculated pressures at discontinuities (Zones 2 or 3) shall be combined with design pressures that apply specifically on rakes or eave overhangs.

(Portions of proposal not shown are unchanged)

Committee Reason: This code change updates the IBC wind load requirements for consistency with the next edition of the ASCE 7 load standard. The modification retains the current IBC alternative procedure with necessary corrections to the ASCE 7 references. A public comment is recommended to further coordinate the IBC with ASCE 7

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Modify the proposal as follows:

1609.1.2.2. Modifications to ATM E 1996. Section 6.2.2 of ASTM E 1996 shall be modified as follows:

6.2.2 Unless otherwise specified, select the wind zone based on the basic wind speed as follows:
6.2.2.1 *Wind Zone 1* - 130 mph ≤ basic wind speed < 140 mph, and Hawaii.
6.2.2.2 *Wind Zone 2* - 140 mph ≤ basic wind speed < 150 mph at greater than 1.6 km (one mile) from the coastline. The coastline shall be measured from the mean high water mark.
~~6.2.2.3 *Wind Zone 3* - basic wind speed ≥ 150 mph, or basic wind speed ≥ 140 mph and within 1.6 km (one mile) of the coastline. The coastline shall be measured from the mean high water mark.~~
6.2.2.3 *Wind Zone 3*—150 mph (58 m/s) ≤ basic wind speed ≤160 mph (63 m/s), or 140 mph (54 m/s) ≤ basic wind speed ≤160 mph (63 m/s) and within 1.6 km (one mile) of the coastline. The coastline shall be measured from the mean high water mark.
6.2.2.4 *Wind Zone 4*—basic wind speed >160 mph (63 m/s).

Commenter's Reason: The purpose of the modification proposed in this public comment is simply to correlate the wind zones in the 2009 Edition of ASTM E 1996 with the new wind speed maps in ASCE 7-10 as proposed in S84-09/10. During the preparation of the original code change, an older version of ASTM E 1996 which didn't include Wind Zone 4 or slight changes to Wind Zone 3 that is reflected in ASTM e 1996-09. Approval of S84-09/10 as modified by this public comment is needed so that the delineation of the wind zones are modified consistently by this section in the IBC.

Public Comment 2:

Jerremy John Barbera, Structural Engineers Association of Washington (SEAW), representing SEAW Wind Engineering Committee, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1605.3.2 Alternative basic load combinations. In lieu of the basic load combinations specified in Section 1605.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. When using these alternative basic load combinations that include wind or seismic loads, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind loads, only two-thirds of the minimum dead load likely to be in place during a design wind event shall be used. Where wind loads are calculated in accordance with Chapters 26 through 31 of ASCE 7, the coefficient ω in the following equations shall be taken as ~~0.78~~ 1.3. For other wind loads ω, shall be taken as 1. When using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. When using these alternative basic load combinations for proportioning foundations for loadings, which include seismic loads, the vertical seismic *load effect*, *Ev, i*n Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero.

$D + L + \underline{0.6}\cancel{(}\omega W\cancel{)}$ **(Equation 16-17)**
$D + L + \underline{0.6}\omega W + S/2$ **(Equation 16-18)**
$D + L + S + \underline{0.6}\omega W/2$ **(Equation 16-19)**

(Equations not shown are unchanged)

(Portions of proposal not shown are unchanged)

Commenter's Reason: As the proponent of S84 pointed out in the reason statement, the ASCE 7 wind maps are changing to a strength-based set of maps. The two sets of allowable stress based load combinations in 1605.3.1 and 1605.3.2 need to have a 0.6 load factor applied to wind loads to account for this change. The proponent made such a change to the load combinations in 1605.3.1. In 1605.3.2, the proponent made a similar change by changing the ω factor from 1.3 to 1.3 * 0.6 = 0.78. While numerically correct, this change is not transparent and will lead to confusion on the part of users. This public comment will align the two sets of allowable stress load combinations so that this new load factor is evident.

Public Comment 3:

Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1605.3.2 Alternative basic load combinations. In lieu of the basic load combinations specified in Section 1605.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. When using these alternative basic load combinations that include wind or seismic loads, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind loads, only two-thirds of the minimum dead load likely to be in place during a design wind event shall be used. When using allowable stresses which have been increased or load combinations which have been reduced as permitted by the material chapter of this code or the referenced standards, where wind loads are calculated in accordance with Chapters 26 through 31 of ASCE 7, the coefficient ω in the following equations shall be taken as ~~0.78~~ 1.3. For other wind loads ω, shall be taken as 1. When allowable stresses have not been increased or load combinations have not been reduced as permitted by the material chapter of this code or the referenced standards ω, shall be taken as 1. When using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. When using these alternative basic load combinations for proportioning foundations for loadings, which include seismic loads, the vertical seismic *load effect*, *Ev, i*n Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero.

$D + L + \underline{0.6}\cancel{(}\omega W\cancel{)}$ **(Equation 16-17)**
$D + L + \underline{0.6}\omega W + S/2$ **(Equation 16-18)**
$D + L + S + \underline{0.6}\omega W/2$ **(Equation 16-19)**

(Equations not shown are unchanged)

(Portions of proposal not shown are unchanged)

Commenter' Reason: The ASCE 7 wind maps are changing to a strength based set of maps. The two sets of allowable stress based load combinations in 1605.3.1 and 1605.3.2 need to have a 0.6 load factor applied to wind loads to account for this change. The proponent made such a change to the load combinations in 1605.3.1.

In testimony at the Code Development Hearings in Baltimore, the CRSC noted that the load combination of 1605.3.2 is often used when a geotechnical consultant permitted a one-third stress increase. Geotechnical consultants routinely do allow this stress increase, but not all geotechnical consultants allow it, so Section 1605.3.2 is not always used with a one-third stress increase. If no stress increase is used, the ω factor in 1605.3.2, should be taken as unity. This Public Comment will address the cases when a one-third stress increase is not provided or permitted and provide for the proper use of the load combinations in Section 1605.3.2 for those cases.

NCSEA urges your acceptance of this public comment to S84-09/10. Thank you.

Final Action: AS AM AMPC____ D

S90-09/10
1609.1.2.2, Chapter 35

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company, representing the Door Safety Council (DSC)

1. Add new text as follows:

1609.1.2.2 Side-hinged doors. Side-hinged door glazed opening protection for wind-borne debris shall meet the requirements of an *approved* impact-resistant standard or ANSI A250.13.

(Renumber remaining sections)

2. Add standard to Chapter 35 as follows:

ANSI
A250.13-08 Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies

Reason: This proposal helps resolve performance and code compliance issues when exterior side-hinged door openings are comprised of components from multiple sources and include interchangeable elements (ie: doors, frames, hinging and latching hardware, etc.).

This proposed change allows an alternative method to demonstrate performance to impact-resistant requirements for side-hinged door openings by requiring components to be tested to ANSI A250.13-2008. ANSI A250.13 contains language that prescribes how components are to be selected to create complete door openings expected to perform equivalently to door assemblies tested to ASTM E 1996 / E 1886 for impact resistance.

Through the ANSI standards development process stake-holders comprising most major manufacturing associations, testing and certification organizations, specifiers, code officials and end users, developed a national standard for a component-based approach to testing for windstorm resistance of swinging door openings. The test procedures used in this standard represent the most severe requirements found in the windstorm resistance standards referenced in today's building codes. These procedures are designed to isolate the loads, conditions and critical performance requirements that a particular component is subjected to in full assembly tests and duplicate these specific conditions. Using a combination of worst-case scenario design and safety factors, this standard is designed to provide a component rating that relates directly to the component's ability to withstand the conditions that occur in full assembly tests.

Prior to releasing the current revision of ANSI A250.13, validation tests of the large missile impact test specified by ASTM E1886/E1996 were conducted through Intertek Testing Services, a Nationally Recognized Test Laboratory. The study was conducted to quantify the energy that would tend to shear the latch bolt in assembly tests and compare it to the energy delivered to the latch bolt in the ANSI A250.13 component test procedure which uses a relatively rigid fixture and a pendulum type impactor. The impact energy applied to the test sample was varied and the actual energy imparted to the lock and hinge was measured. The component text fixture is more efficient at transferring the energy applied to the system into the test samples than the ASTM E1996 assembly test fixture. This results in higher impact energy at the lock or hinge. For example, only 4% of the impact energy applied in the ASTM E1996 test transfers to the lock. Whereas, 15% of the impact energy is delivered to the lock mounted in the A250.13 test fixture.

Results demonstrated that this test specified in ANSI A250.13 for latches was indeed much more severe (approximately 3.75 times more) than the exposure provided in door assembly tests conducted per ASTM E1996 and similar wind borne debris impact tests. The current impact test requirements of ANSI A250.13 were therefore adjusted to be two times more severe (maintaining a 2 times safety factor) to the current requirements of ASTM E1996.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, ANSI A250 13-08, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: WOESTMAN-S1-1609.1.2.2

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard ANSI A250.12 indicated that, in the opinion of ICC Staff, the standard complies with ICC standards criteria.

Committee Action: **Approved as Submitted**

Committee Reason: With the addition of ANSI A250.12 to regulate the parts of a side-hinged door, there will be at least a requirement for their testing. It can be better to have tests on each part of the assembly. This component approach is not a novel idea, but is something that is done all the time. There is a consensus standard and it's a good option to have in the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jeff Inks, Window and Door Manufacturers Association, requests Disapproval.

Commenter's Reason: After subsequent consideration of the Structural Committee's approval of this code change proposal, WDMA believes it should be disapproved.

While as the committee pointed out in their reason for approving the proposal, the "*component approach is not a novel idea*," it has not evolved to the point that it can be relied upon to the extent intended by this proposal which is to ensure side-hinged door assemblies constructed of components that have been tested, but not together as an assembly, are compliant with the performance requirements for these assemblies in wind borne debris regions. ANSI 250.13 allows substitutions that go far beyond what is allowed in the ASTM E-1996 standard.

While we are also supportive of the concept, more guidance should be in place with respect to component substitution and the extent to which it can be safely employed in the construction of assemblies that are not tested as assemblies. That guidance should be available before provisions such as those proposed by S90 are approved for the code.

Public Comment 2:

Julie Ruth, JRuth Code Consulting, representing American Architectural Manufacturers Association, requests Disapproval.

Commenter's Reason: S90 would require glazed opening protection in side hinged doors to meet the requirements of an approved impact resistant standard, or ANSI A250.13. Since glazed opening protections are already required to meet the requirements of an approved impact resistant standard elsewhere in Section 1609.1.2, the net effect of S90 would be to permit the alternate use of ANSI A250.13 to determine the impact resistance of components of side hinged doors rather than testing complete systems as required by other impact resistance standards.

It has been AAMA's experience that the testing and rating of individual components of a fenestration assembly, without testing a full assembly to establish a baseline, does not provide adequate information on the performance of the resultant assembly under load. This is as true for resistance to impact load as it is for resistance to design wind pressure.

During the testimony on S90 at the code development hearings in Baltimore, the proponents of S90 pointed to the fact that the standard requires the door slab to be stiffened prior to testing, to more fully impart the impact load onto the hardware that is securing the door slab into the opening. While such stiffening may in fact provide a more meaningful test of the hardware, it almost certainly does not give an accurate view of the performance of the door slab itself. There is also some question as to whether the most appropriate test for the hardware is in fact also the most appropriate for the door slab. Perhaps two different test methods, or two different methods of preparing the test assembly, should be used.

AAMA also has a concern that sections 9.1.1 and 9.1.2 of ANSI A250.13 permit alternate means of testing glazing in impact rated doors. Section 9.1.1 specifies that the glazing is to be tested in the largest size that can accommodate the glazing system. Section 9.1.2 permits the glazing system to be tested as part of door assemblies that are defined elsewhere in the standard, which are not required to include glazing in the largest size that can be accommodated. The members of the AAMA Door Council know from years of testing that these glazing options will react differently in different door slab and framing systems (assemblies). Therefore, permitting alternate means of testing the glazing options will not result in consistent test results, or consistent product performance.

Finally, it should be noted that validation test data from proponents of ANSI A250.13 has not been made available for review. Confirmation of the validity of a proposed new testing and rating method, either through peer review, round robin testing, or some other method of verifying the validity of the results, is the hallmark of meaningful standards development. The need for it should not be dismissed or lightly set aside.

Considering the importance of impact protection in maintaining the integrity of the building envelope, it is prudent that building codes remain conservative in their approach to specifying the means of qualifying impact protective products. Allowing a method such as A250.13, that does not require a full assembly test, is not a conservative approach. We urge disapproval of the use of this method, as provided for in S90.

Public Comment 3:

Larry J. Tanner P.E., Texas Tech University, representing Wind Sciences & Engineering Center, Debris Impact Test Laboratory, requests Disapproval.

Commenter's Reason: The ANSI A250 Standard, along with the ASTM 1886/1996 standards, were developed to prevent the proliferation of envelope perforations and the resulting inundation of rainwater from hurricane events. Evidence from hurricane investigations has revealed that indeed buildings designed to these standards performed better than buildings without said protection. However, it should be understood and specifically included in technical specifications by the manufacturers and advertisements to the consumers, that such products are intended only for non-catastrophic property protection from rainwater inundation and not for the protection of building occupants (Life Safety). I was a coauthor of both FEMA 320 and FEMA 361 which utilize Tornado and Hurricane Saferoom Design Wind Speed Maps. Never were the above referenced ANSI and ASTM standards considered suitable for FEMA 320 Saferooms or FEMA 361 Community Shelters.

Specifics to the proposed changes to the ANSI A250.13-2008 Standard:

1. From a quantitative standpoint the "stiffness theory" appears reasonable; however laboratory tests have proven otherwise. Texas Tech University has been the leading "storm debris impact researcher" for over 35 years. Tests on door assemblies have proven that success or failure from wind pressures and debris impacts is unique to the door (or window unit) and the hardware components installed. A heavily constructed door absorbs little energy and directs most of the energy to the attaching components and has proven to fail components that previously passed on other less massive doors. Lighter constructed doors can bend excessively and either pull out locking bolts or cause bolting bending and ultimate failure. Doors passing the impact tests must have a unique set of hardware that matches the door performance, thus doors are rated as a complete assembly, inclusive of frame, door(s), hinging, and locking hardware. Window lites in doors compromise the strength of the door and present another set of unique circumstances which require the unit to be rated as a complete assembly. Window unit performance is unique to the opening size, frame type, and the glazing. The elasticity of the glazing is a function of size and type. Based on size, some glazing is so elastic that it bounces

out of the frame. Smaller is not always better; some glazing will destroy the framing system and be pushed out. Thus, the only way to predict window behavior under impact is by full scale testing in the laboratory in "as specified and installed" condition.

2. Though these Standards were developed for "envelope" protection to reduce rainwater intrusion, these components that are now rated as "Hurricane Tested" are now being used in hardened "Hurricane Shelters" which are intended to protect lives. This is the result of misleading specification sheets, and uninformed dealers and consumers.

3. The "component rating" system does not consider the size of doors or glazed openings; the stiffness of doors with various sizes of lites, nor the quantity of hinges or latches required per size to carry the loads.

4. The Standard requires the component to be rated by ultimate load, but there is no guidance regarding the "assembly rating" based upon mixture of components with various ratings.

5. The Standard does not require engineering review or oversight.

6. According to the Test Procedure stated in Section 5.2.2, the impact energy should be 350 foot-pounds. However, for hinges, Section 6.1.1.2 and Latching Hardware, Section 7.1.1.3, the impact kinetic energy has been reduced to 125 foot-pounds. I understand the "stiffness" theory of the test fixture and product configuration, but this assumes that every laboratory will have the same fixtures and the same laboratory conditions.

7. The wind speed range has changed from 110-150 mph for the 2003 Standard to 110-170 mph for the 2008 Standard, but the test loads and impact criteria has not changed.

8. The impact location 6" above the floor on Figure 4, page 6 is unrealistic. In researching most all of the severe tornadoes and hurricanes since 1989, I have never seen an impact lower than 2.5 feet on a vertical surface.

9. Although there is not the opportunity at this time, to prevent the misuse of these products as describe above, I would suggest that the title of the standard be changed to: *Testing and Rating of Windstorm Resistant Components for Swinging Doors for Non-Life Safety Uses.*

Public Comment 4:

Gordon Thomas P.E., representing self, requests Disapproval.

Commenter's Reason: The ANSI A250.13 standard is a component rating standard not an assembly design standard. By referencing a component standard in the code, it would allow any non-engineering professional to inappropriately assemble components into an unqualified door assembly.

In addition, the proponent's *Reason Statement* for S90 contained the following statement regarding ANSI A250.13;

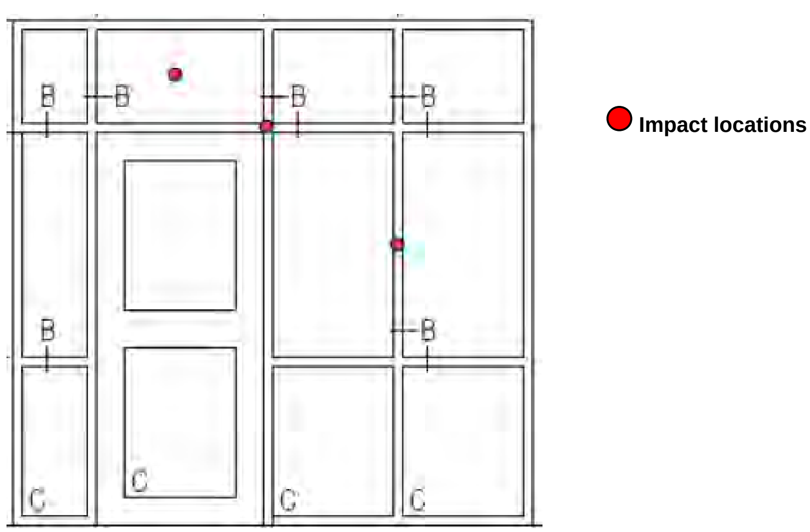
"The test procedures used in this standard represent the most severe requirements found in the windstorm resistance standards referenced in today's building codes."

As a Professional Engineer with extensive experience in design, testing and analysis of debris impact-resistant opening protectives, I have researched this claim and have concluded that this is not an accurate statement. Please consider the following facts;

ANSI A250.13 Section 6.1.1.2 – Hinges, and Section 7.1.1.3 – Latching Hardware, have impact energy requirements reduced to 125 foot-pounds. This represents a 64% reduction from the 350 foot-pounds impact energy requirements of the Florida Building Code or ASTM 1996.

The 2003 edition of A250.13 defined its scope as hurricanes with wind speeds of 110 to 150 MPH. The 2008 edition has expanded its scope to encompass wind speeds up to 170 MPH, while reducing impact energy requirements and the safety factor in section 6.1.3.1

ANSI A250.13 - 2008 section 10.1 prohibits missile impacts to framing members of glazed transom / sidelite openings, as is typically conducted under ASTM 1996, ICC 500 or Florida Building Code protocol TAS 201 testing. A graphic comparison of impact test methods follows;



Florida Building Code - TAS 201
6.3.2.2 When testing any specimen with more than one component, in addition to complying with the impacts required by Section 1626.2 of the Florida Building Code, the framing member connecting these components shall be impacted at one half the span of such member with the large missile at a speed indicated in Section 1626.2.4 of the Florida Building Code.

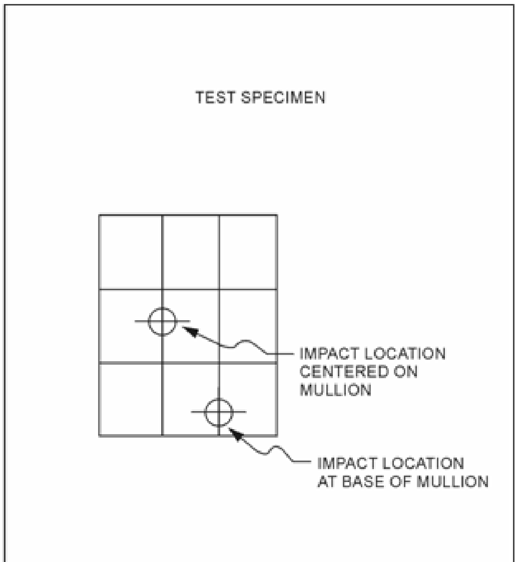
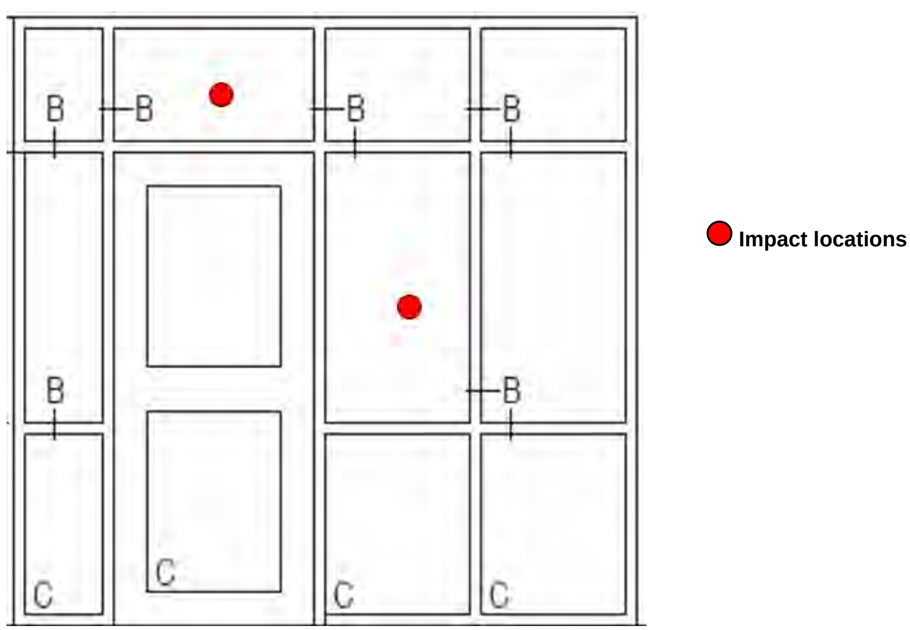


Figure 804.9.4-2

ICC 500

804.9.4 Windows and other Glazed Openings. All window assemblies and other glazed openings shall be impacted in the center of the smallest glazed section, and at one interface corner as detailed in Figure 804.9.4-1. Where interior mullions or other glazed section joints and/or latches are present, additional impacts shall be applied on these features as shown in Figure 804.9.4-2.



ANSI A 250.13
Sidelights and / or Transoms
10.1 Sidelights and/or transoms shall be tested with doors, to the largest total size (maximum area, height and width) to be rated. Testing shall be performed per ASTM E1886 and ASTM E1996 with the impacts applied only to the glazed portion of the assembly

Two similar proposals (S83 and S143 -07/08) to add ANSI A250.13 were disapproved in the last cycle by vote of the membership on September 20, 2008 at the Final Action Hearings in Minneapolis, MN

The Standard does not require engineering calculations validating openings configured from components, leaving the Plans Examiner or AHJ with the responsibility to do so, or the liability for not doing so

The October 30, 2009 issue of ANSI Standards Action identifies for public comment changes made to the A250.13 standard *after the approval of the document*. This matter is still open and pending with ANSI, subject to further review by the ANSI Board of Standards Review

Final Action: AS AM AMPC____ D

S94-09/10

1612.6 (New), Chapter 35

Proposed Change as Submitted

Proponent: Michael Mahoney, Federal Emergency Management Agency, representing the National Tsunami Hazard Mitigation Program

1. Add a new text as follows:

1612.6 Tsunami-generated flood hazard. Construction within a Tsunami Hazard Inundation Zone shall be in accordance with this section.

1612.6.1 Definitions. The following words and terms shall, for the purposes of this section, have the meanings shown herein.

TSUNAMI HAZARD INUNDATION MAP. A map that designates the extent of inundation by a design event tsunami which is developed and provided to a community by either the State or the National Atmospheric and Oceanic Administration (NOAA) under the National Tsunami Hazard Mitigation Program, using NOAA mapping criteria.

TSUNAMI HAZARD INUNDATION ZONE. The area anticipated to be flooded or inundated by a design event tsunami as identified on a community's Tsunami Hazard Inundation Map.

1612.6.2 Establishment of Tsunami Hazard Inundation Zone. Where a community has adopted a Tsunami Hazard Inundation Map, that map shall be used to establish a community's Tsunami Hazard Inundation Zone.

1612.6.3 Construction within the Tsunami Hazard Inundation Zone. Buildings and structures designated Occupancy Category III or IV in accordance with Section 1604.5 shall be prohibited within a Tsunami Hazard Inundation Zone.

> **Exception:** A vertical evacuation tsunami refuge shall be permitted to be located in a Tsunami Hazard Inundation Zone provided it is constructed in accordance with FEMA P646.

2. Add standard to Chapter 35 as follows:

Federal Emergency Management Agency
P646- 08 *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis*

Reason: For coastal communities subject to tsunami waves, where the either the State or the National Oceanic and Atmospheric Administration (NOAA) have provided a Tsunami Hazard Inundation Map and that community has adopted that Map, the Map specifies a Tsunami Hazard Inundation Zone. This Zone is subject to inundation in a design event tsunami, which can result in significant damage. Most of these maps are deterministic in nature, using historical and best available scientific data, and it is currently difficult to assign a specific probability to the design event used for mapping purposes. However, given the potentially serious life safety risk presented to structures within this zone, this is sufficient justification to limit the presence of high hazard and high occupancy structures within the Zone.

Cost Impact: The potential cost impact would be requiring new high hazard and high occupancy structures to be located outside the Tsunami Inundation Zone. Given that this land is further away from the shore and therefore normally less expensive, the cost impact is believed to be minimal.

Analysis: A review of the standard(s) proposed for inclusion in the code, FEMA P646-08, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: MAHONEY-S2-1612.6 NEW

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard, FEMA P646, indicated that, in the opinion of ICC Staff, the standard did not comply with ICC standards criteria, Section 3.6.2(1) Mandatory language, 3.6.3(2) Consensus process.

Committee Action: Approved as Modified

Modify the proposal as follows:

~~**1612.6 Tsunami-generated flood hazard.** Construction within a Tsunami Hazard Inundation Zone shall be in accordance with this section.~~

APPENDIX L
TSUNAMI-GENERATED FLOOD HAZARD

L101.1 General. The purpose of this appendix is to provide tsunami regulatory criteria for those communities that have a tsunami hazard and have elected to develop and adopt a map of their tsunami hazard inundation zone.

~~**1612.6.1**~~ **L101.2 Definitions.** The following words and terms shall, for the purposes of this ~~section~~ appendix, have the meanings shown herein.

TSUNAMI HAZARD INUNDATION MAP. A map that designates the extent of inundation by a design event tsunami which is developed and provided to a community by either the State or the National Atmospheric and Oceanic Administration (NOAA) under the National Tsunami Hazard Mitigation Program, using NOAA mapping criteria.

TSUNAMI HAZARD INUNDATION ZONE. The area anticipated to be flooded or inundated by a design event tsunami as identified on a community's Tsunami Hazard Inundation Map.

~~**1612.6.2**~~ **L101.3 Establishment of Tsunami Hazard Inundation Zone.** Where a community has adopted a Tsunami Hazard Inundation Map, that map shall be used to establish a community's Tsunami Hazard Inundation Zone.

~~**1612.6.3**~~ **L101.4 Construction within the Tsunami Hazard Inundation Zone.** Buildings and structures designated Occupancy Category III or IV in accordance with Section 1604.5 shall be prohibited within a Tsunami Hazard Inundation Zone.

> **Exception:** A vertical evacuation tsunami refuge shall be permitted to be located in a Tsunami Hazard Inundation Zone provided it is constructed in accordance with FEMA P646.

(Portions of proposal not shown are unchanged)

Committee Reason: This code change provides a good start, giving guidance on tsunami hazards. The modification places the provisions In an appendix, making them available for jurisdictions to adopt them.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Mahoney, FEMA, representing National Tsunami Hazard Mitigation Program, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

APPENDIX L
TSUNAMI-GENERATED FLOOD HAZARD

L101.1 General. The purpose of this appendix is to provide tsunami regulatory criteria for those communities that have a tsunami hazard and have elected to develop and adopt a map of their tsunami hazard inundation zone.

L101.2 Definitions.

TSUNAMI HAZARD ~~INUNDATION~~ ZONE MAP. A map adopted by the community that designates the extent of inundation by a design event tsunami. This map shall be based the tsunami inundation map which is developed and provided to a community by either the applicable State agency or the National Atmospheric and Oceanic Administration (NOAA) under the National Tsunami Hazard Mitigation Program, ~~using NOAA mapping criteria~~ but shall be permitted to utilize a different probability or hazard level.

TSUNAMI HAZARD ~~INUNDATION~~ ZONE. The area ~~anticipated to be~~ vulnerable to being flooded or inundated by a design event tsunami as identified on a community's Tsunami Hazard ~~Inundation~~ Zone Map.

L101.3 Establishment of Tsunami Hazard ~~Inundation~~ Zone. Where applicable, if a community has adopted a Tsunami Hazard ~~Inundation~~ Zone Map, that map shall be used to establish a community's Tsunami Hazard ~~Inundation~~ Zone.

L101.4 Construction within the Tsunami Hazard ~~Inundation~~ Zone. Construction of structures designated Occupancy Category III and IV as specified under Section 1604.5 shall be prohibited within a Tsunami Hazard ~~Inundation~~ Zone.

Exceptions:

1. A vertical evacuation tsunami refuge shall be permitted to be located in a Tsunami Hazard ~~Inundation~~ Zone provided it is constructed in accordance with FEMA P646.
2. Community critical facilities shall be permitted to be located within the Tsunami Hazard Zone when such a location is necessary to fulfill their function, providing suitable structural and emergency evacuation measures have been incorporated..

Commenter's Reason: A subsequent review by the State representatives to the National Tsunami Hazard Mitigation Program (NTHMP) generated several comments, which have been condensed into this single public comment. The most significant of these was that the Tsunami Inundation Maps developed by either the State or the National Oceanic and Atmospheric Administration (NOAA) are generally worst case deterministic maps for emergency evacuation purposes. Those maps may be too severe for the purposes of this appendix, so the language in M101.2 has been modified to decouple the Tsunami Inundation Map from the Tsunami Hazard Zone Map referenced in this appendix so that a community can select a map using a more appropriate hazard level. A second comment was that some communities may have a situation where critical facilities may need to be located in the Tsunami Hazard Zone. Exception #2 was added for this situation, but only if evacuation measures have been incorporated.

Final Action: AS AM AMPC____ D

S97-09/10-PART I

1613.5.1, Figure 1613.5(1) - Figure 1613.5(14)

Proposed Change as Submitted

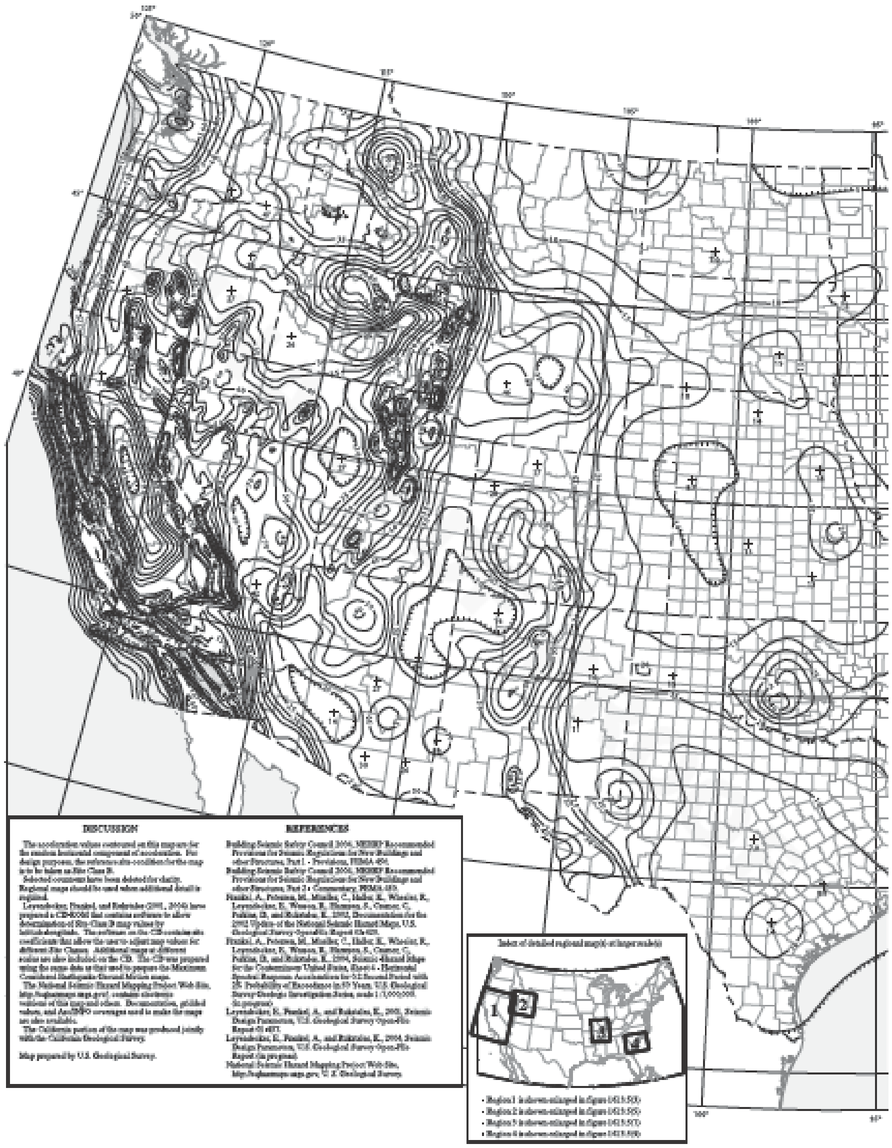
Proponent: Steven Winkel, FAIA, PE, Kelly Cobeen, PE, SE, and J. Daniel Dolan, PhD, PE, Building Seismic Safety Council (BSSC) of the National Institute of Building Sciences, representing the Federal Emergency Management Agency/BSSC Code Resource Support Committee

PART I – IBC STRUCTURAL

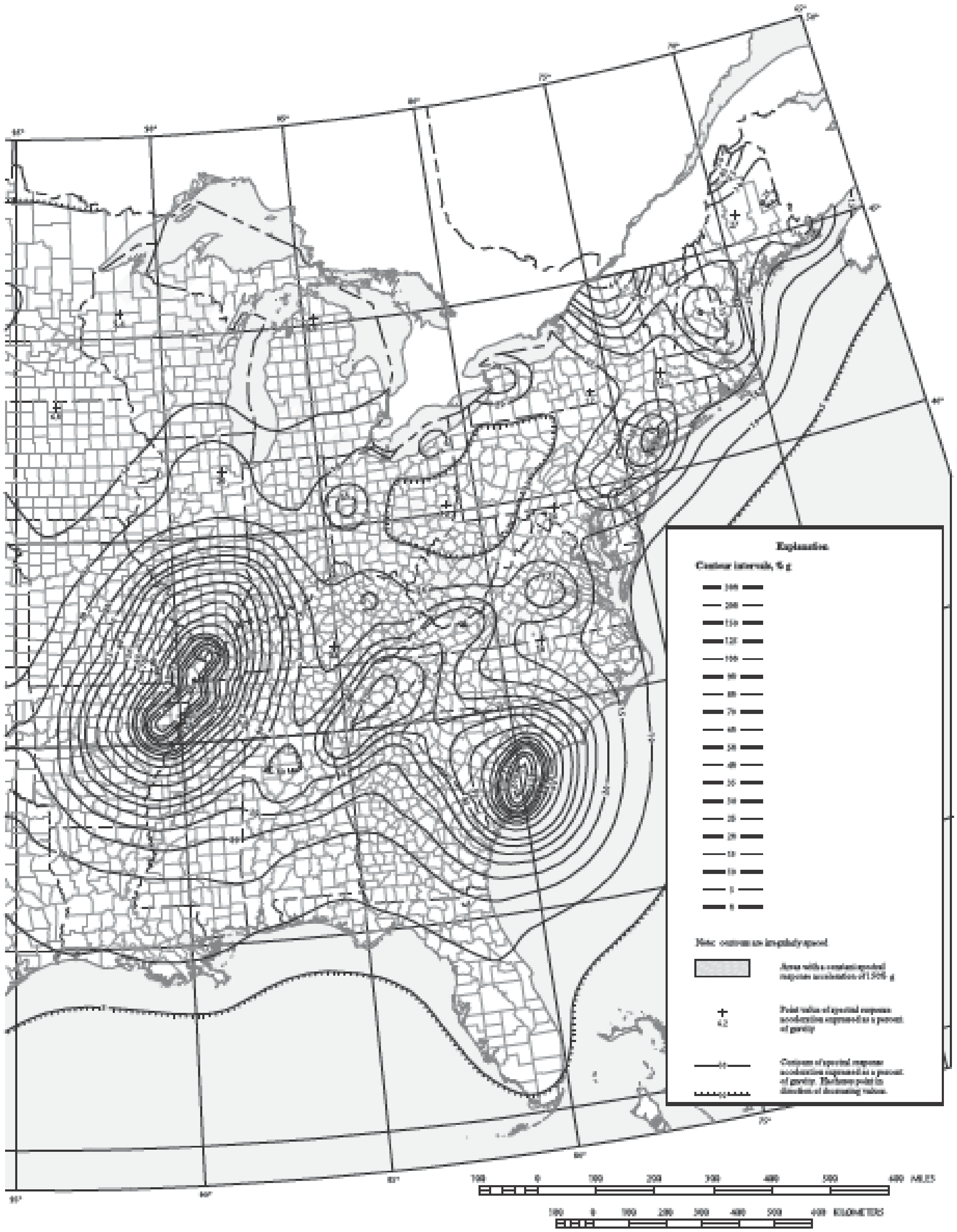
Revise as follows:

1613.5.1 Mapped Acceleration Parameters. The parameters S_S and S_1 shall be determined from the 0.2 and 1 s spectral response accelerations shown on Figures 1613.5(1) and 1613.5(2) ~~through 1613.5(14), respectively~~. Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned to Seismic Design Category A.

2. Delete and substitute as follows:



~~FIGURE 1613.5(1)~~
~~MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B~~



~~**FIGURE 1613.5(1)-continued**~~
~~**MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B**~~

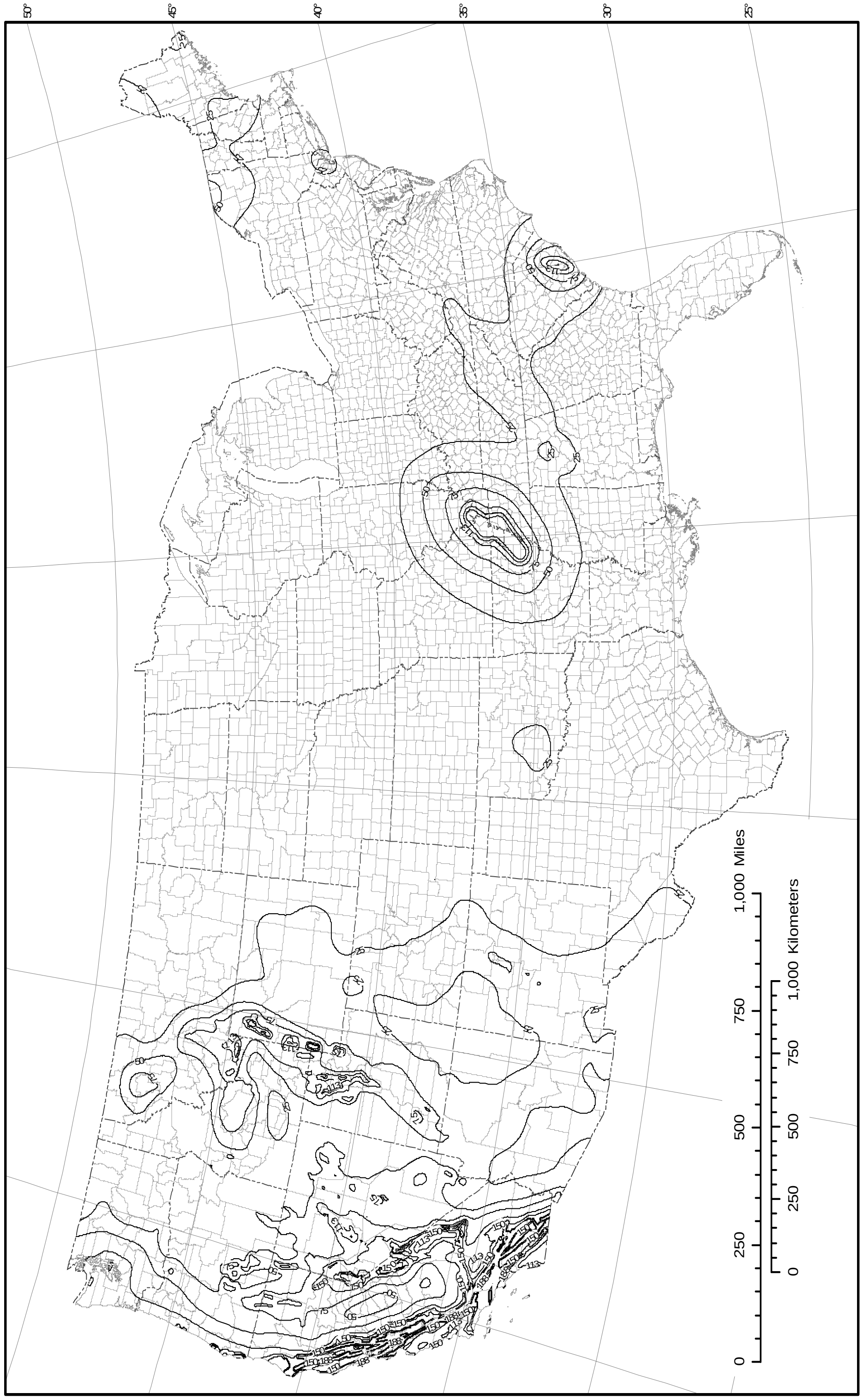
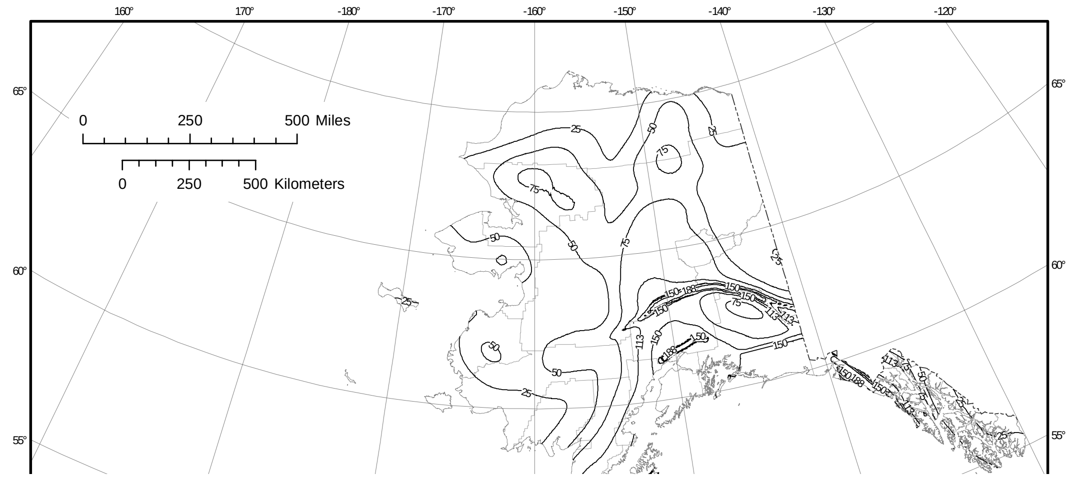
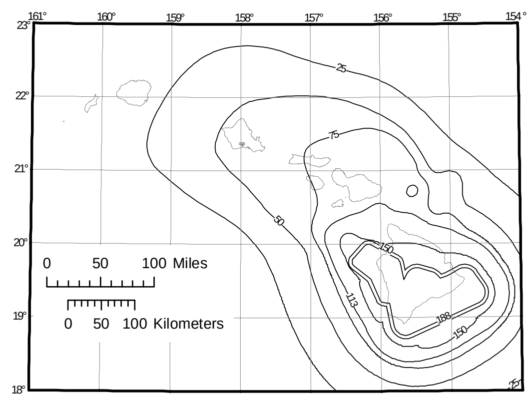
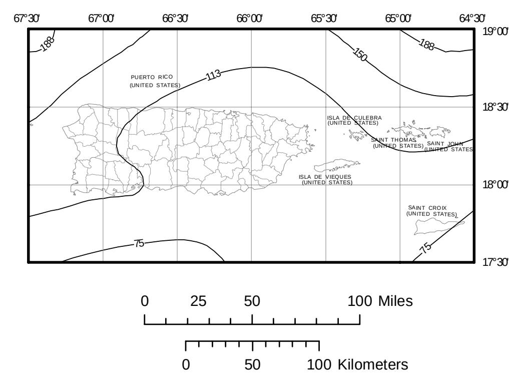


FIGURE 1613.5(1)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION OF 0.2 S SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



Contours are in units of %g





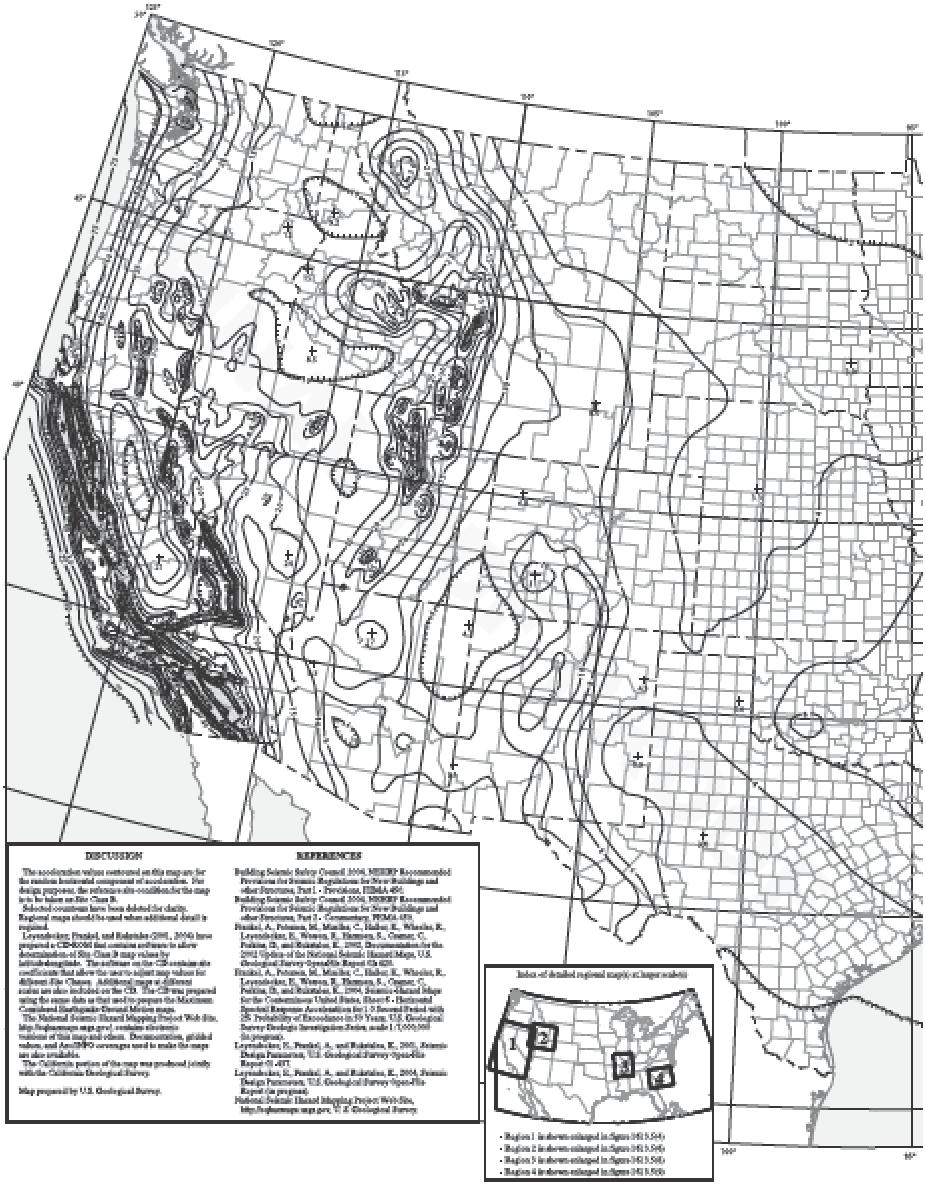
Notes:

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency funded work of the Building Seismic Safety Council (BSSC) and with the American Society of Civil Engineers (ASCE) 7 Seismic Subcommittee.

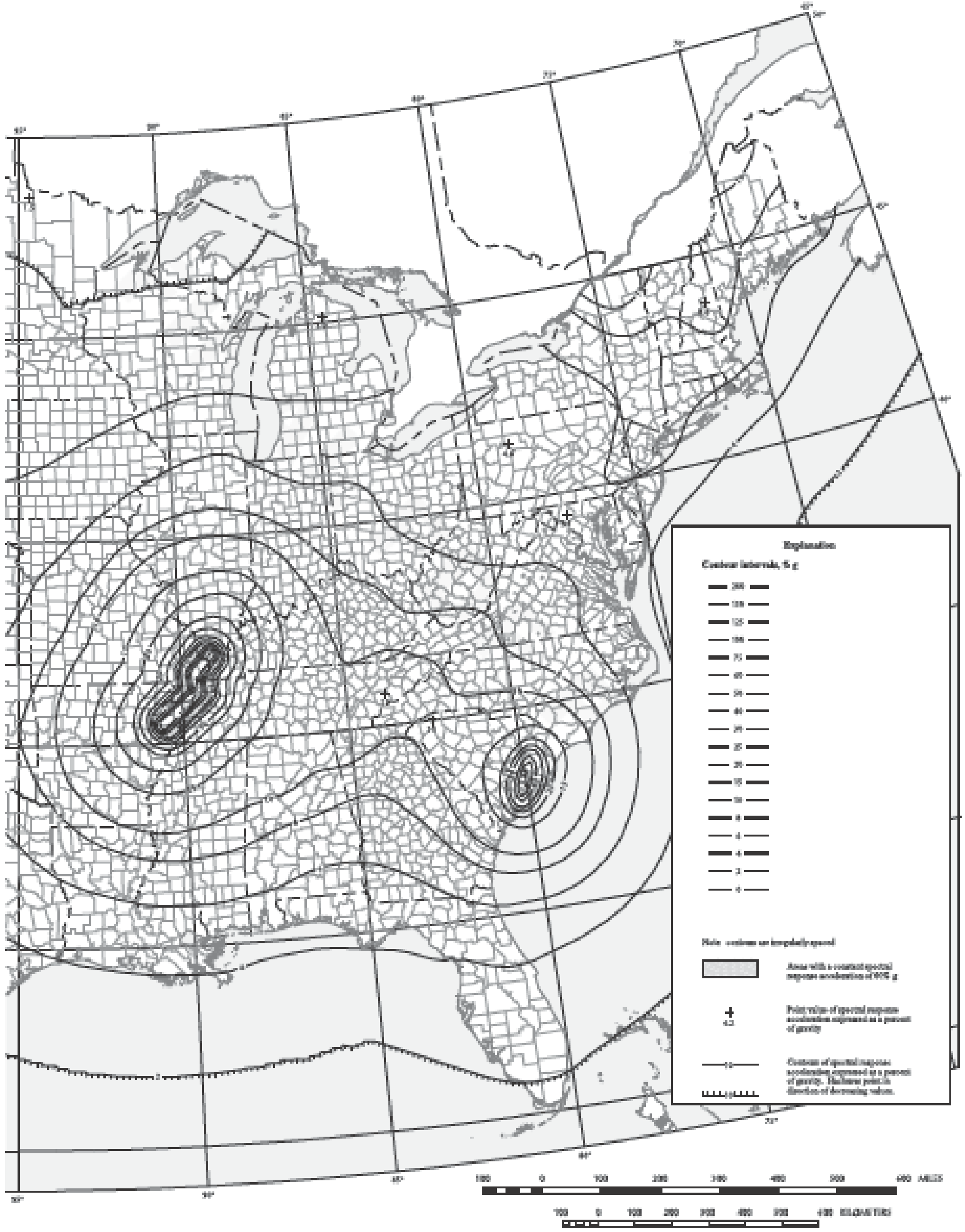
Ground motion values contoured on these maps incorporate risk-targeted and deterministic ground motions and a factor of 1.1 for the maximum direction of 0.2 s spectral response acceleration. As such, they are different from those on the uniform-hazard-based 2008 USGS National Seismic Hazard Maps posted at http://earthquake.usgs.gov/research/hazmaps/.

Larger, more detailed versions of these maps are not provided because it is recommended that a corresponding USGS web tool at http://earthquake.usgs.gov/research /hazmaps/design/ be used to determine the mapped value for specific locations.

FIGURE 1613.5(1) (CONTINUED)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION OF 0.2 S SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



~~FIGURE 1613.5(2)~~
~~MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B~~



~~**FIGURE 1613.5(2)—continued**~~
~~**MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B**~~

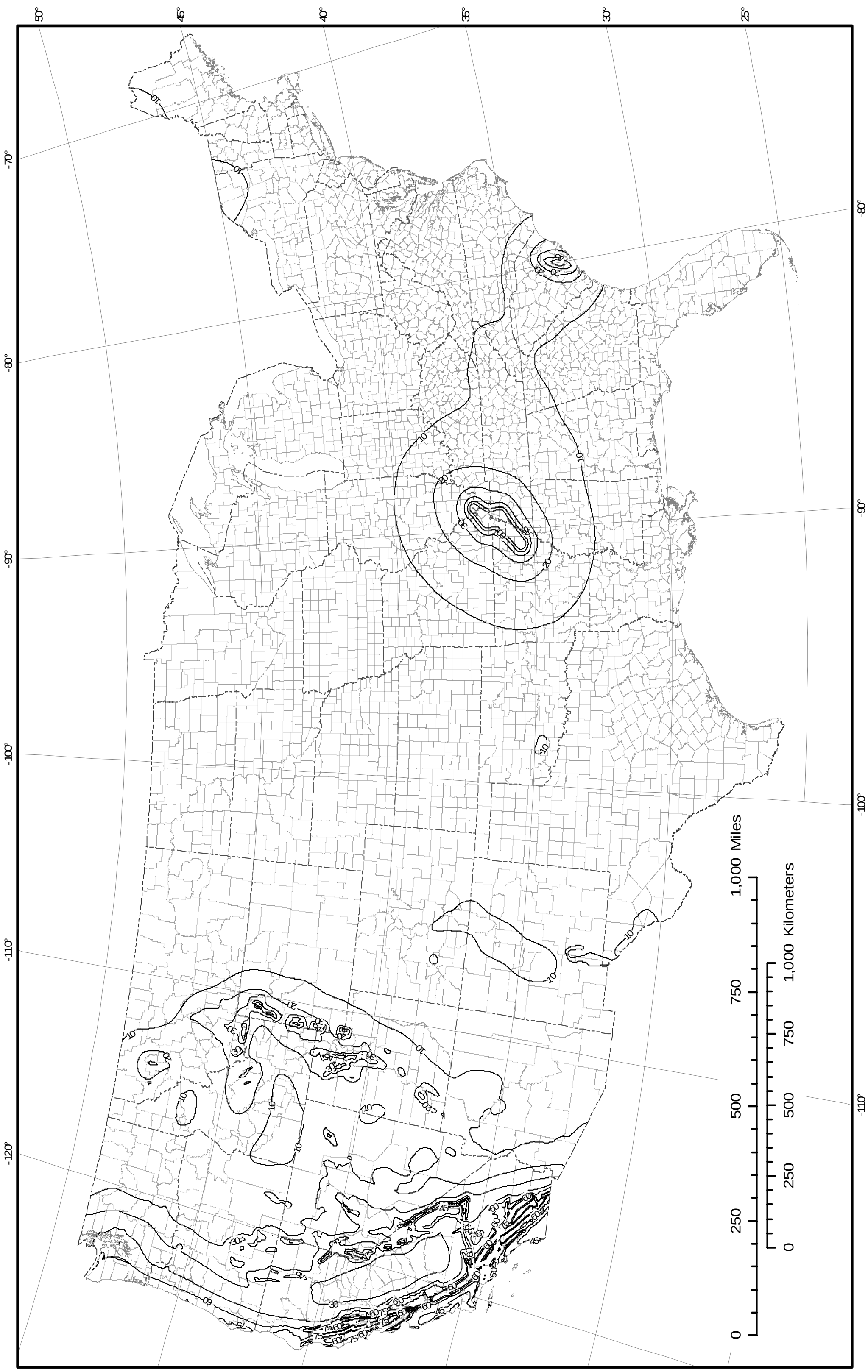
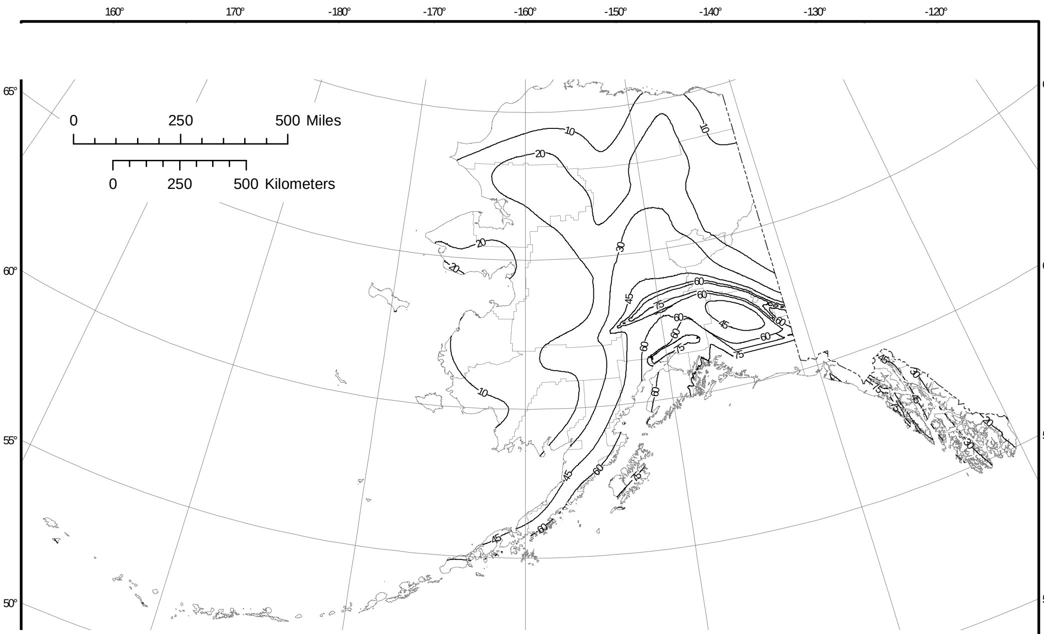
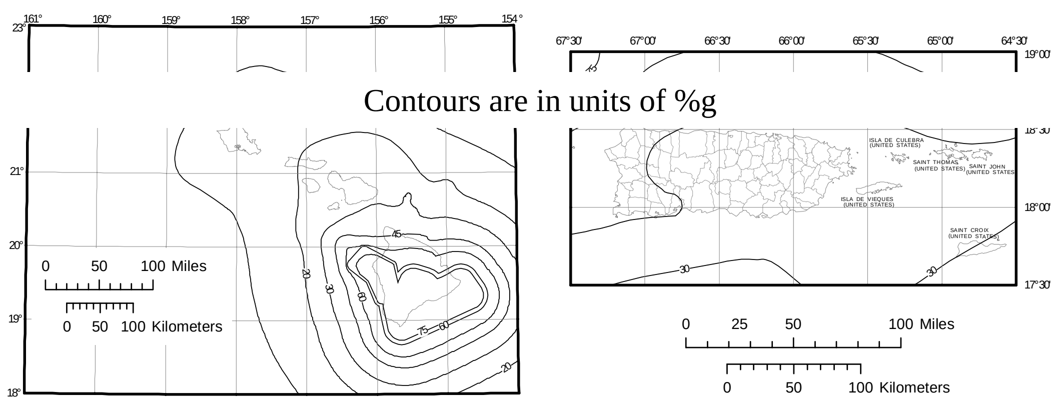


FIGURE 1613.5(2)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION OF 1 S SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



Contours are in units of %g



Contours are in units of %g

Notes:

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency funded work of the Building Seismic Safety Council (BSSC) and with the American Society of Civil Engineers (ASCE) 7 Seismic Subcommittee.

Ground motion values contoured on these maps incorporate risk-targeted and deterministic ground motions and a factor of 1.3 for the maximum direction of 1.0 s spectral response acceleration. As such, they are different from those on the uniform-hazard-based 2008 USGS National Seismic Hazard Maps posted at http://earthquake.usgs.gov/research/hazmaps/.

Larger, more detailed versions of these maps are not provided because it is recommended that a corresponding USGS web tool at http://earthquake.usgs.gov/research /hazmaps/design/ be used to determine the mapped value for specific locations.

FIGURE 1613.5(2) (CONTINUED)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION OF 1 S SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

Delete Figures 1613.5(3) through 1613.5(14) without substitution.

Reason: PART I**-** This proposal incorporates updated earthquake ground motion maps that reflect the 2008 maps developed by the United States Geological Survey (USGS) National Seismic Hazard Mapping Project as well as technical changes adopted for the 2009 *NEHRP Recommended Seismic Provisions for New Buildings and Other Structures* (FEMA P750), which was developed by the Building Seismic Safety Council with funding from the Federal Emergency Management Agency. Both projects are part of federal National Earthquake Hazard Reduction Program's (NEHRP) ongoing efforts to make the most current earthquake hazard information available to the building codes. If this code change is not moved forward, the ground motion maps in the IBC will reflect superseded seismic hazard information.

The 2008 USGS seismic hazard maps incorporate new information on earthquake sources and ground motion prediction equations including the new Next Generation Attenuation (NGA) relations. The ground motion maps proposed for the IBC further incorporate technical changes adopted for the 2009 *NEHRP Provisions* that include use of: (1) risk-targeted ground motions, (2) maximum direction ground motions, and (3) near-source 84th percentile ground motions.

The proposed ground motion maps for the IBC also reflect a current draft proposal for change to the ASCE 7 (Minimum Design Loads for Buildings and other Structures) standard update process. Under normal circumstances, ASCE 7 would adopt ground motion map related changes drawn from the most current edition of the *NEHRP Recommended Seismic Provisions* prior to incorporation of the maps into the IBC*;* however, the recent changes to the ICC code development process and schedule have made it necessary to submit this working version of the ASCE 7 proposal in an effort to provide the regulatory community with the most up-to-date information available. It should be understood that, to the extent possible, this proposal will be updated to reflect any modifications to maps, maps titles or other Section 1613 content made during the ASCE 7 consensus standard process so the consistency between ASCE 7 and the IBC is maintained. In the NEHRP update process the title for these maps was revised from "Maximum Considered Earthquake (MCE) Ground Motions" to "Risk-Targeted Earthquake (RTE) Ground Motions." This proposal retains the MCE terminology because it is retained in the working version of the ASCE 7 proposal.

This proposal also reduces the number of printed maps to appear in the IBC from 14 to 2. Twelve of the maps included in earlier editions of the IBC provided enlargements of portions of two maps that covered the entire United States; this proposal eliminates the enlargements. This is being recommended because the maps printed in former editions of the IBC, while generally illustrative of the earthquake hazard, could not to be read clearly enough to provide exact design values for specific building sites. Those in need of precise design values can easily obtain them from a USGS web site (http://earthquake.usgs.gov/research/hazmaps/design/index.php) using the longitude and latitude of the building site, obtained from GPS mapping programs or web sites.

Detailed descriptions of changes made for the 2009 *NEHRP Recommended Seismic Provisions* are available at www.bssconline.org under the explanation of changes made for the 2009 edition of the *Provisions.*

Cost Impact: The new maps may lower costs in some locations but may increase them in others.

ICCFILENAME: WINKEL-COBEEN-S1-1613.1

Public Hearing Results

PART I- IBC STRUCTURAL
Committee Action: Approved as Modified

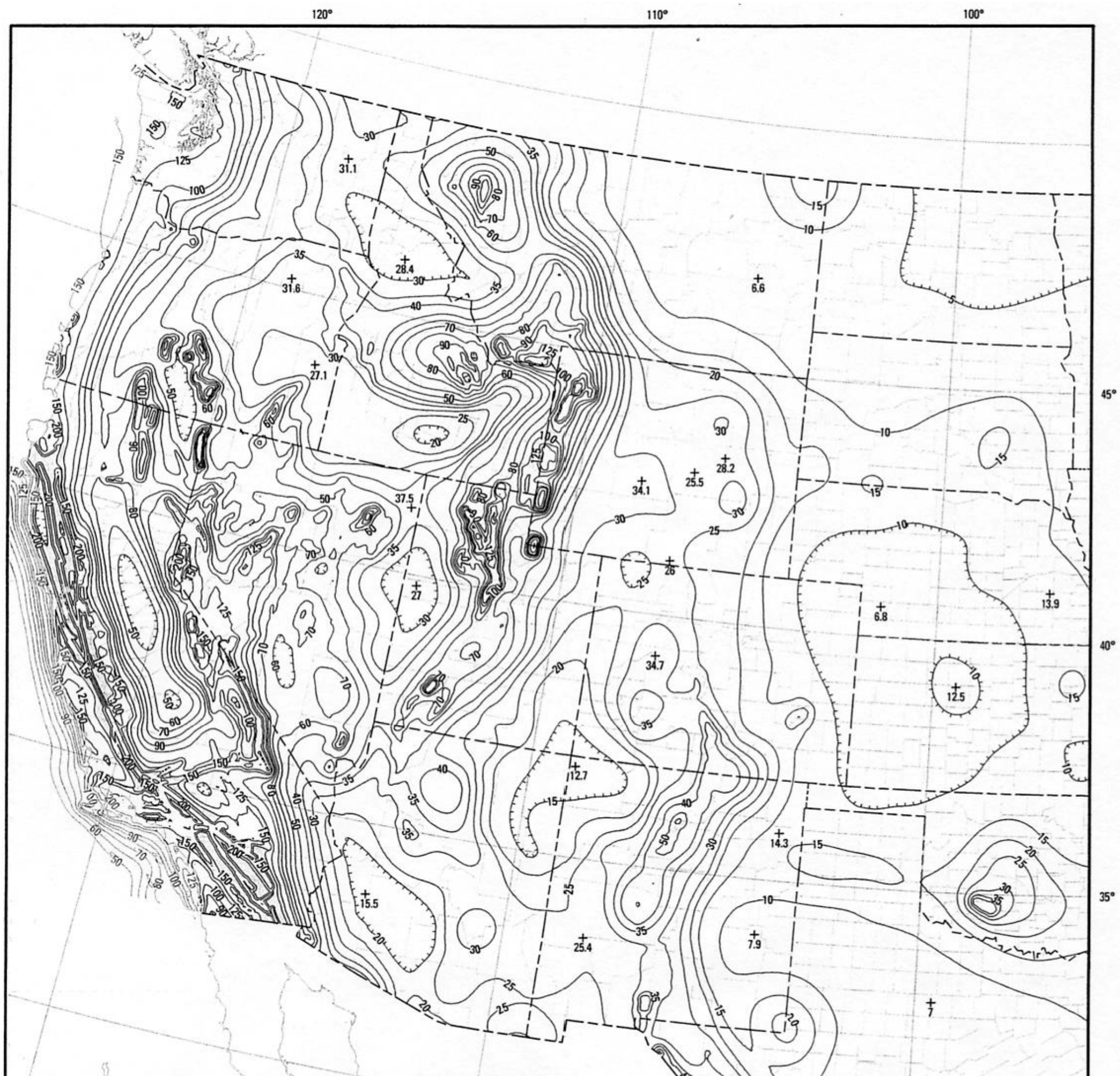
Modify the proposal as follows:

1613.2 Definitions. The following words and terms shall, for the purposes of this section, have the meanings shown herein.

MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE$_R$). The most severe earthquake effects considered by this code.

(No changes to definitions not shown)

1613.5.1 Mapped Acceleration Parameters. The parameters S_S and S_1 shall be determined from the 0.2 and 1 s spectral response accelerations shown on Figures 1613.5(1) ~~and 1613.5(2)~~ through 1613.5(6). Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned to Seismic Design Category A.



DISCUSSION

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE). The basis is explained in commentaries prepared by BSSC and ASCE and in the references.

Ground motion values contoured on these maps incorporate:

- a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility
- a factor of 1.1 to adjust from a geometric mean to the maximum response regardless of direction
- deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% g.

As such, the values are different from those on the uniform-hazard 2008 USGS National Seismic Hazard Maps posted at http://earthquake.usgs.gov/hazmaps.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/designmaps or http://content.seinstitute.org) be used to determine the mapped value for a specified location.

REFERENCES

Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

Luco, Nicolas, Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

Petersen, M.D., Frankel, A.D., Harmsen, S.C., Mueller, C.S., Haller, K.M., Wheeler, R.L., Wesson, R.L., Zeng, Yuehua, Boyd, O.S., Perkins, D.M., Luco, Nicolas, Field, E.H., Wills, C.J., and Rukstales, K.S., 2008, Documentation for the 2008 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2008-1128, 61 p.

FIGURE 1613.5(1) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE$_R$) FOR THE CONTERMINOUS UNITED STATES OF 0.2 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

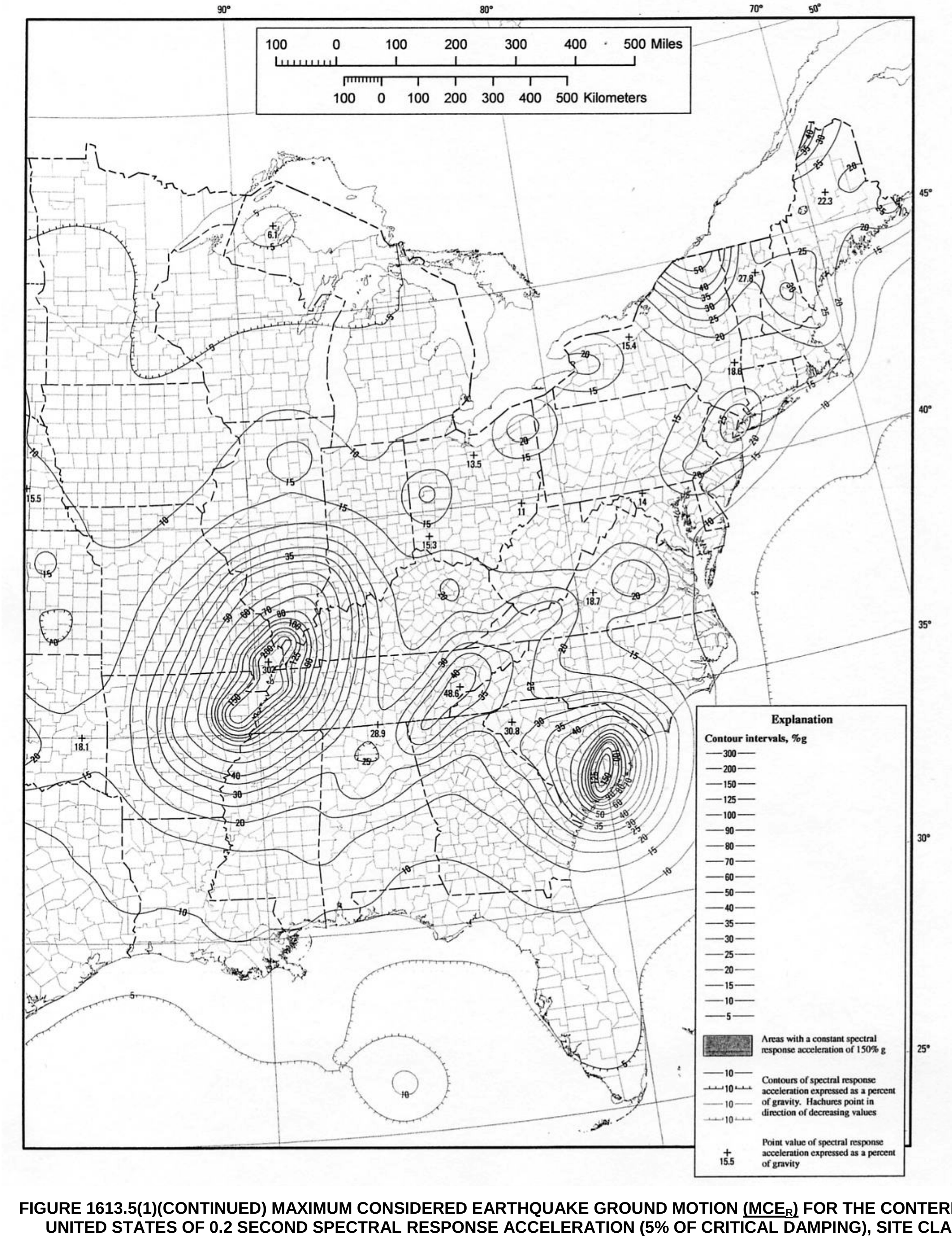


FIGURE 1613.5(1)(CONTINUED) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE$_R$) FOR THE CONTERMINOUS UNITED STATES OF 0.2 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

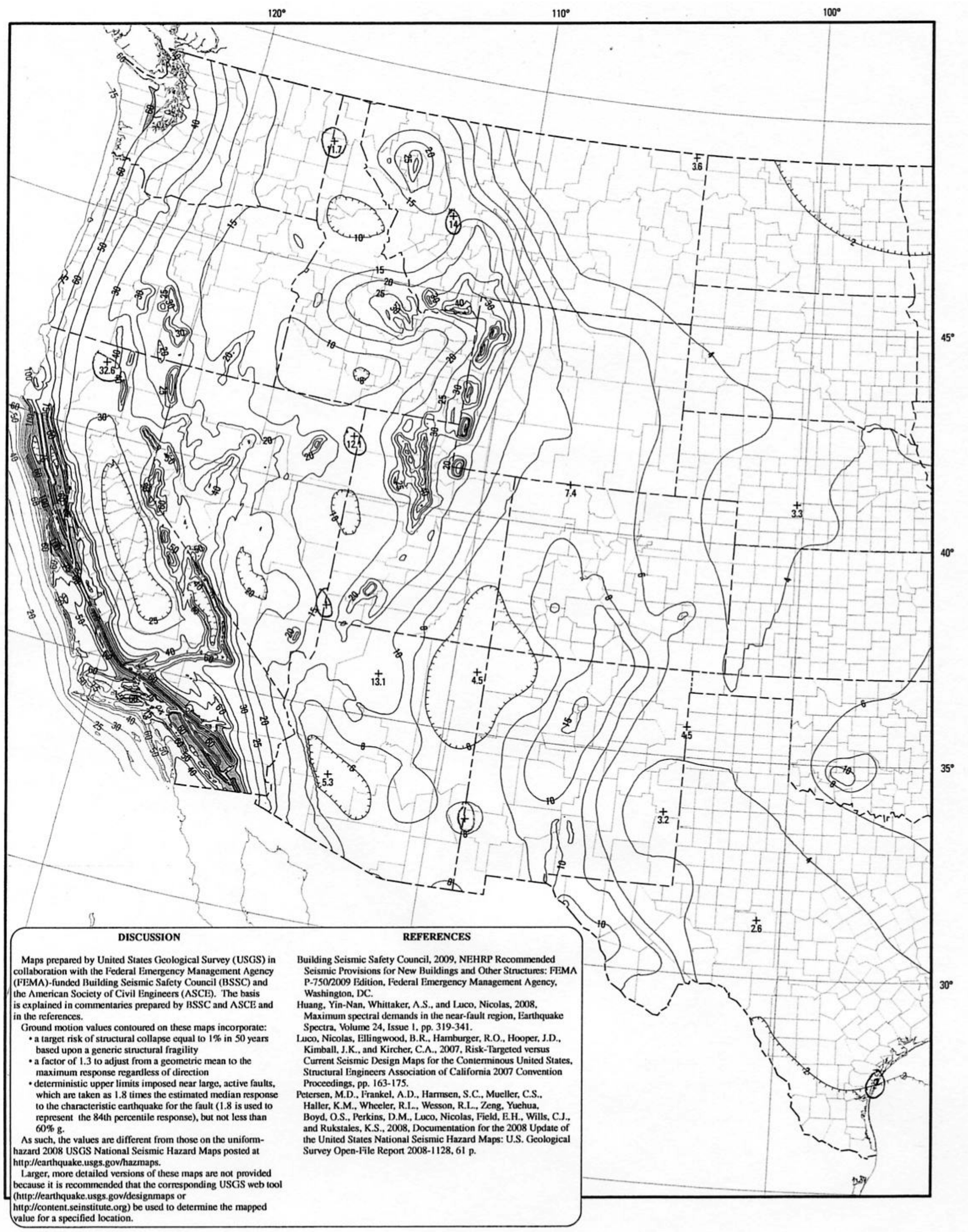


FIGURE 1613.5(2) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE$_R$) FOR THE CONTERMINOUS UNITED STATES OF 1 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

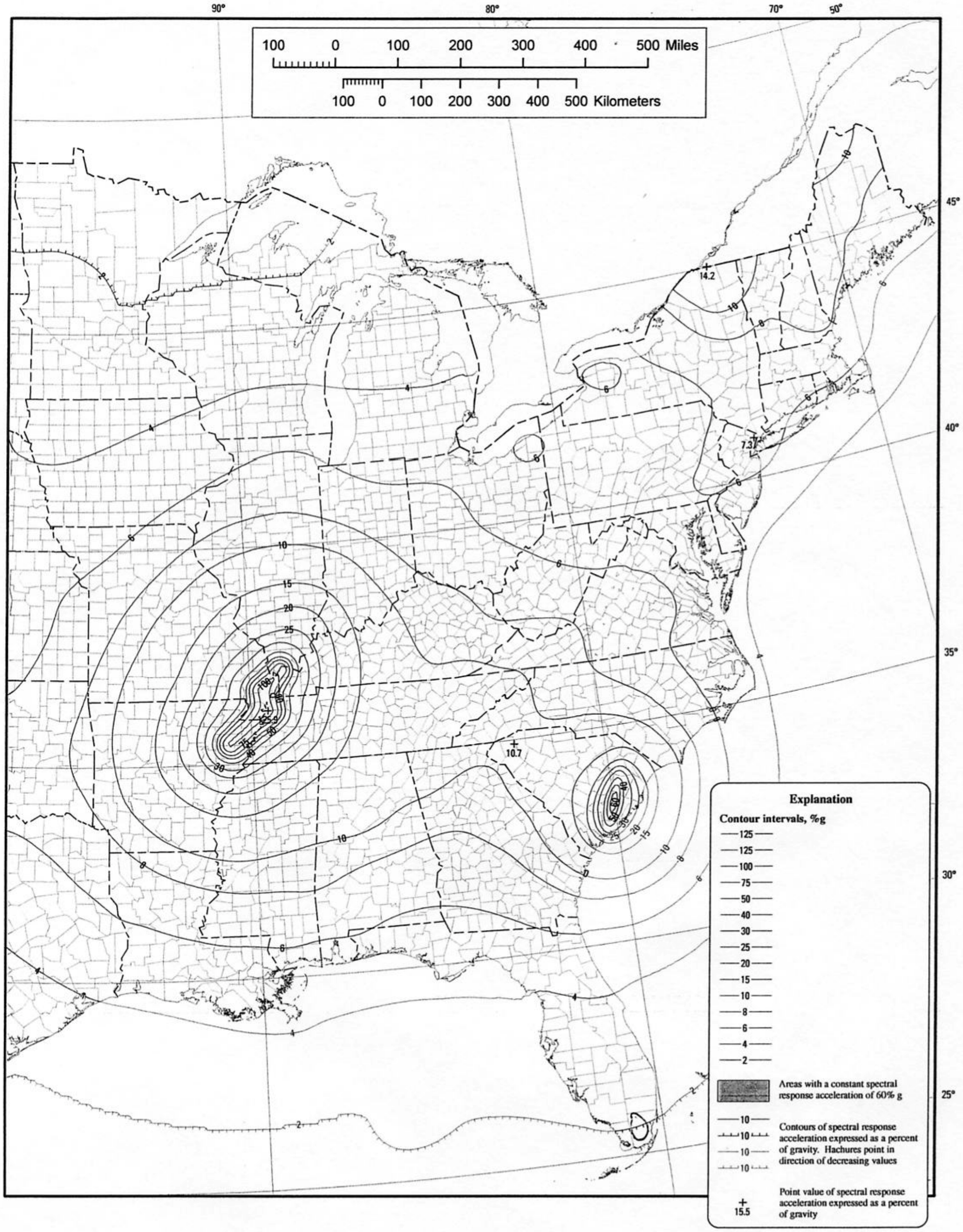
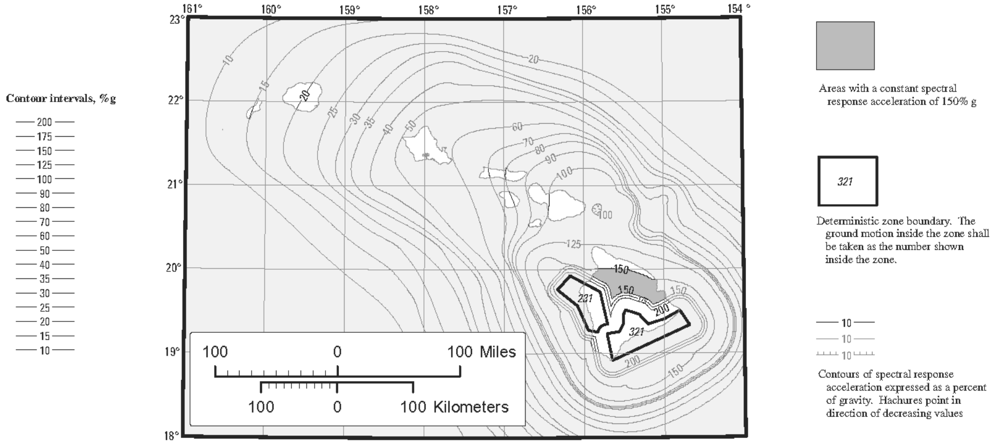
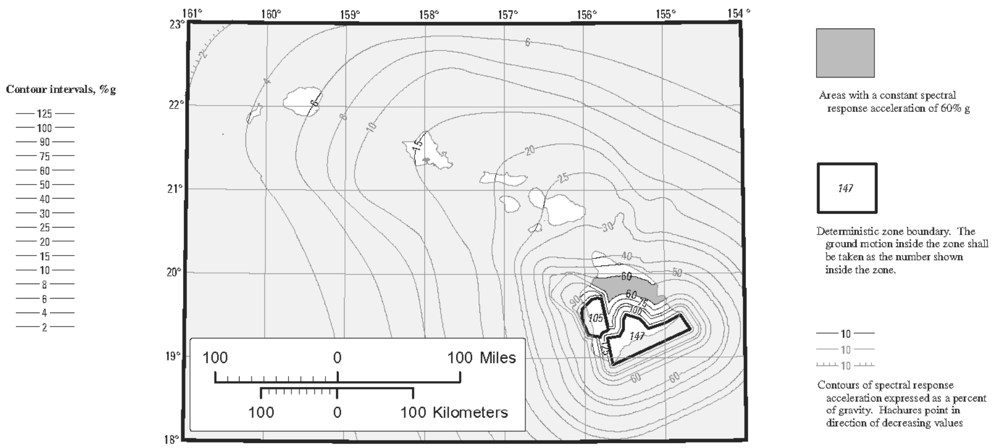


FIGURE 1613.5(2)(CONTINUED) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE$_R$) FOR THE CONTERMINOUS UNITED STATES OF 1 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



0.2 Second Spectral Response Acceleration (5% of Criitcal Damping)



1.0 Second Spectral Response Acceleration (5% of Criitcal Damping)

DISCUSSION

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE). The basis is explained in commentaries prepared by BSSC and ASCE and in the references given below.

Ground motion values contoured on these maps incorporate:

- a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility
- deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150 and 60% g for 0.2 and 1.0 sec, respectively.

As such, the values are different from those on the uniform-hazard 1998 USGS National Seismic Hazard Maps for Hawaii posted at http://earthquake.usgs.gov/hazmaps.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/designmaps or http://content.seinstitute.org) be used to determine the mapped value for a specified location.

REFERENCES

Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

Klein, F., Frankel, A.D., Mueller, C.S., Wesson, R.L., and Okubo, P., 2001, Seismic hazard in Hawaii: high rate of large earthquakes and probabilistic ground-motion maps, Bulletin of the Seismological Society of America, Volume 91, pp. 479-498.

Luco, Nicolas, Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

FIGURE 1613.5(3) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE_R) FOR HAWAII OF 0.2 AND 1 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

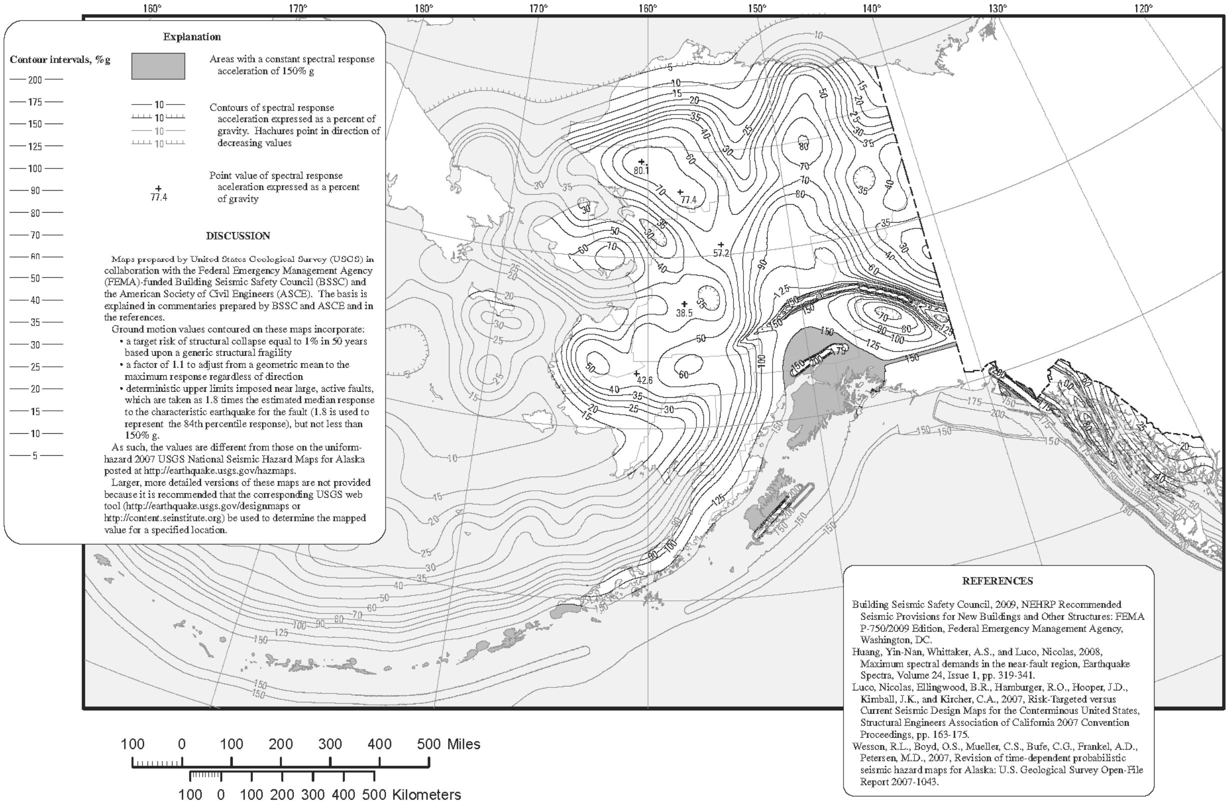


FIGURE 1613.5(4) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE_R) FOR ALASKA OF 0.2 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

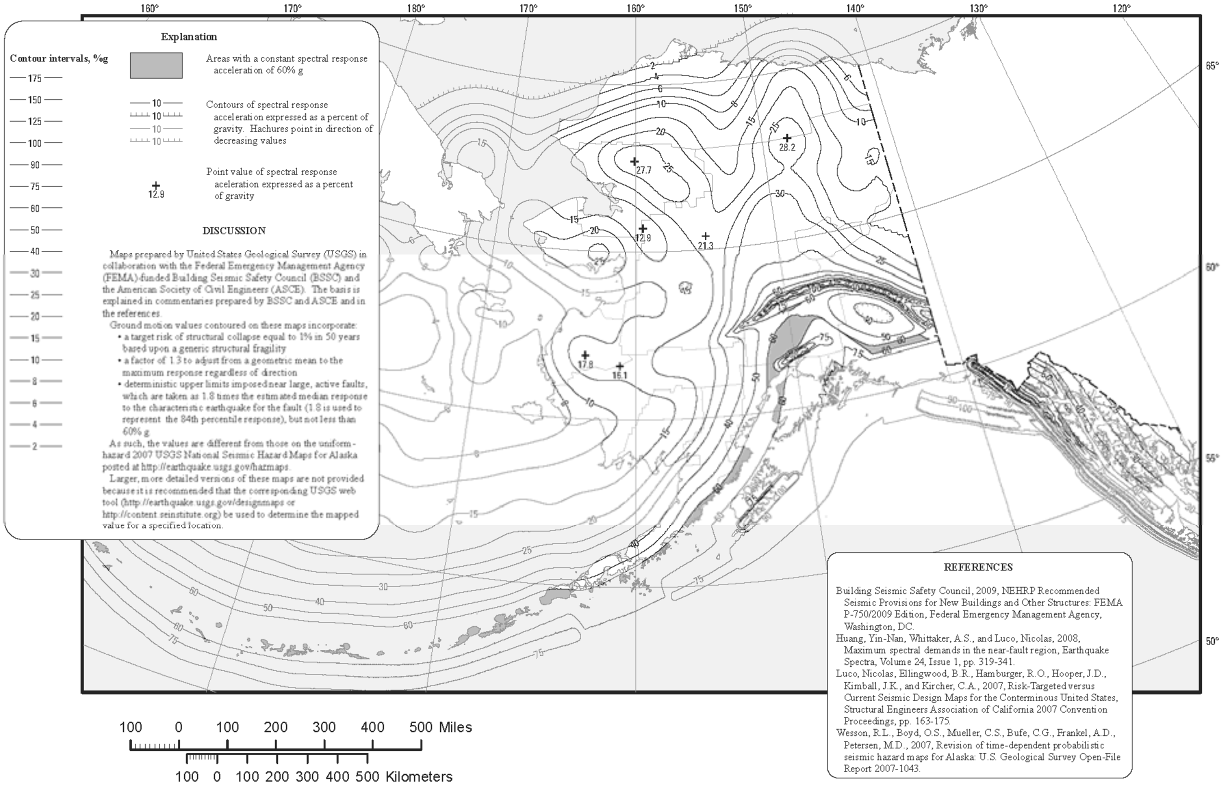
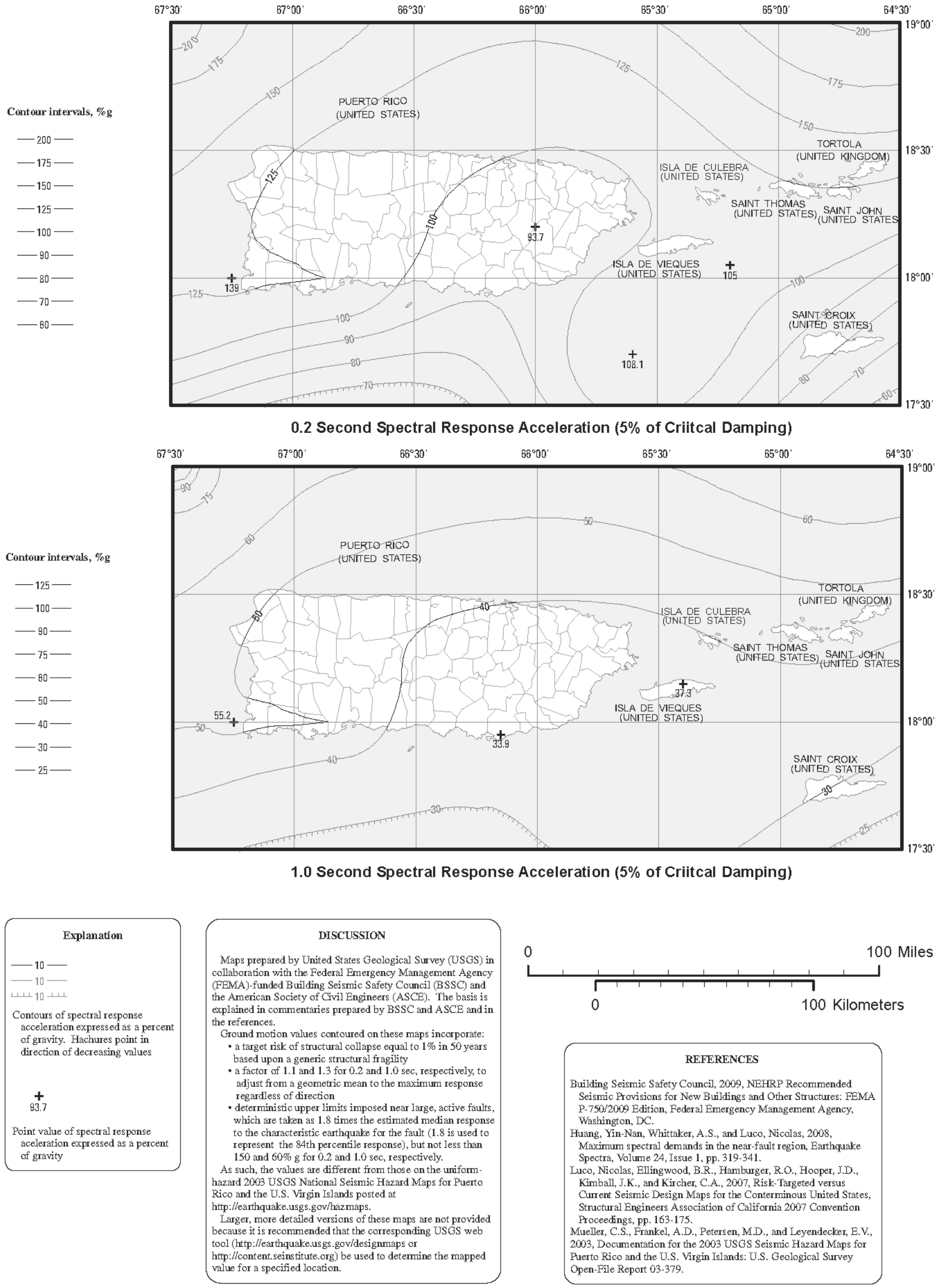


FIGURE 1613.5(5) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE_R) FOR ALASKA OF 1.0 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



ıure 22-6 Maximum Considered Earth Ground Motion (MCE_R) for Puerto Rico, Culebra, Vieques, St. Thomas, St. John and St. Croix

FIGURE 1613.5(6) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION (MCE_R) FOR PUERTO RICO, CULEBRA, VIEQUES, ST. THOMAS, ST. JOHN AND ST. CROIX OF 0.2 AND 1 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

Committee Reason: This proposal incorporates the latest USGS ground motion maps. The modification updates the map titles and provides reformatted versions of the maps with no technical changes. It also separates areas outside the conterminous United States, on individual maps.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Steven Winkel, FAIA, PE, and Kelly Cobeen, PE, SE, representing the Federal Emergency Management Agency/Building Seismic Safety Council Code Resource Support Committee (FEMA/BSSC CRSC) and James Rossberg, PE, representing the American Society of Civil Engineers (ASCE),request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1613.2 Definitions. The following words and terms shall, for the purposes of this section, have the meanings shown herein.

RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R). GROUND MOTION ~~(MCE_R).~~ RESPONSE ACCELERATIONS The most severe earthquake effects considered by this code, determined for the orientation that results in the largest maximum response to horizontal ground motions and, with adjustment for targeted risk.

(No changes to definitions not shown)

FIGURE 1613.5(1)
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS ~~(MCE_R)~~ FOR THE CONTERMINOUS UNITED STATES OF 0.2 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

FIGURE 1613.5(2)
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS ~~(MCE_R)~~ FOR THE CONTERMINOUS UNITED STATES OF 1 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

FIGURE 1613.5(3)
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS ~~(MCE_R)~~ FOR HAWAII OF 0.2 AND 1 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

FIGURE 1613.5(4)
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS ~~(MCE_R)~~ FOR ALASKA OF 0.2 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

FIGURE 1613.5(5)
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS ~~(MCE_R)~~ FOR ALASKA OF 1.0 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

FIGURE 1613.5(6)
RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS ~~(MCE_R)~~ FOR PUERTO RICO, CULEBRA, VIEQUES, ST. THOMAS, ST. JOHN AND ST. CROIX OF 0.2 AND 1 SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

(Portions of proposal not shown remain unchanged)

Commenter's Reason: In the original submittal, the reason stated that this code change would be modified if required to correlate with modifications to the maps being adopted into ASCE 7. This modification changes the map titles and definition to coordinate with ASCE 7 wording. This change is editorial; there is no technical change.

Public Comment 2:

James Bela, Oregon Earthquake Awareness, requests Disapproval.

Commenter's Reason: The Commenter asks DISAPPROVAL, because the proposals [Part I- IBC STRUCTURAL; PART II- IRC B/E] were:

(a) neither adequately nor correctly justified by the committee, but were let-in without a proper checking of their content and credentials, *simply* because they were "the latest USGS ground motion maps."

(b) inclusive of *changes* in Mapped Spectral Response Acceleration contour values from previous code editions that were *not* specifically made clear (along with the impact of those changes on seismic design parameters).

(c) inclusive of changes resulting from applying Next Generation Attenuation (NGA) relationships that reduced design spectral response acceleration by up to 25% in some earthquake prone regions of the country, despite a clear lack of consensus for this change from the USGS Ground Motion Mapping Workshop participants.

(d) inclusive of a so-called "target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility" that is arbitrary, ambiguous and a major departure from all previous codes. This is particularly "dangerous" to public safety (because the specified target risk is the same probability as considered for the May 2008 Wenchuan Earthquake in China—where that earthquake *disproved* all the assumptions underlying the formulation of the USGS Seismic Hazard Maps (and killed more than 80,000 people); and

(e) introduces a new term $\underline{MCE_R}$ as a "MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION" – that is anything but an earthquake ground motion! This will introduce unnecessary confusion and complication into the code--in particular, problems in relating to earlier code editions for continuity.

The USGS Seismic Hazard Maps have been, and continue to be, too *unstable* as a basis for seismic design. We are introducing "yo-yo" tectonics into the seismic design codes, such that there is no longer *continuity* in our system of what to do to keep the earthquakes from attacking you! Engineers cannot develop experience and hone valuable judgement skills, if the code continues to be a moving target.

For the wholesale changes proposed here (where seismic hazard has become whatever input parameters people can come up with . . . from NGA, GPS strain monitoring, new faults and so-called slip rates, Risk mumbo-jumbo, generic fragility curves); the new spectral response acceleration maps should have first been produced in the same manner as the previous code editions - then a comparison of results could have been made with proposed applications of the new map. This is necessary for a *reality check* as to the reasonableness of adopting something "new" for "newness" sake, where it might weaken or reduce long accepted minimum standards for protecting the public safety.

These new maps should have provided a city-by-city comparison of old map design values with the "latest" to be considered values. Otherwise, there is no telling how the public safety is being impacted. *Documentation of the discussions, votes taken, and specific explanations and justifications for these changes should have been provided to the committee and to the public*. A code change proponent must be held accountable to justify these changes (and also clearly define these same) to the committee from which approval is sought. Giving a weblink to a telephone book of information is unacceptable for a public process.

These "latest" maps are unsafe at any parameter, because they are not anchored to a stable earthquake design methodology. The only stable basis for earthquake design provisions that truly protect publics safety is to link them to a consideration of the maximum potential earthquake size (or Magnitude) from a specific fault. For example, earthquake design within 15 miles of a M 6 active fault, and within 25 miles of a M 7 or greater active faults should incorporate design provisions against that eventuality, regardless of complex methodologies of applied mathematics (to calculate earthquake probabilities and risk). These methods entice our code provisions to sink ever lower, because they too often *perceive* the likelihood of an earthquake to be too rare to be taken seriously.

Final Action: AS AM AMPC____ D

S97-09/10-PART II

IRC Figure R301.2(2)

Proposed Change as Submitted

Proponent: Steven Winkel, FAIA, PE, Kelly Cobeen, PE, SE, and J. Daniel Dolan, PhD, PE, Building Seismic Safety Council (BSSC) of the National Institute of Building Sciences, representing the Federal Emergency Management Agency/BSSC Code Resource Support Committee

PART II – IRC BUILDING/ENERGY

Delete Figure R301.2(2) and substitute as follows:

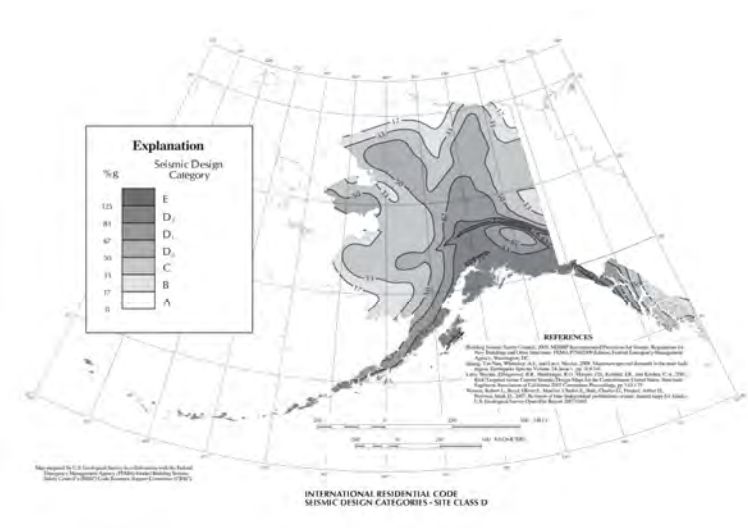
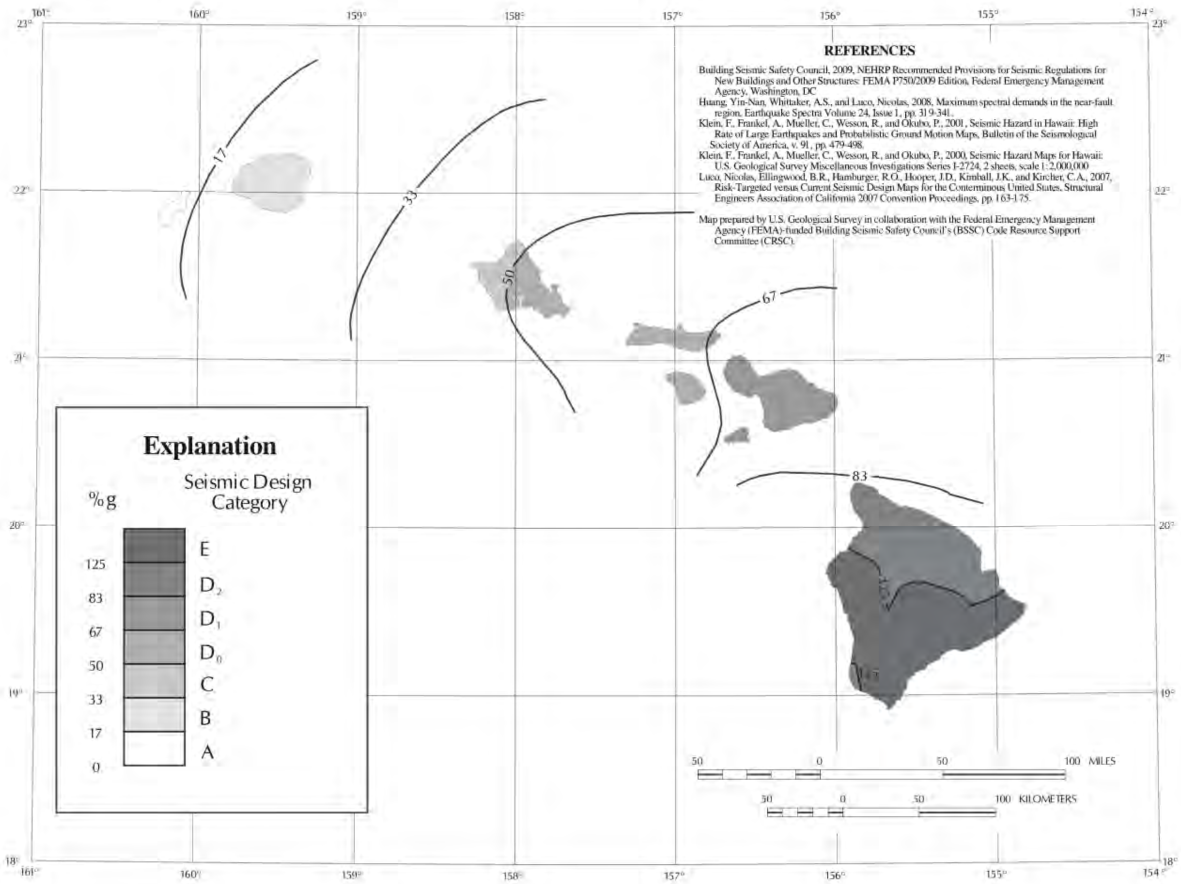


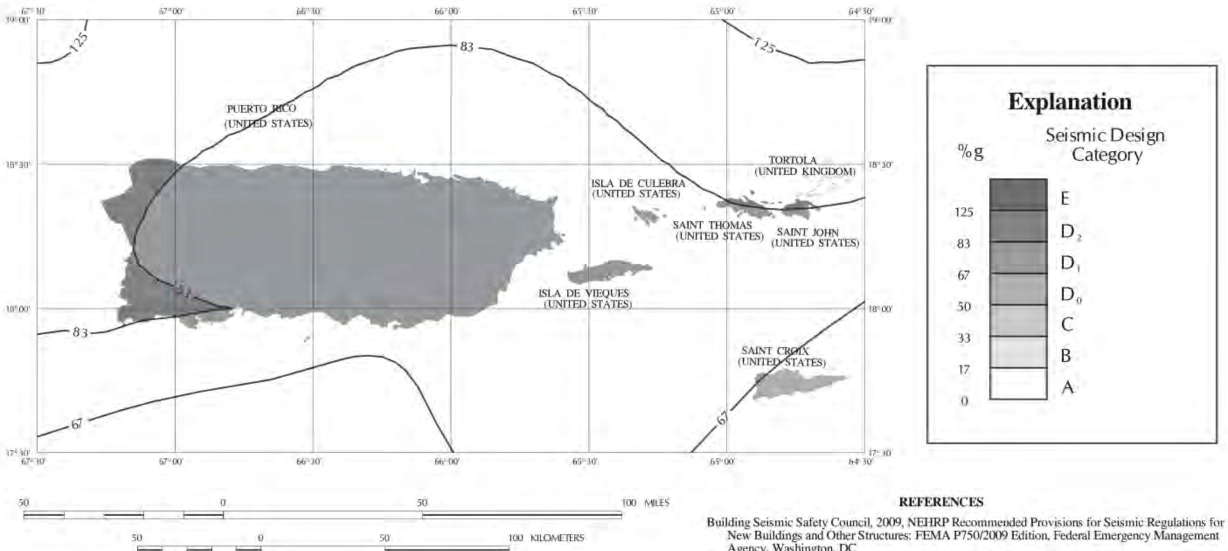
FIGURE R301.2(2)
SEISMIC DESIGN CATEGORIES -- SITE CLASS D

FIGURE R301.2(2) -- continued



INTERNATIONAL RESIDENTIAL CODE
SEISMIC DESIGN CATEGORIES - SITE CLASS D

SEISMIC DESIGN CATEGORIES -- SITE CLASS D



REFERENCES

Building Seismic Safety Council, 2009, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures: FEMA P750/2009 Edition, Federal Emergency Management Agency, Washington, DC

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra Volume 24, Issue 1, pp. 319-341.

Luco, Nicolas, Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

Mueller, C., Frankel, A., Petersen, M., and Leyendecker, E., 2003, Documentation for 2003 USGS Seismic Hazard Maps for Puerto Rico and the U.S. Virgin Islands, U.S. Geological Survey Open-File Report 03-379.

Map prepared by U.S. Geological Survey in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council's (BSSC) Code Resource Support Committee (CRSC).

INTERNATIONAL RESIDENTIAL CODE
SEISMIC DESIGN CATEGORIES - SITE CLASS D

FIGURE R301.2(2) -- continued
SEISMIC DESIGN CATEGORIES -- SITE CLASS D

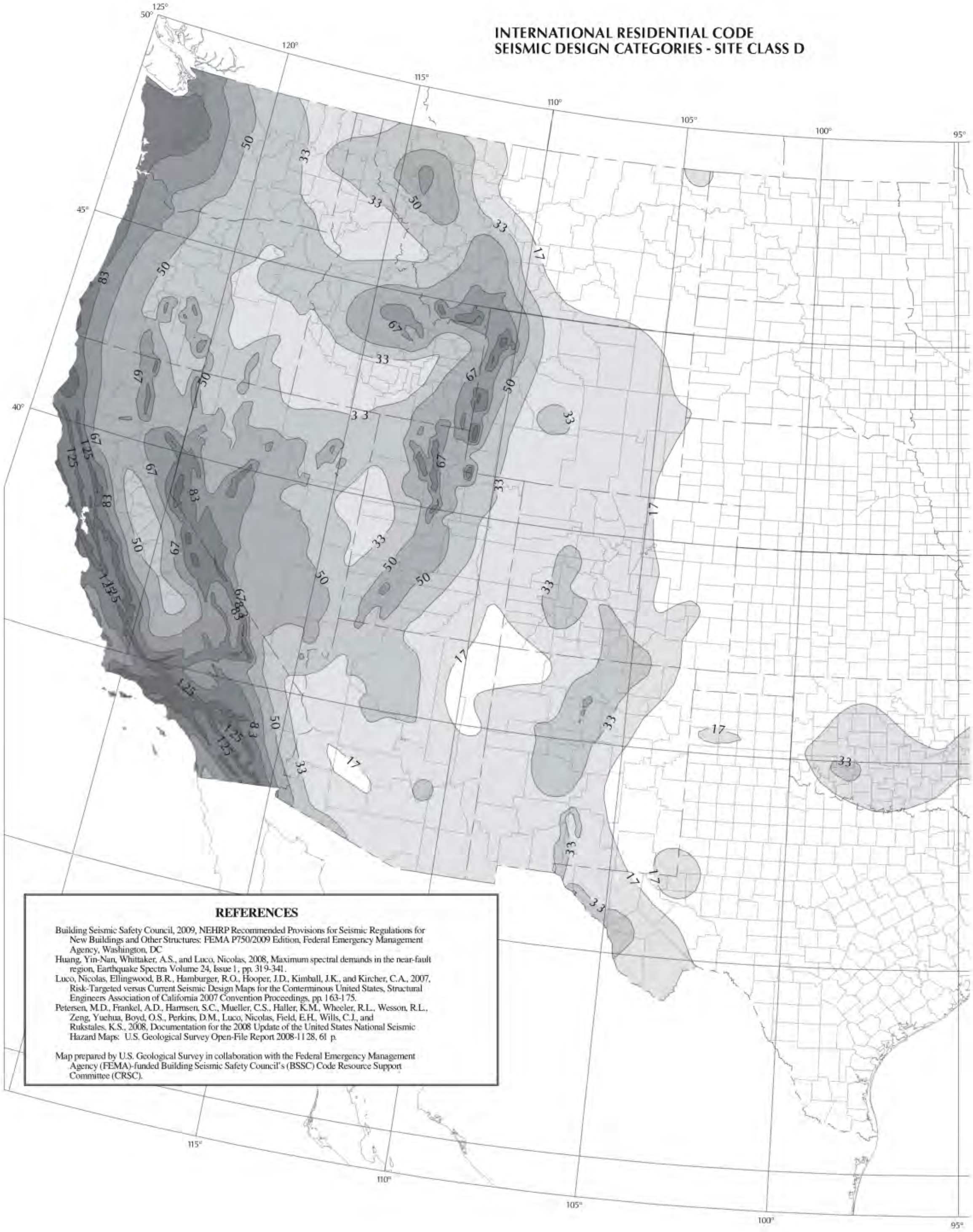


FIGURE R301.2(2) -- continued
SEISMIC DESIGN CATEGORIES -- SITE CLASS D

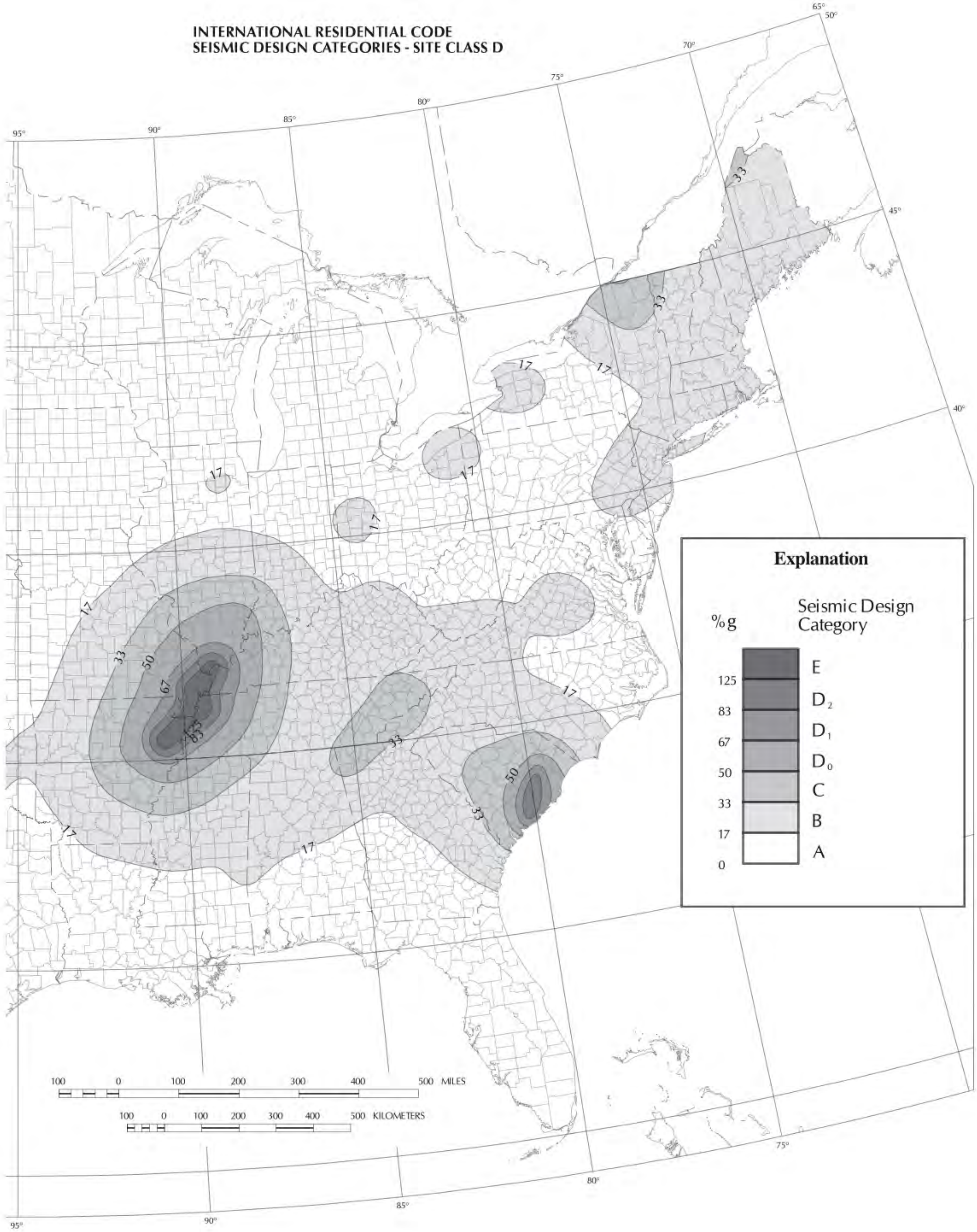


FIGURE R301.2(2) -- continued
SEISMIC DESIGN CATEGORIES -- SITE CLASS D

Reason: This proposal reflects new seismic hazard data developed by the U.S. Geological Survey (USGS) as part of its National Seismic Hazard Mapping Project and related technical changes developed by the Building Seismic Safety Council's (BSSC) Seismic Design Procedures Reassessment Group (SDPRG) as part of its work for the Federal Emergency Management Agency (FEMA).

The USGS and the FEMA-funded SDPRG worked together to update the seismic design maps and procedures for the 2009 edition of the NEHRP (National Earthquake Hazards Reduction Program) Recommended Seismic Provisions for New Building and Other Structures. The products of this collaboration are new design maps that appear in the 2009 *Provisions* and a similar version that is proposed for inclusion in ASCE 7-10. Although the terminology used in the *Provisions* is slightly different from that proposed for ASCE 7-10, the substance of the mapping changes is the same for both. The new design maps are based on USGS updates to their seismic hazard data and ground motion attenuation formulas as well as the SDPRG's use of risk-targeted ground motions, maximum direction ground motions, and near-source 84th percentile ground motions.

Code updates to the seismic maps and seismic resistant design requirements normally are drawn from ASCE 7 (*Minimum Design Loads for Buildings and Other Structures*) which is, in turn, based on the *NEHRP Recommended Provisions*. This proposal reflects material developed under the 2009 *NEHRP Recommended Provisions* as presented in the current draft proposal for ASCE 7-10. The ICC code change submittal schedule makes it necessary to submit this working version with the understanding that it will be updated to the extent possible to reflect any modifications made by ASCE 7. Note that the maps included in this proposal are based on the maps proposed for inclusion in the IBC. If this code change is not moved forward, the IRC will retain superseded seismic hazard mapping information, thereby potentially being in conflict with the IBC.

These new IRC maps are different from earlier versions in that the division between Seismic Design Categories D2 and E has been changed from 118% g to 125% g. The 125% g contour would have been used in earlier maps but the mapping technology then available for drawing the IRC maps did not permit this to be done. The result of this change and the improved seismic hazard data generated by the USGS over the past 10 years is that the geographic region affected by the Seismic Design Category E designation is smaller. This occurs primarily in the region around Charleston, South Carolina, but is also evident in Seismic Design Category E regions in other parts of the United States. As noted above, maps developed on the same basis have been proposed for the IBC which will allow engineers to design components of the building that are outside of the scope of the IRC with compatible seismic loads.

Cost Impact: This proposal will not increase the cost of construction and will reduce the cost in some regions.

ICCFILENAME: WINKEL-COBEEN-S2-1613.5.1

Public Hearing Results

PART II- IRC B/E
Committee Action: **Approved as Submitted**

Committee Reason: This change brings the latest and improved Seismic Maps into the code. This will correlate the maps with the IBC and ASCE 7-10. One benefit of the new map is that some Seismic Design Category E regions will be smaller in area. This will result in some previous Seismic Design Category E structures to now be Seismic Design Category D structures.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Bela, Oregon Earthquake Awareness, requests Disapproval.

Commenter's Reason: See S97-09/10-Part I

Final Action: AS AM AMPC____ D

S108-09/10

1613.8 (New), Appendix L (New)

Proposed Change as Submitted

Proponent: Robert E. Bachman, SE, Robert E Bachman Consulting Structural Engineers, representing The Consortium of Organizations for Strong-Motion Observation Systems

Add new text as follows:

1613.8 Earthquake-recording instrumentations. For earthquake-recording instrumentations, see Appendix L.

APPENDIX L

EARTHQUAKE RECORDING INSTRUMENTATIONS

SECTION L101
GENERAL

L101.1 General. Every building located where the 1-second spectral response acceleration, S_1, in accordance with Section 1613.5 is greater than 0.40 that either 1) exceeds six stories above grade plane with an aggregate floor area of 60,000 square feet (5574 m^2) or more, or 2) exceeds 10 stories above grade plane regardless of floor area, shall be provided with not less than three approved recording accelerographs.

The accelerographs shall be interconnected for common start and common timing.

L 101.2 Location. As a minimum, instruments shall be located at the lowest level, midheight, and near the top of the building. Each instrument shall be located so that access is maintained at all times and is unobstructed by room contents. A sign stating MAINTAIN CLEAR ACCESS TO THIS INSTRUMENT shall be posted in a conspicuous location.

L 101.3 Maintenance. Maintenance and service of the instrumentation shall be provided by the owner of the building, subject to the approval of the building official. Data produced by the instrument shall be made available to the building official on request.

Reason: Earthquake Recording Instrumentation measurements provide fundamental information needed to cost effectively improve the seismic performance of buildings. The wording of the added Section is taken from Section 1652 and Appendix Chapter 16, Division II of the 1997 UBC. When the IBC was created, this section was apparently inadvertently not included. The code change proposal is intended to correct this oversight. The proposed change only covers instrumentation in newly constructed buildings. This proposal was submitted in the last cycle as a mandatory requirement in Chapter 1613. The Structural Committee suggested it be resubmitted as a non-mandatory Appendix during this cycle.

Cost Impact: Because this is an optional Appendix, this change will only have a cost impact in Jurisdictions in which it is adopted. In Jurisdictions where it is adopted, the cost impact will depend on whether similar ordinances are already in place. If ordinances are already in place, the cost impact will be negligible. For jurisdictions that adopt where ordinances are not in place, the cost impact, would be very small (less than 0.1% of the cost of the new construction) and only apply to very few structures in the high areas of seismic activity.

ICCFILENAME: Bachman-S1-1613.8-App L

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

~~**1613.8 Earthquake-Recording Instrumentations.** For earthquake-recording instrumentations, see Appendix L.~~

L101.1 General. Every structure ~~building~~ located where the 1-second spectral response acceleration, S_1, in accordance with Section 1613.5 is greater than 0.40 that either 1) exceeds six stories in height ~~above grade plane~~ with an aggregate floor area of 60,000 square feet (5574 m^2) or more, or 2) exceeds ten ~~10~~ stories in height ~~above grade plane~~ regardless of floor area, shall be equipped ~~provided~~ with not less than three approved recording accelerographs. The accelerographs shall be interconnected for common start and common timing.

~~The accelerographs shall be interconnected for common start and common timing.~~

L 101.2 Location. As a minimum, instruments shall be located at the lowest level, mid-height, and near the top of the structure ~~building~~. Each instrument shall be located so that access is maintained at all times and is unobstructed by room contents. A sign stating "MAINTAIN CLEAR ACCESS TO THIS INSTRUMENT" in one inch block letters shall be posted in a conspicuous location.

L 101.3 Maintenance. Maintenance and service of the instrumentation shall be provided by the owner of the structure ~~building, subject to the approval of the building official~~. Data produced by the instrument shall be made available to the building official on request.

Maintenance and service of the instruments shall be performed annually by an approved testing agency. The owner shall file with the building official a written report from an approved testing agency certifying that each instrument has been serviced and is in proper working condition. This report shall be submitted when the instruments are installed and annually thereafter. Each instrument shall have affixed to it an externally visible tag specifying the date of the last maintenance or service and the printed name and address of the testing agency.

(Portions of the proposal not shown are unchanged.)

Committee Reason: An appendix chapter on earthquake recording instrumentation is an important addition to the IBC for those jurisdictions that have typically adopted such provisions. The data collected is valuable in understanding how earthquakes affect structures. The modification removes an unnecessary reference to the appendix from Chapter 16. "Building" has been appropriately changed to the more general term, "structure". The reference to the building official's approval was removed from the section on maintenance since this would be difficult to enforce after a certificate of occupancy is issued. Other changes are consistent with similar requirements in the LA City Building Code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Bela, Oregon Earthquake Awareness, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1613.8 Earthquake Recording Instrumentation. For earthquake-recording instrumentations, see Appendix L.

L101.1 General. Every ~~structure~~ building located where the 1-second spectral response acceleration, S_1, in accordance with Section 1613.5 is greater than 0.40, or lies within 15 miles distance of an active fault with a maximum potential earthquake M 6 or above, or lies within 25 miles distance of an active fault with a maximum potential earthquake M 7 or above; and that either 1) exceeds six stories in height with an aggregate floor area of 60,000 square feet (5574 m^2) or more, or 2) exceeds ten stories in height regardless of floor area, shall be equipped with not less than three approved recording accelerographs. The accelerographs shall be interconnected for common start and common timing.

L 101.2 Location. As a minimum, instruments shall be located at the lowest level, mid-height, and near the top of the ~~structure~~ building. Each instrument shall be located so that access is maintained at all times and is unobstructed by room contents. A sign stating "MAINTAIN CLEAR ACCESS TO THIS INSTRUMENT" in one inch block letters shall be posted in a conspicuous location.

L 101.3 Maintenance. Maintenance and service of the instrumentation shall be provided by the owner of the ~~structure~~ building, subject to the approval of the building official. Data produced by the instrument shall be made available to the building official on request.

Maintenance and service of the instruments shall be performed annually by an approved testing agency. The owner shall file with the building official a written report from an approved testing agency certifying that each instrument has been serviced and is in proper working condition. This report shall be submitted when the instruments are installed and annually thereafter. Each instrument shall have affixed to it an externally visible tag specifying the date of the last maintenance or service and the printed name and address of the testing agency.

(Portions of the proposal not shown are unchanged)

Commenter's Reason: The 1-second spectral response acceleration contours are interesting, but their locations are yo-yoing around with each new addition of the maps; so that are not reliable over time. An earthquake will occur on a fault, and it is the proximity of a building to an earthquake source that determines its actual experience to ground shaking in a real earthquake. This additional charging language fills this hole in locations, particularly in the western U.S. where there are active faults; but the sum total of all contributing faults is not enough to give 1-second contours of 0.40g.

The term building is as used in the city of Los Angeles strong motion accelerograph language. We have building officials, building codes, building permits, building maintenance, Building Owners and Managers Associations . . . so everyone is pretty clear what a "building" actually is. Maybe, for example, an airplane hangar is more of a structure, than it is a building?

Final Action: AS AM AMPC____ D

S111-09/10
1702.1

Proposed Change as Submitted

Proponent: Philip Brazil, PE, SE, Reid Middleton, Inc., representing self

Revise as follows:

1702.1 General. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

SPECIAL INSPECTION, CONTINUOUS. The ~~full-time~~ observation of construction or work requiring special inspection by an approved special inspector who is continuously present in the area when and where the construction or work is being performed.

SPECIAL INSPECTION, PERIODIC. The ~~part-time or intermittent~~ observation of construction or work requiring special inspection by an approved special inspector who is intermittently present in the area when and where the construction or work ~~has been or~~ is being performed ~~and at the completion of the work~~.

Reason: The purpose for this proposal is to adjust the definitions for "continuous special inspection" and "periodic special inspection" for consistency with the requirements for special inspection elsewhere in Chapter 17. These requirements typically specify special inspections as either continuous or periodic. The only means in the IBC for determining what is required of a special inspector to perform continuous or periodic special inspection is their respective definitions in Section 1702.1. The definitions should be such that the special inspector is able to arrive at the site in time to observe the construction or work sufficiently to enable a determination of whether the construction complies with applicable requirements in the building code and its reference standards and is in accordance with the approved construction documents.

The definitions need to account for two primary aspects of special inspection: extent and frequency. Frequency can be seen as the number of times a special inspector inspects; extent can be seen as the degree to which a special inspector inspects. Neither can be comprehensively accounted for in a definition and this proposal does not attempt to do so. However, adjustments to the definitions are proposed to improve their correlation with the extent and frequency assumed for the special inspections where continuous or periodic special inspection is specified.
In both definitions, "construction" is added before "work" for consistency with the same phrase in Section 110.1 on inspections by the building official. Also in both definitions, "when" is added before "where" to indicate that the special inspector is expected be in the area while the work is being performed, not before or after the work is being performed, which is possible with the current definitions.

In the definition of periodic special inspection, "has been" is deleted so that the definition is silent on whether performing special inspections after the construction or work is completed constitutes periodic special inspection. It is conceivable that certain special inspection are possible after completion of the construction or work but this should be agreed upon by all affected parties, including, but not limited to, the owner or owner's representative, contractor, special inspector and the building official. Retaining "has been" in the definition, however, implies that special inspection after the construction or work is completed always constitutes periodic special inspection and there are certain special inspections identified as periodic elsewhere in Chapter 17 for which such inspection may not be sufficient.

Also in the definition of periodic special inspection, "at the completion of work" is deleted. Where periodic special inspection is warranted, whether the special inspector is present "at the completion of work" is irrelevant. An intermittent presence permits time gaps between actions or observations by the special inspector, which includes a period of time between the last action or observation by the special inspector and the completion of the work. Where this is not considered to be a sufficient presence by the special inspector, periodic special inspection is not warranted.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Brazil-S41-1702.1

Public Hearing Results

Committee Action: Disapproved

Committee Reason: There was concern over striking "at the completion of the work" from the definition of periodic special inspection. The proposed revisions should be reconciled with S115 – 09/10

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing self; D. Kirk Harman, P.E., The Harman Group, representing the National Council of Structural Engineers Associations (NCSEA) Code Advisory Committee, Quality Assurance and Special Inspection Subcommittee; Jonathan Siu, P.E., S.E., City of Seattle, Department of Planning and Development, representing self; John Silva, P.E., S.E., Hilti North America, representing self, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1702.1 General. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

SPECIAL INSPECTION. Inspection ~~as herein required of the materials, installation, fabrication, erection or placement of components and connections~~ of construction requiring ~~special~~ the expertise of an *approved* special inspector in order to ensure compliance with this code and the *approved construction documents* ~~and referenced standards (see Section 1704)~~.

~~SPECIAL INSPECTION, CONTINUOUS~~ Continuous special inspection. ~~The observation of construction or work requiring~~ *Special inspection* by ~~an *approved*~~ the special inspector who is continuously present ~~in the area~~ when and where the ~~construction or~~ work to be inspected is being performed.

~~SPECIAL INSPECTION, PERIODIC~~ Periodic special inspection. ~~The observation of construction or work requiring~~ *Special inspection* by ~~an *approved*~~ the special inspector who is intermittently present ~~in the area when and~~ where the ~~construction or~~ work to be inspected has been or is being performed.

Commenter's Reason: The original proposal modified the definitions of "special inspection, continuous" and "special inspection, periodic" but, based on comments at the code development hearings, it was recognized that some of the objectives in submitting the proposal would be better served by also considering the definition of "special inspection," which is being done in this public comment.

The proposed revisions to these definitions recognize that a definition is inherently nonmandatory and can be nothing more than an explanation of the meaning for a word or phrase. One purpose for the revisions in this public comment is so that these definitions provide this explanation.

The proposed revisions also recognize what these definitions can not do and that is to explain the meaning of "inspection." The IBC does not contain a definition of "inspection" deferring to dictionaries for an explanation. Therefore, the definition of "special inspection" should explain what it means for an inspection to be "special" and should not also explain the meaning of "inspection." Also, the definitions of continuous special inspection and periodic special inspection should explain what it means for a special inspection to be "continuous" or "periodic" and should not also explain the meaning of "special inspection."

In the definition of “special inspection,” inspection of the “materials, installation, fabrication, erection or placement of components and connections” is replaced by inspection of “construction” because they are related to the meaning of “inspection,” not to what it means for an inspection to be “special.” A list of this sort is also inappropriate because it is not comprehensive and implies that actions other than those listed are not special inspections.

In the definition of “special inspection,” “special” is deleted before “expertise” because specifying expertise is sufficient to denote the role of the special inspector in the definition of special inspection: provide expertise. If “special” were to remain, it would imply that a special inspector with the expertise to ensure compliance would not be conducting a special inspection unless his or her expertise is “special” and would raise the question of what is necessary for an individual’s expertise to be special in order to qualify as special expertise.

In the definition of “special inspection,” “this code” is added because an essential part of special inspection by a special inspector is compliance with the building code as well as the approved construction documents. There are requirements in the building code relevant to the performance of the special inspector’s duties that may not appear in the approved construction documents.

In the definition of “special inspection,” “and referenced standards (see Section 1704)” is deleted because specifying them is redundant and can lead to conflicts with the building code. According to IBC Section 102.4, referenced standards are a mandatory “part or the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.” Specifying “referenced standards” but not “this code” conflicts with Section 102.4 in that the referenced standards apply rather than the building code where there are conflicts between them and the building code, and the referenced standards apply to their full extent rather than to their prescribed extent.

Adding “approved special inspector” to the definition of “special inspection,” and deleting “approved” from the definitions of continuous special inspection and periodic special inspection is seen as editorial because whether a special inspector is approved is not related to the distinction between “continuous” and “periodic.”

The definitions of “special inspection, continuous” and “special inspection, periodic” are adjusted to be sub-definitions of “special inspection” because the purpose in defining them should be to explain what it means for a special inspection to be “continuous” or “periodic.”

In the sub-definitions of “continuous special inspection” and “periodic special inspection,” deleting “the observation of construction or work” is seen as editorial because it is redundant given the adjustment of the current definitions to be sub-definitions that explain what it means for a special inspection to be “continuous” or “periodic” (see above).

In the sub-definitions, the addition in the original proposal of “construction or” before “work” is removed and “to be inspected” is added after “work” in this public comment to establish the distinction between “inspection of construction” in the definition of special inspection and “work to be inspected” by the special inspector in the sub-definitions. Thus, “special inspection” is a process involving the actions of a special inspector and the continuous special inspection” or “periodic special inspection” are the actions of a special inspector. With the addition of “to be inspected,” the deletion in the original proposal of “and at the completion of work” in the sub-definition of “periodic special inspection,” is now seen as editorial because it is redundant given the obvious assumption that a special inspector will complete the work to be inspected. This is also being done for consistency with similar terminology in Section 1704.1.

In the sub-definitions, deleting “in the area” is seen as editorial because it is redundant given the text explaining that the special inspector is present “where the work to be inspected is being performed.” Obviously, the special inspector is “in the area” when he or she is at “the work to be inspected.”

The deletion in the original proposal of “has been” before “or is being performed” is restored in the sub-definition of “periodic special inspection” to distinguish between periodic special inspection that could be delayed until after material installation but before the materials are covered (e.g., reinforcing steel after installation but before concrete placement), and continuous special inspection that typically can’t be delayed until after material installation (e.g., concrete placement). Also, the addition in the original proposal of “when and” before “where” is removed from the sub-definition of “periodic special inspection” but is retained in the sub-definition of “continuous special inspection” so that “has been” does not conflict with “intermittently present” (avoids “intermittently present when…the work…has been…performed”).

Finally, the original proposal and this public comment were submitted, in part, because of the apparent belief by some individuals that the current definition of continuous special inspection intends inspection by a special inspector who is continuously present the entire time construction requiring special inspection is occurring even to the extent of expecting a special inspector be continuously present to observe the actions of each worker involved in the construction (i.e., 100 welders would require 100 special inspectors). This is not the intent of the definition nor is it the purpose for continuous special inspection, which is intended to provide a level of quality assurance sufficient to ensure that public safety in the built environment is achieved. For any construction project, the extent of special inspection and the frequency of special inspections can not be reliably determined except through an agreement between the owner, contractor, special inspector and the building official before construction begins on the scope of work for the special inspector. Chapter 17 of the International Building Code does not specify extent or frequency except through the definitions of continuous and periodic special inspection and the revisions to the definitions in this public comment will not change that.

Final Action: AS AM AMPC____ D

S113-09/10
1702.1

Proposed Change as Submitted

Proponent: D. Kirk Harman, The Harman Group, representing The National Council of Structural Engineers Associations (NCSEA) Code Advisory Committee, Quality Assurance and Special Inspection Subcommittee

Add new definition as follows:

1702.1 General. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

SPECIAL INSPECTOR. An individual qualified in accordance with Section 1704.1 of this code, employed or retained by the *approved agency* and assigned to execute the *special inspections* or tests required by the statement of special inspections.

Reason: The term Special Inspector is used many times throughout the chapter but is currently not defined. Approved Agency is defined as the entity that provides inspection but the inspections are actually accomplished by the "special inspector". Both should be defined.

Cost Impact: This proposal will not increase the cost of construction.

ICCFILENAME: Harman-S1-1702.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed definition is not needed since Section 1704.1 currently contains this information.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing self; D. Kirk Harman, P.E., The Harman Group, representing the National Council of Structural Engineers Associations (NCSEA) Code Advisory Committee, Quality Assurance and Special Inspection Subcommittee; Jonathan Siu, P.E., S.E., City of Seattle, Department of Planning and Development, representing self; John Silva, P.E., S.E., Hilti North America, representing self, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

SPECIAL INSPECTOR. ~~An individual~~ A qualified ~~in accordance with Section 1704.1 of this code,~~ person employed or retained by ~~the~~ an *approved agency* and ~~assigned to execute the *special inspections* or tests required by the statement of special inspections~~ *approved* by the *building official* as having the competence necessary to inspect a particular type of construction requiring *special inspection*.

1704.1 General. Where application is made for construction as described in this section, the owner or the *registered design professional in responsible charge* acting as the owner's agent shall employ one or more *approved agencies* to perform inspections during construction on the types of work listed under Section 1704. These inspections are in addition to the inspections specified in Section 110.
~~The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the *building official*, for the inspection of the particular type of construction or operation requiring *special inspection*.~~ The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the *approved agency* and their personnel are permitted to act as the special inspector for the work designed by them, provided ~~those personnel meet the qualification requirements of this section to the satisfaction of the *building official*~~ they qualify as *special inspectors*.
The special inspector shall provide written documentation to the building official demonstrating his or her competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of *special inspection* activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

Exceptions:

1. *Special inspections* are not required for ~~work~~ construction of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. *Special inspections* are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
3. Unless otherwise required by the *building official*, *special inspections* are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.

Commenter's Reason: This public comment addresses the concern of the Committee that the definition is not needed because Section 1704.1 currently contains the information in the proposed definition. The text from Section 1704.1 that is replaced by the definition is deleted. The definition is also revised to be consistent with the text in Section 1704.1 that it replaces. In addition, "work" is changed to "construction" in Exception #1 of Section 1704.1 for consistency with the public comment on Proposal S111-09/10, which distinguishes between "inspection of construction" in the definition of special inspection and "work to be inspected" by the special inspector in the sub-definitions of "continuous special inspection" and "periodic special inspection."

Note that the first paragraph of Section 1704.1 currently requires the owner, or the registered design professional in responsible charge acting as the owner's agent, to employ one or more approved agencies, not special inspectors, to perform the necessary special inspections; and the second paragraph of Section 1704.1 requires the special inspector to "demonstrate competence, to the satisfaction of the building official, for the inspection of the particular type of construction or operation requiring special inspection." This proposal defines a "special inspector" as "employed or retained by an approved agency" for consistency with the first paragraph of Section 1704.1 and also as "approved by the building official as having the competence necessary to inspect a particular type of construction requiring special inspection" for consistency with the second paragraph of Section 1704.1.

Final Action: AS AM AMPC____ D

S118-09/10
1704.1

Proposed Change as Submitted

Proponent: Gary J. Ehrlich, PE, representing National Association of Home Builders

Revise as follows:

1704.1 General. Where application is made for construction as described in this section, the owner or the *registered design professional in responsible charge* acting as the owner's agent shall employ one or more *approved agencies* to perform inspections during construction on the types of work listed under Section 1704. These inspections are in addition to the inspections identified in Section 110.

The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the *building official*, for the inspection of the particular type of construction or operation requiring *special inspection*. The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the *approved agency* and their personnel are permitted to act as the special inspector for the work designed by them, provided those personnel meet the qualification requirements of this section to the satisfaction of the *building official*. The special inspector shall provide written documentation to the building official demonstrating their competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of *special inspection* activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

Exceptions:

1. *Special inspections* are not required for work of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. *Special inspections* are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
3. Unless otherwise required by the *building official*, *special inspections* are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.
4. Special inspections are not required for portions of structures designed and constructed in accordance with the conventional light-frame construction provisions of Section 2308.

Reason: The purpose of this proposal is to add an exemption from third-party special inspections for portions of wood-frame dwellings or other simple wood-frame structures constructed under prescriptive provisions within the International Building Code (IBC). Without this exception, a building official may require a builder to contract with a third-party inspector, with the expense passed on to the homeowner.

A change made to the IBC during the 2006-07 Code Development Cycle (S31-06/07) struck the exemption for Residential R-3 structures, and now subjects one- and two-family dwellings and townhouses designed under the IBC to the requirements for special inspections. These inspections are in addition to the standard inspections performed by the building department. Also, other structures classified as R-3 occupancies (group homes, day care) will be subject to these special inspections for all elements of their construction. As justification for the original code change, the proponent claimed R 3 structures often contain complicated roof truss systems, structural steel framing, reinforced masonry and other complex elements or unusual construction materials and methods requiring the qualifications and experience of a special inspector.

But, IBC Section 1704.1.1 exempts the registered design professional from needing to prepare, and the permit applicant from needing to submit, a statement of special inspections for structures designed and constructed per Section 2308. This clearly implies that structures built under Section 2308 do not need special inspections for any element, including the wood wall framing, roof and floor trusses, concrete or masonry foundations, and any miscellaneous masonry or steel framing inside the structure. In a structure designed to the conventional construction provisions, these elements are not likely to be as complex as those in a fully-engineered structure.

Building departments are more than capable of reviewing and inspecting these simple structures. In the case of items such as trusses and miscellaneous steel framing that may occur in a structure otherwise designed using conventional construction provisions, shop drawings will be submitted to the building official for their review and use in inspections. The building department does not need a special inspector to do their work for them in reviewing and inspecting these structures and elements.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: Ehrlich-S1-1704 1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The wording of the proposed exception in Section 1704.1 is potentially confusing, specifically the reference to "portions of structures". Furthermore, the reference solely to section 2308 would be too narrow since it would not include other types of light-frame construction.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, PE, National Association of Home Builders; Bonnie Manley, PE, AISI, representing Steel Framing Alliance; Larry Wainright, Qualtim, Inc., representing Structural Building Components Association (SBCA); Philip Brazil, PE, SE, Reid Middleton, Inc., representing self, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.1 General. Where application is made for construction as described in this section, the owner or the *registered design professional in responsible charge* acting as the owner's agent shall employ one or more *approved agencies* to perform inspections during construction on the types of work listed under Section 1704. These inspections are in addition to the inspections identified in Section 110.

The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the *building official*, for the inspection of the particular type of construction or operation requiring *special inspection*. The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the *approved agency* and their personnel are permitted to act as the special inspector for the work designed by them, provided those personnel meet the qualification requirements of this section to the satisfaction of the *building official*. The special inspector shall provide written documentation to the building official demonstrating their competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of *special inspection* activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

Exceptions:

1. *Special inspections* are not required for work of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. *Special inspections* are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
3. Unless otherwise required by the *building official*, *special inspections* are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.
4. Special inspections are not required for portions of structures designed and constructed in accordance with the <u>cold formed steel light-frame construction provisions of Section 2210.7 or the </u>conventional light-frame construction provisions of Section 2308.

1704.1.1 Statement of special inspections. The applicant shall submit a statement of *special inspections* prepared by the *registered design professional in responsible charge* in accordance with Section 107.1 as a condition for issuance. This statement shall be in accordance with Section 1705.

Exceptions:

1. A statement of *special inspections* is not required for <u>portions of </u>structures designed and constructed in accordance with the <u>cold formed steel light-frame construction provisions of Section 2210.7 or the </u>conventional <u>light frame </u>construction provisions of Section 2308.
2. The statement of *special inspections* is permitted to be prepared by a qualified person *approved* by the *building official* for construction not designed by a *registered design professional*.

Commenter's Reason: At the Public Hearing in Baltimore, a floor modification was offered by the Steel Framing Alliance to add a reference to Section 2210.7 for construction of cold-formed steel light-frame structures using the prescriptive provisions of AISI S230. The modification was ruled out-of-order, leading to disapproval of the proposal. The IBC Structural Committee strongly indicated their desire to have the proposed Exception #4 to Section 1704.1 incorporate the floor modification.

In addition to providing the desired reference in Exception #4 of Section 1704.1, this public comment also makes the corresponding change in Exception #1 of Section 1704.1.1 to exempt cold-formed steel light frame construction from the requirement for a statement of special inspections. Furthermore, Exception #1 is amended to apply only to those <u>portions</u> of structures constructed using prescriptive methods. This clarifies that special inspections would still be required for those portions not designed and constructed using prescriptive method, e.g. deep foundations, helical piers, or structural steel.

Final Action: AS AM AMPC____ D

S121-09/10
1704.3-1704.3.3.3, Table 1704.3

Proposed Change as Submitted

Proponent: Bonnie Manley, American Iron and Steel Institute, representing American Institute of Steel Construction

1. Revise as follows:

1704.3 Steel construction. The *special inspections* for steel elements of buildings and structures shall be as required in this Section ~~by Section 1704.3 and Table 1704.3~~.

Exception~~s~~:

~~1.~~ *Special inspection* of the steel fabrication process shall not be required where the fabricator does not perform any welding, thermal cutting or heating operation of any kind as part of the fabrication process. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator's ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification~~,~~ and grade ~~and mill test reports~~ for the main stress-carrying elements are capable of being determined. Mill test reports shall be identifiable to the main stress-carrying elements when required by the approved construction documents.

~~2. The special inspector need not be continuously present during welding of the following items, provided the materials, welding procedures and qualifications of welders are verified prior to the start of the work; periodic inspections are made of the work in progress and a visual inspection of all welds is made prior to completion or prior to shipment of shop welding.~~

~~2.1. Single-pass fillet welds not exceeding 5/16 inch (7.9 mm) in size.~~
~~2.2. Floor and roof deck welding.~~
~~2.3. Welded studs when used for structural diaphragm.~~
~~2.4. Welded sheet steel for cold-formed steel members.~~
~~2.5. Welding of stairs and railing systems.~~

1704.3.1 Structural steel. Special inspection for structural steel shall be in accordance with the quality assurance inspection requirements of AISC 360.

1704.3.2 Steel construction other than structural steel. Special inspection for steel construction other than structural steel shall be in accordance with Table 1704.3 and this section.

~~**1704.3.1**~~ **1704.3.2.1 Welding.**Welding inspection and welding inspector qualification shall be in accordance with this section.

~~**1704.3.1.1 Structural steel.** Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1.~~

~~**1704.3.1.2**~~ **1704.3.2.1.1 Cold-formed steel.** Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks shall be in accordance with AWS D1.3.

~~**1704.3.1.3**~~ **1704.3.2.1.2 Reinforcing steel.** Welding inspection and welding inspector qualification for reinforcing steel shall be in accordance with AWS D1.4 and ACI 318.

2. Delete without substitution:

~~**1704.3.2 Details.** The special inspector shall perform an inspection of the steel frame to verify compliance with the details shown on the *approved construction documents*, such as bracing, stiffening, member locations and proper application of joint details at each connection.~~

~~**1704.3.3 High-strength bolts.** Installation of high-strength bolts shall be inspected in accordance with AISC 360.~~

~~**1704.3.3.1 General.** While the work is in progress, the special inspector shall determine that the requirements for bolts, nuts,washers and paint; bolted parts and installation and tightening in such standards are met. For boltsrequiring pretensioning, the special inspector shall observe the preinstallation testing and calibration procedures when such procedures are required by the installation method or by project plans or specifications; determine that all plies of connected materials have been drawn together and properly snugged and monitor the installation of bolts to verify that the selected procedure for installation is properly used to tighten bolts. For joints required to be tightened only to the snug-tight condition, the special inspector need only verify that the connected materials have been drawn together and properly snugged.~~

~~**1704.3.3.2 Periodic monitoring.** Monitoring of bolt installation for pretensioning is permitted to be performed on a periodic basis when using the turn-of-nut method with matchmarking techniques, the direct tension indicator method or the alternate design fastener (twist-off bolt) method. Joints designated as snug tight need be inspected only on a periodic basis.~~

~~**1704.3.3.3 Continuous monitoring.** Monitoring of bolt installation for pretensioning using the calibrated wrench method or the turn-of-nut method without matchmarking shall be performed on a continuous basis.~~

3. Revise as follows:

~~**1704.3.4**~~ **1704.3.2.2 Cold-formed steel trusses spanning 60 feet or greater.** Where a cold-formed steel truss clear span is 60 feet (18 288 mm) or greater, the special inspector shall verify that the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the *approved* truss submittal package.

TABLE 1704.3
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
~~1. Material verification of high-strength bolts, nuts and washers:~~				
~~a. Identification markings to conform to ASTM standards specified in the approved construction documents.~~	~~—~~	~~X~~	~~AISC 360, Section A3.3 and applicable ASTM material standards~~	~~—~~
~~b. Manufacturer's certificate of compliance required.~~	~~—~~	~~X~~	~~—~~	~~—~~
~~2. Inspection of high-strength bolting:~~				
~~a.Snug-tight joints.~~	~~—~~	~~X~~	~~AISC 360, Section M2.5~~	~~1704.3.3~~
~~b. Pretensioned and slip-critical joints using turn-of-nut with matchmarking, twist-off bolt, or direct tension indicator methods of installation.~~	~~—~~	~~X~~		
~~c. Pretensioned and slip-critical joints using turn-of-nut without matchmarking or calibrated wrench methods of installation.~~	~~X~~	~~—~~		
1~~3~~. Material verification of ~~structural steel and~~ cold-formed steel deck:				
~~a. For structural steel, identification markings to conform to AISC 360.~~	~~—~~	~~X~~	~~AISC 360, Section M5.5~~	
a.~~b. For other steel, i~~Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material standards	
b~~c~~. Manufacturers' certified test reports.	—	X		
~~4. Material verification of weld filler materials:~~				
~~a. Identification markings to conform to AWS specification in the approved~~	~~—~~	~~X~~	~~AISC 360, Section A3.5 and Applicable AWS A5~~	~~—~~

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
~~construction documents.~~			~~documents~~	
~~b. Manufacturer's certificate of compliance required.~~	~~—~~	~~X~~	~~—~~	~~—~~
2~~5~~. Inspection of welding: a. ~~Structural steel and c~~Cold-formed steel deck:				
~~1) Complete and partial joint penetration groove welds.~~	~~X~~	~~—~~	~~AWS D1.1~~	~~1704.3.1~~
~~2) Multipass fillet welds.~~	~~X~~	~~—~~		
~~3) Single-pass fillet welds >5/16”~~	~~X~~	~~—~~		
~~4) Plug and slot welds~~	~~X~~	~~—~~		
~~5) Single-pass fillet welds ≤5/16”~~	~~—~~	~~X~~		
1~~6~~) Floor and roof deck welds.	—	X	AWS D1.3	
b. Reinforcing steel:				
1) Verification of weldability of reinforcing steel other than ASTM A 706.	—	X	AWS D1.4 or ACI 318: Section 3.5.2	—
2) Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.	X	—		
3) Shear reinforcement.	X	—		
4) Other reinforcing steel.	—	X		
~~6. Inspection of steel frame joint details for compliance with approved construction documents:~~				
~~a. Details such as bracing and stiffening.~~	~~—~~	~~X~~	~~—~~	~~1704.3.2~~
~~b. Member locations.~~	~~—~~	~~X~~		
~~c. Application of joint details at each connection.~~	~~—~~	~~X~~		

For SI: 1 inch = 25.4 mm.

a. Where applicable, see also Section 1707.1, Special inspection for seismic resistance.

Reason: The 2010 edition of ANSI/AISC 360, *Specification for Structural Steel Buildings,* incorporates a new Chapter N, which addresses comprehensive quality control and quality assurance requirements for all structural steel construction. These requirements are similar in nature to those that were incorporated into the 2005 edition of AISC 341, Appendix Q. Those AISC 341 requirements are currently referenced in the 2009 edition of the IBC, Sections 1707 and 1708 for special inspection requirements in high-seismic applications. AISC 360-10, Chapter N provisions provide the foundation for the quality control and quality assurance requirements for general structural steel construction, with AISC 341-10, Chapter I (previously contained in AISC 341-05, Appendix Q) extending specific requirements to high-seismic applications.

AISC 360, Chapter N covers quality control requirements on the part of the structural steel fabricator and erector, as well as quality assurance requirements on the part of the owners inspecting and or testing agents. While AISC 360 addresses the total quality aspects of the structural steel project, the inspection requirements of the Quality Assurance Inspector can be equated to those specified for the Special Inspector under IBC Chapter 17.

The present Section 1704.3 addresses all forms of steel construction. The majority of the requirements in this section and Table 1704.3 pertain to structural steel construction. However, there are a few items which refer to cold-formed steel construction and rebar welding, which are not covered by AISC 360. The current special inspection requirements for structural steel as covered in Section 1704.3 and Table 1704.3 are recommended for deletion by this proposal; and, instead, a direct reference is made to the more detailed requirements of AISC 360, Chapter N. Requirements for special inspection of other forms of steel construction are left in a separate section of Section 1704.3.2, and in a reduced Table 1704.3, *Steel Construction Other than Structural Steel*.

Specifically, the topics currently in IBC Section 1704.3 are covered in AISC 360, Chapter N as follows:

Section 1704.3, Exception 2: The structural steel items are covered in AISC 360, Section N5.5. As for the cold formed steel exception applicable to roof and floor deck, it really is not correct and is recommended for deletion. Shop welding is typically used for a multi-skin closed cell deck, which would be a violation of the AWS D1.3 requirement that arc spot is only valid for deck to underlying structural members (D1.3, Clause 1.5.4). Multi-skin deck within itself appears to fall outside of the code itself and requires direct qualification by the manufacturer of their processes, potentially through testing rather than calculations. In reality, cold formed steel deck is sufficiently covered in Section 1704.3.2.1.1, Table 1704.3, and the reference to AWS D1.3.

Section 1704.3.2: AISC 360, Section N5.8.

Section 1704.3.3: AISC 360, Section N5.7(3)

Additionally, the topics currently in IBC Table 1704.3 are covered as in AISC 360, Chapter N as follows:

Table 1704.3, Item 1: AISC 360, Section N5.7 and Table N5.7-1.

Table 1704.3, Item 2: AISC 360, Section N5.7

Table 1704.3, Item 3a: AISC 360, Section N3.2 requires that the MTRs, as well as numerous other documents be made available for EOR review.

Table 1704.3, Item 4: AISC 360, Section N5.5 and Table N5.5-1

Table 1704.3, Item 5: AISC 360, Section N5.5
Table 1704.3, Item 6: AISC 360, Section N5.8

Also, Section 1704.3, Exception 1 is retained and modified to clarify the requirements. Often in practice, the "representative mill test reports" are supplied as described in the AISC Code of Standard practice. The added sentence on mill test reports allows for traceability when required by the construction documents, and defers to AISC 360 in other cases.

Please note, public review drafts of the 2010 AISC documents can be found on the AISC website (www.aisc.org). The public review period for AISC 360-10 is currently scheduled for 8/14/09 through 9/28/09 and the public review period for AISC 341-10 is currently scheduled for 9/11/09 through 10/26/09. It is anticipated that the 2010 editions of both AISC 360 and AISC 341 will be technically complete by the end of October 2009, with ANSI approval in March 2010 and publication in August 2010.

Cost Impact: There is no anticipated impact on the cost of construction.

ICCFILENAME: Manley-S13-1704.3

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal makes use of the more comprehensive inspection requirements for structural steel by referencing AISC 360 quality assurance inspections. Replacing the IBC provisions with this reference is similar to the reference to AISC 341 for steel seismic systems.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Steven Winkel, FAIA, PE, and Kelly Cobeen, PE, SE, representing the Federal Emergency Management Agency/Building Seismic Safety Council Code Resource Support Committee (FEMA/BSSC CRSC) and Bonnie Manley, PE, representing the American Institute of Steel Construction (AISC), request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.3 Steel construction. The *special inspections* for steel elements of buildings and structures shall be as required in this Section.

> **Exception:** *Special inspection* of the steel fabrication process shall not be required where the fabricator does not perform any welding, thermal cutting or heating operation of any kind as part of the fabrication process. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator's ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification and grade for the main stress-carrying elements are capable of being determined. Mill test reports shall be identifiable to the main stress-carrying elements when required by the approved construction documents.

1704.3.1 Structural steel. Special inspection for structural steel shall be in accordance with the quality assurance inspection requirements of AISC 360.

1704.3.2 Steel Construction other than structural steel. Special inspection for steel construction other than structural steel shall be in accordance with Table 1704.3 and this section.

1704.3.2.1 Welding. Welding inspection and welding inspector qualification shall be in accordance with this section.

1704.3.2.1.1 Cold-formed steel. Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks shall be in accordance with AWS D1.3.

1704.3.2.1.2 Reinforcing steel. Welding inspection and welding inspector qualification for reinforcing steel shall be in accordance with AWS D1.4 and ACI 318.

1704.3.2.1.3 Other steel construction. Hot-rolled steel construction, other than structural steel covered in Section 1704.3.1, that has been designated in the statement of special inspections by the registered design professional in responsible charge as requiring special inspection, shall be subject to the welding inspection requirements of AWS D1.1. The welding shall be inspected on a periodic basis. As a minimum, such construction shall include H-piles and stair and railing systems.

1704.3.2.2 Cold-formed steel trusses spanning 60 feet or greater. Where a cold-formed steel truss clear span is 60 feet (18 288 mm) or greater, the special inspector shall verify that the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the *approved* truss submittal package.

TABLE 1704.3
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
1. Material verification cold-formed steel deck:				
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material standards	
b. Manufacturers' certified test reports.	—	X		
2. Inspection of welding: a. Cold-formed steel deck:				
1) Floor and roof deck welds.	—	X	AWS D1.3	
b. Reinforcing steel:				
1) Verification of weldability of reinforcing steel other than ASTM A 706.	—	X	AWS D1.4 or ACI 318: Section 3.5.2	—
2) Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.	X	—		
3) Shear reinforcement.	X	—		
4) Other reinforcing steel.	—	X		

For SI: 1 inch = 25.4 mm.
a. Where applicable, see also Section 1707.1, special inspection for seismic resistance

Commenter's Reason: Proposal S121-09/10, as originally written, inadvertently deleted a narrow sub-set of hot-rolled structural steel items that are intended to be covered by the special inspection requirements of IBC Chapter 17 but that fall outside the defined scope of AISC 360. Specifically, the scope of AISC 360 states the following in Section A1:

> The *Specification for Structural Steel Buildings*, hereafter referred to as the Specification, shall apply to the design of the *structural steel* system, where the steel elements are defined in the AISC *Code of Standard Practice for Steel Buildings and Bridges*, Section 2.1.

In addition, the AISC 360 glossary defines structural steel as follows:

> *Structural steel.* Steel elements as defined in Section 2.1 of the AISC *Code of Standard Practice for Steel Buildings and Bridges*.

In contrast, the 2009 IBC does not specifically define "structural steel." Rather, Chapter 22, *Steel*, includes definitions for *Cold Formed Steel Construction, Steel Joist,* and *Structural Steel Member*. The definition of *Structural Steel Member* is as follows:

> STEEL MEMBER, STRUCTURAL. Any steel structural member of a building or structure consisting of a rolled steel structural shape other than cold-formed steel, or steel joist members.

And, IBC-09, Section 2205, *Structural Steel*, references AISC 360 for the "…design, fabrication and erection of structural steel for buildings and structures..." (2205.1).

However, IBC-09, Section 1704.3, Exception 2 includes welding special inspection requirements for steel construction other than steel deck and reinforcing steel that is not purely defined as "structural steel," such as stair and railing systems. The deletion of this exception by Proposal S121-09/10 removed these necessary special inspection requirements.

This public comment reinstitutes the welding special inspection for such elements, when identified in the statement of special inspection by the design professional in responsible charge. In practice, structural engineers often use the provisions of AISC 360 to design steel members using hot-rolled steel shapes, plates, and bars that resist loads and forces, even when such members do not meet AISC's definition of structural steel. Rather than continue to use AISC 360 outside of its intended scope, this comment references AWS D1.1 and specifies "periodic" frequency for the welding inspection, which is consistent with the provisions inadvertently deleted by S121. The minimum list of steel elements includes both H-piles and stair and railing systems. The inclusion of steel H-piles is consistent with the requirements of Table 1704.8, *Required Verification and Inspection of Driven Deep Foundation Elements*, Item 5.

Public Comment 2:

Alan Robinson, SE and Art Dell, PE, representing Structural Engineers Association of California, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.3 Steel construction. The *special inspections* for steel elements of buildings and structures shall be as required in this Section.

> **Exception:** *Special inspection* of the steel fabrication process shall not be required where the fabricator does not perform any welding, thermal cutting or heating operation of any kind as part of the fabrication process. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator's ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification and grade for the main stress-carrying elements are capable of being determined. Mill test reports shall be identifiable to the main stress-carrying elements when required by the approved construction documents.

1704.3.1 Structural steel. Special inspection for structural steel shall be in accordance with the quality assurance inspection requirements of AISC 360.

> **Exception:** The special inspection for complete and partial penetration groove welds, multipass fillet welds, and fillet welds greater than 5/16 inch (7.9 mm) shall be continuous *special inspection* as defined in this code.

1704.3.2 Steel Construction other than structural steel. Special inspection for steel construction other than structural steel shall be in accordance with Table 1704.3 and this section.

1704.3.2.1 Welding. Welding inspection and welding inspector qualification shall be in accordance with this section.

1704.3.2.1.1 Cold-formed steel. Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks shall be in accordance with AWS D1.3.

1704.3.2.1.2 Reinforcing steel. Welding inspection and welding inspector qualification for reinforcing steel shall be in accordance with AWS D1.4 and ACI 318.

1704.3.2.2 Cold-formed steel trusses spanning 60 feet or greater. Where a cold-formed steel truss clear span is 60 feet (18 288 mm) or greater, the special inspector shall verify that the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the *approved* truss submittal package.

TABLE 1704.3
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
1. Material verification cold-formed steel deck:				
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material standards	
b. Manufacturers' certified test reports.	—	X		
2. Inspection of welding: a. Cold-formed steel deck:				
1) Floor and roof deck welds.	—	X	AWS D1.3	
b. Reinforcing steel:				
1) Verification of weldability of reinforcing steel other than ASTM A 706.	—	X	AWS D1.4 or ACI 318: Section 3.5.2	—
2) Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.	X	—		
3) Shear reinforcement.	X	—		
4) Other reinforcing steel.	—	X		

Commenter's Reason: As approved at the Code Development Hearing, S121-09/10 will result in a reduction of the frequency of welding special inspection.

The frequency of special inspections has always been defined in the International Building Code (IBC) by the use of the terms "continuous" and "periodic". Continuous special inspection is invoked for work that cannot be verified when complete, such as concrete placement and multipass welding. Periodic inspection is invoked for work that can be verified adequately by initial inspection of materials and procedures, some in-process inspection, and final inspection of the completed work.

Continuous special inspection has been required by Table 1704.3 for complete and partial penetration groove welds, multipass fillet welds, fillet welds > 5/16", and plug and slot welds.

Proposal S121-09/10 has removed the special inspections for welding and bolting of structural steel from IBC Chapter 17 in favor of the quality assurance provisions of the new Chapter N in AISC 360-10.

Chapter N of AISC 360-10 does not use "continuous" or "periodic" to describe the frequency of welding inspection. Rather, the terms **O**bserve and **P**erform are applied to the welding inspection tasks identified in three tables (for Before, During, and After welding).

Observe and Perform are defined as follows (AISC 360-10, N5.4 Inspection of Welding):

O – Observe these items on a random basis. Operations need not be delayed pending these inspections.

P – Perform these tasks for each welded joint or member.

The Observe level of inspection is applied to all of the Before and During Welding tasks, with the exception of verifying that WPSs are available, and that manufacturer certifications for welding consumables are available. Inspection tasks such as verifying fit-up of groove welds and fillet welds (before welding), verifying that the WPS is followed and that interpass cleaning and quality are adequate (during welding), would thus only be performed on a "random basis".

This would allow welding on any particular joint to be performed without any in-process inspection, once the welding inspector has verified the materials, procedures, and welder skill. In fact, there is no requirement that the welding inspector be on site while welding is performed.

This is not appropriate for complete and partial penetration groove welds, multipass fillet welds, and fillet welds > 5/16" which currently require continuous inspection.

This public comment corrects this deficiency by adding an exception to the language of 1704.3.1 which invokes the quality assurance inspection requirements of AISC 360.

Public Comment 3:

Homer Maiel, PE. CBO, City of San Jose, CA, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters), requests Disapproval.

Commenter's Reason: As approved at the Code Development Hearing, S121-09/10 permits a significant reduction of the frequency and thoroughness of inspections that must be conducted for multi-pass welds by the special inspector. This reduction was not disclosed in the proponent's reason statement nor was it discussed by the IBC Structural Committee that voted to approve the proposal.

Continuous special inspection has been required by Table 1704.3 since the inception of the IBC for complete and partial penetration groove welds, multipass fillet welds, and single pass fillet welds greater than 5/16". Plug and slot welds were added to that list in the 2009 edition.

Proposal S121-09/10 removes most of Table 1704.3 and replaces that information by referencing the quality assurance (QA) provisions of the new Chapter N in AISC 360-10.

Chapter N of AISC 360-10 does not use the traditional code terminology of "continuous" or "periodic" to describe the frequency of welding inspection. Rather, the terms Observe (O), and Perform (P) are applied to the welding inspection tasks identified in three separate tables that address the inspection tasks to be performed Before, During, and After welding.

Observe and Perform are defined in AISC 360-10, Section N5.4 Inspection of Welding as follows:

O – Observe these items on a random basis. Operations need not be delayed pending these inspections.

P – Perform these tasks for each welded joint or member.

The Observe level of inspection is applied to all of the "Before" and "During" welding inspection tasks, with the exception of verifying that welding procedure specifications (WPSs) are available, and that manufacturer certifications for welding consumables are available. Inspection tasks such as verifying fit-up of groove welds and fillet welds (before welding), and verifying that the WPS is followed and that interpass cleaning and quality (during welding) are adequate, would thus only be performed on a "random basis". AISC 360 Commentary indicates that the inspector would not need to be on site when welding is performed, provided he or she has verified the materials, processes, and the welder's skill level. This is clearly very different than current IBC requirements that specify continuous inspection yet the reason statement provided for S121 did not acknowledge this significant change nor did it provide any insight into why such a reduction might be warranted.

The Tri-Chapter requests that the approval given to S121-09/10 be rescinded so that welding special inspection is not reduced, until such time that this reduction can be fully justified and be openly discussed by the members of ICC that enforce the current provisions of the code.

Final Action: AS AM AMPC____ D

S124-09/10

1704.6, Table 1704.6 (New), 1706.2, 1707.3, 1704.3.5 (New), Table 1704.3, 1706.3, 1707.4

Proposed Change as Submitted

Proponent: D. Kirk Harman, The Harman Group, representing The National Council of Structural Engineers Associations (NCSEA) Code Advisory Committee, Quality Assurance and Special Inspection Subcommittee

1. Revise as follows:

1704.6 Wood construction. ~~Special inspections of the fabrication process of prefabricated wood structural elements and assemblies shall be in accordance with Section 1704.2.Special inspections of site-built assemblies shall be in accordance with this section.~~ Special Inspections for prefabricated and site built wood construction and assemblies including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs shall be as required by this section and Table 1704.6.

Exceptions:

1. *Special inspection* of wood construction for buildings and structures in Occupancy Category I shall not be required.
2. *Special inspection* of wood construction for buildings and structures in Occupancy Category II that are 3 or less stories in height shall not be required.

2. Add new Table as follows:

TABLE 1704.6
REQUIRED VERIFICATION AND INSPECTION OF WOOD CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC
1. Verify that grade stamp on framing lumber, plywood and OSB panels conforms to the construction documents.		X
2. Verify that wood connections including nail quantity, size and spacing; bolt size and location anchor bolt size, spacing and location; tie down size location and configuration; beam hangers and framing anchors conform to the approved construction documents.		X
3. Inspect details of wood framing including framing layout, member sizes, blocking, bridging and bearing lengths.		X
4. Inspect diaphragms and shear walls to verify that wood structural panel sheathing is of the grade and thickness indicated on the approved construction documents and the nominal size of framing		X

members at adjoining panel edges, the nail or staple diameter and length, are as indicated on the approved construction documents.		

3. Revise as follows:

1706.2 Structural wood. Continuous special inspection is required during field gluing operations of elements of the main wind-force-resisting system. ~~Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the main wind-force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.~~

> ~~**Exception:** *Special inspection* is not required for wood shearwalls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main wind-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.~~

1707.3 Structural wood. Continuous special inspection is required during field gluing operations of elements of the seismic-force-resisting system. ~~Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.~~

> ~~**Exception:** Special inspection is not required for wood shearwalls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the seismic-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).~~

4. Add new text as follows:

1704.3.5 Cold-formed steel light-frame construction. Special Inspections for prefabricated and site built cold-formed steel light-frame construction and assemblies including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs shall be as required by this section and Table 1704.3.

Exceptions:

1. *Special inspection* of cold-formed steel light-frame construction for buildings and structures in Occupancy Category I shall not be required.
2. *Special inspection* of cold-formed steel light-frame construction for buildings and structures in Occupancy Category II that are 3 or less stories in height shall not be required.

5. Revise as follows:

TABLE 1704.3
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
3. Material verification of structural steel, cold-formed steel light-frame construction and cold-formed steel deck:				
a. For structural steel, identification markings to conform to AISC 360	–	X	AISC 360, Section M5.5	
b. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents.	–	X	Applicable ASTM material standards	
c. Manufacturer's certified test reports.	–	X		
5. Inspection of welding:				
a. Structural steel, cold-formed steel light-frame construction and cold-formed steel deck:				
1) Complete and partial joint penetration groove welds.	X	–	AWS D1.1	1704.3.1
2) Multipass fillet welds	X	–		
3) Single-pass fillet welds > 5/16"	X	–		
4) Plug and slot welds	X	–		
5) Single-pass fillet welds 5/16"	–	X		

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
6) Floor and roof deck welds.	–	X	AWS D1.3	
7) Cold-formed steel light-frame construction welds		X	AWS D1.3	
6. Inspection of steel frame joint details for compliance with approved construction documents:				
a. Details such as bracing, drag struts and stiffening.	–	X	–	1704.3.2
b. Member locations.	–	X		
c. Application of joint details at each connection.	–	X		
d. Mechanical connections for cold-formed steel light-frame construction including screws, powder actuated fasteners, bolts, anchor bolts, tie downs, anchors and other fastening components		X	Applicable ASTM material standards	

(Portions of table not shown remain unchanged)

6. Delete without substitution:

~~**1706.3 Cold-formed steel light-frame construction.** Periodic special inspection is required during welding operations of elements of the main wind-force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the main wind-force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.~~

> ~~**Exception:** *Special inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:~~
>
> ~~1. The sheathing is gypsum board or fiberboard.~~
> ~~2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).~~

~~**1707.4 Cold-formed steel light-frame construction.** Periodic special inspection is required during welding operations of elements of the seismic-force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.~~

> ~~**Exception:** *Special inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:~~
>
> ~~1. The sheathing is gypsum board or fiberboard.~~
> ~~2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) o.c.~~

Reason: NCSEA believes that light frame construction in wood and cold formed steel have become more commonly used for load bearing applications of significant height and in regions with moderate and high seismic and wind concerns. These types of construction should be subject to Special Inspections in a similar manner and to a comparable extent as other systems such as concrete, structural steel and masonry. The Code is vague in the requirements for these systems resulting in confusion as to what special inspections and to what extent special inspection is required. This proposal clarifies requirements to be consistent across both systems and to improve the consistency of special inspections across all the major structural materials.

The emphasis of the existing special inspection requirements for wood framed construction is on shop inspection of fabricated wood assemblies rather than the field assembly of wood framing. Quality control problems with wood construction are most pronounced in the field work rather than in prefabricated components. The proposed provisions focus on the areas of wood construction that would benefit most from more comprehensive inspections. Deletion of the exception under 1707.3 coordinates with this change.

Exceptions are provided to limit the applicability of these provisions to exclude single and two family dwellings, small commercial, agricultural and buildings of lesser occupancies.

Sections 1706.2, 1706.3, 1707.3 and 1707.4 are revised because the provisions deleted from these sections are now covered in the new or revised tables. The exceptions are deleted to be consistent with the proposal.

This proposal contains provisions addressing both wood frame and cold-formed steel light-frame construction together. This is an effort to address both systems in one change therefore avoiding any perception of one system having an advantage over the other regarding special inspection.

There will be some increase in construction cost due to the increased special inspection that will take place. However, the improved field quality assurance will improve safety and reduced field errors resulting in a savings in construction cost and schedule. The improved public safety far outweighs any minor increase there may be in construction cost.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Harman-S2-1704

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the historical performance of light-frame construction of wood and cold-formed steel, the proposed changes in special inspections were too substantial to make without better substantiation by the proponent. There was nothing in the way of case studies, calculation or rational analysis offered to the committee. Additionally the proponent's rather extensive floor modification would indicate that this proposal needs work before it can be approved. Clarification of inspection for prefabricated structural assemblies and components may be necessary but these need to be clearer so that it can be implemented both with building inspectors and third party inspectors. Since the proposal is getting into new territory, it would be preferable to treat wood and cold-formed steel separately so they can be discussed and voted on individually.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

D. Kirk Harman, PE, SE, SECB , The Harman Group, Inc, representing The National Council of Structural Engineers Associations (NCSEA) Code Advisory Committee, Quality Assurance and Special Inspection Subcommittee requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1704.6 Wood construction. ~~Special inspections of the fabrication process of prefabricated wood structural elements and assemblies shall be in accordance with Section 1704.2. Special inspections of site-built assemblies shall be in accordance with this section.~~ Special Inspections for prefabricated and site built wood construction and assemblies including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs shall be as required by this section and Table 1704.6.

Exceptions:

1. *Special inspection* of wood construction for buildings and structures in Occupancy Category I shall not berequired.
2. *Special inspection* of wood construction for buildings and structures in Occupancy Category II that are 3 or less stories in height above grade plane and that are not included in Sections 1706 or 1707, shall not be required.

TABLE 1704.6
REQUIRED VERIFICATION AND INSPECTION OF WOOD CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC
1. Verify that grade stamp on framing lumber, plywood and OSB panels conforms to the construction documents.		X
2. Verify that wood connections including nail quantity, size and spacing; bolt size and location anchor bolt size, spacing and location; tie down size location and configuration; beam hangers and framing anchors conform to the approved construction documents.		X
3. Inspect details of wood framing including framing layout, member sizes, blocking, bridging and bearing lengths.		X
4. Inspect diaphragms and shear walls to verify that wood structural panel sheathing is of the grade and thickness indicated on the approved construction documents and the nominal size of framing members at adjoining panel edges, the nail or staple diameter and length, are as indicated on the approved construction documents.		X

1706.2 Structural wood. Continuous special inspection is required during field gluing operations of elements of the main wind-force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the main wind-force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.

Exception: For buildings and structures in Occupancy Category I, or in Occupancy Category II and 3 or less stories in height above grade plane, s~~S~~*pecial inspection* is not required for wood shearwalls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main wind-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

1707.3 Structural wood. Continuous special inspection is required during field gluing operations of elements of the seismic-force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.

> **Exception:** For buildings and structures in Occupancy Category I, or in Occupancy Category II and 3 or less stories in height above grade plane, s~~S~~pecial inspection is not required for wood shearwalls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the seismic-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1704.3.5 Cold-formed steel light-frame construction. Special Inspections for prefabricated and site built cold-formed steel light-frame construction and assemblies including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs shall be as required by this section and Table 1704.3.

Exceptions:

1. *Special inspection* of cold-formed steel light-frame construction for buildings and structures in Occupancy Category I shall not be required.
2. *Special inspection* of cold-formed steel light-frame construction for buildings and structures in Occupancy Category II that are 3 or less stories in height above grade plane and that are not included in Sections 1706 or 1707, shall not be required.

TABLE 1704.3
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
3. Material verification of structural steel, cold-formed steel light-frame construction and cold-formed steel deck:				
a. For structural steel, identification markings to conform to AISC 360	_	X	AISC 360, Section M5.5	
b. For cold-formed steel light-frame construction, identification markings to conform to AISI S200 as specified in the approved construction documents.	_	X	AISI S200 Section A5.4	
c~~b~~. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents.	-	X	Applicable ASTM material standards	
d~~c~~. Manufacturers certified test reports.	-	X		
5. Inspection of welding:				
a. Structural steel, cold-formed steel light-frame construction and cold-formed steel deck:				
1) Complete and partial joint penetration groove welds.	X	–	AWS D1.1	1704.3.1
2) Multipass fillet welds	X	–		
3) Single-pass fillet welds > 5/16"	X	–		
4) Plug and slot welds	X	–		
5) Single-pass fillet welds 5/16"	–	X		
6) Floor and roof deck welds.	–	X	AWS D1.3	
7) Cold-formed steel light-frame construction welds		X	AWS D1.3	
6. Inspection of steel frame joint details for compliance with approved construction documents:				
a. Details such as bracing, drag struts and stiffening.	–	X	–	1704.3.2
b. Member locations.	–	X		
c. Application of joint details at each connection.	–	X		
d. Mechanical connections for cold-formed steel light-frame construction including screws, powder actuated fasteners, bolts, anchor bolts, tie downs, anchors and other fastening components		X	AISI S200 Section D	

(Portions of table not shown are unchanged).

1706.3 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the main wind-force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the main wind-force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

> **Exception:** For buildings and structures in Occupancy Category I, or in Occupancy Category II and 3 or less stories in height above grade plane, s~~S~~*pecial inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:
>
> 1. The sheathing is gypsum board or fiberboard.
> 2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1707.4 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the seismic-force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

Exception: For buildings and structures in Occupancy Category I, or in Occupancy Category II and 3 or less stories in height above grade plane, s~~S~~*pecial inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) o.c.

Commenter's Reason: The above revision to the proposal addresses comments received from various interested parties. This version maintains all Special Inspections for light frame systems in high wind and high seismic situations, (Sections 1706 and 1707). The purpose of the previous floor modification was to address these areas. The above version now reflects these changes.

The above revision also adds reference to AISI S200 for inspection procedures. This document is currently referenced in the IBC for design of cold formed steel light frame construction.

The proposal seeks to capture the buildings constructed with light frame systems that are over 3 stories in height. For this reason buildings in Occupancy Category I, or in Occupancy Category II and 3 or less stories in height above grade plane are excluded from the requirements. This will exclude nearly all single family and two family dwellings, most low-rise multi-family residential buildings and light frame low-rise commercial buildings. Therefore, the vast majority of buildings constructed with light frame wood or cold formed steel systems will not be included in the proposed Special Inspection requirements. It is only those taller buildings, 4 stories or more in height, which would be subject to the proposed Special Inspections.

Each comment by the committee contained in the Public Hearing Results is addressed below individually:

Based on the historical performance of light-frame construction of wood and cold-formed steel, the proposed changes in special inspections were too substantial to make without better substantiation by the proponent.

To date light frame construction has been used predominantly in buildings 3 stories or less in height. These buildings would remain exempt under this proposal; therefore, the historical performance of these buildings has been recognized. It is only recently that light frame construction has been pushed to heights of nine stories and more. These taller buildings are a small number of the total buildings constructed each year with light frame systems therefore the proposed changes are not substantial across all light frame buildings. The proposed Special Inspections are limited to the small number of light frame structures that are at risk under the current IBC. NCSEA represents over 11,000 structural engineers throughout the United States. The structural engineers in our Member Organizations have voiced concern for the safety of these taller buildings as these systems are pushed to the limits of their capacity while not subject to the same level of Special Inspections as other structural systems used in the same height buildings. The only reason that there has not been a failure is that engineers designing these taller buildings have specified a higher level of inspection than the IBC requires. However, this is not a mandated inspection and the situation presents a very high risk to the public.

There was nothing in the way of case studies, calculation or rational analysis offered to the committee.

If the ICC waited for buildings to collapse before making changes to the Code, seismic design requirements would be twenty years out of date. This proposal is based on the observations of numerous structural engineers working in the field and observing these structures on a daily basis. The risk is real. The day that one of these structures collapses due to lack of inspection will be one day too late for the lives lost.

Additionally the proponent's rather extensive floor modification would indicate that this proposal needs work before it can be approved.

The floor modification has been incorporated into the revised proposal represented in this public comment.

Clarification of inspection for prefabricated structural assemblies and components may be necessary but these need to be clearer so that it can be implemented both with building inspectors and third party inspectors.

The proposal addresses both prefabricated assemblies and components as well as field constructed structural systems. The requirements are set forth in the same format as the current requirements for other systems.

Since the proposal is getting into new territory, it would be preferable to treat wood and cold-formed steel separately so they can be discussed and voted on individually.

To avoid any argument that one system (wood or cold formed steel) would have a competitive disadvantage relative to the other as a result of improved inspection of one and not the other, the two materials are covered in one proposal. Both systems of light frame-frame construction are being used in taller buildings previously envisioned by the current Special Inspection requirements.

This is not "new territory" for Special Inspection. Special inspections have been required for decades for all other buildings over three stories in height constructed using structural steel, concrete and masonry. Until recently light frame construction was rarely used for buildings over 3 stories so Special Inspection for these systems were never addressed. These systems are now "getting into new territory" and should be treated in the same manner as any other structural system employed in buildings over 3 stories.

One additional argument against providing Special Inspections for light frame construction is that the Inspections of Chapter 1 of the IBC are sufficient and no special expertise is required for these inspections.

If a four story building is constructed with structural steel, it is subject to the rigorous Special Inspections of Chapter 17. If the same building is constructed using wood frame or cold formed steel, there is no requirement for Special Inspections and the only inspections are those performed by the Building Official. This places an unreasonable burden on the Building Official to inspect at a much higher level than is anticipated by the provisions of Chapter 1. The AWS welding inspection requirements for cold formed steel are well outside the responsibility of the Building Official yet the Code has no requirements for Special Inspection.

If an eight story masonry bearing wall building is constructed with precast concrete floor units, it is subject to the rigorous Special Inspections of Chapter 17. If that same building is constructed using cold formed steel bearing walls and precast concrete floor units, there is no requirement for Special Inspections of the bearing wall system and the only inspections are those performed by the Building Official. This places an even more unreasonable burden on the Building Official to inspect at a much higher level than is anticipated by the provisions of Chapter 1. There is a serious risk to public safety when an eight story building can be constructed and the only inspections are those by a Building Official, in the same manner as a single family home. These are buildings such as senior living facilities, student housing, apartments, and hotels.

This proposal seeks to plug a serious hole in the Special Inspections requirements of the IBC. It seeks to apply the same level of Special Inspection to all structural systems used in buildings over three stories in height.

Final Action: AS AM AMPC____ D

S127-09/10
1704.15 (New), Chapter 35

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc., representing Firestop Contractors International Association

1. Add new text as follows:

1704.15 Fire-resistant penetrations and joints. In buildings assigned an Occupancy Category of III or IV in accordance with Section 1604.5, special inspections for through penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems of the types specified in Sections 713.3.1.2, 713.4.1.2, 714.3 and 714.4 shall be in accordance with Sections 1704.15.1 or 1704.15.2.

1704.15.1 Penetration firestops. Inspections of penetration firestop systems of the types specified in Sections 713.3.1.2 and 713.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1704.15.2 Fire-resistant joint systems. Inspection of fire resistant joint systems of the types specified in Sections 714.3 and 714.4 shall be conducted by an approved inspection agency in accordance with ASTM E 2393.

2. Add standards to Chapter 35 as follows:

ASTM International

E 2174-09	Standard Practice for On-Site Inspection of Installed Fire Stops
E 2393-09	Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barrier

Reason: Through penetration and joint firestop systems are critical to maintaining the fire resistance rating of fire resistance rated construction, including fire barriers, smoke barriers, and fire resistance rated horizontal assemblies. Every construction trade has very unique requirements that are specific to that trade, with technical knowledge built through cumulative continued work in the trade. Firestopping is no different. The concept has been proposed in the past and some felt the scope was too broad. Therefore, the scope of the proposed requirement has been limited to those buildings that represent a substantial hazard to human life in the event of a system failure or that are considered to be essential facilities in accordance with Table 1604.5.

In order to meet the requirements of a listed firestop system from the UL Fire Resistance, Intertek, FM Approvals or other testing laboratory directories, a 'zero tolerance' systems installation protocol is needed, or a system can be violated and rendered ineffective. The violation can be as small as a minor annular space size variance, joint width exceeding system requirements, penetrating item size or type not as listed. There are no typical 'construction tolerances' allowed in firestopping for fire and life safety.

Firestop Systems must be selected from the listing directories, then applied in the correct manner, in the right place. With endless variations to penetrating items, hole sizes and shapes, plus the classified systems to restore the fire ratings, firestop systems selection looks easy to the untrained eye.

The UL Fire Resistance Directories have over 8,500 listed firestop systems, each with variations that multiplies possible systems for a building exponentially. Systems selection is not a 'generic process'. Systems selection is an exacting exercise by skilled contractors who submit appropriate systems for approval, then communicate these systems to the educated firestop – containment workers they employ….which becomes the inspection document for a qualified inspector of firestop systems to leading documents such as International Accreditation Services Accreditation Criteria, AC 291, section 6.11, Firestop Systems.

Should a penetration or joint condition in the field vary from the system design listing from the directories, the firestop system may not perform as intended, opening risk to the structure, and the occupants on the other side of the fire. Structurally, the floor, floor-ceiling or wall assemblies are not tested with unprotected holes with penetrating items or joints allowing fire attack to take place from both sides at once. They are tested with fire attack from one side, with all openings and penetrating items and joints firestopped.

On construction projects, there are three ways firestopping is installed currently. First, the 'he or she who pokes the hole fills it with firestopping' takes place, about 1/3 the time. A specialty firestop contractor installs for about another 1/3 of installations. The final 1/3 is a combination of specialty firestop contractors and the 'he or she who pokes the hole fills it' method. In other words, about ½ of the installations are installed by companies who most likely do not understand firestop systems selection nor the zero tolerance installation protocol. And, with the 20+ trades who potentially touch firestopping, many who perform the work as a 'sideline', the potential for a mistake increases exponentially when inexperienced companies install firestopping. However, firestopping is a complex operation, just like any other trade. Mastering more than one trade by attending a 30 minute to 16 hour class is nearly impossible for workers of any trade background.

In simple terms, inadequate firestopping makes the fire resistance rated floor or wall assembly become swiss cheese like, and not representative of testing. The risks of inadequate firestopping are apparent due to the many trades who install firestopping as a sideline…who just don't get the 'zero tolerance' systems oriented approach needed to get firestopping done right. Inspection to ASTM E 2174 and ASTM E 2393 brings a needed check to this important discipline, whether a FCIA Member specialty firestop contractor is installing or not.

Cost Impact: This will increase cost of construction when a contractor installing firestopping does not understand the zero tolerance protocol for firestopping. It will not increase the cost of construction when a contractor knowledgeable in the zero tolerance protocol for firestopping is used.

Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM E2174-09 and ASTME E2393-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: KOFFELL-S3-1704.15 NEW

Public Hearing Results

This code change was contained in the errata posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/09-10ProposedChanges.aspx.

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standards ASTM E 2174 and ASTM E 2393 indicated that, in the opinion of ICC Staff, the standards comply with ICC standards criteria.

Committee Action: Approved as Modified

Modify the proposal as follows:

1704.15 Fire-resistant penetrations and joints. In buildings assigned an Occupancy Category of III or IV in accordance with Section 1604.5, special inspections for through penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems ~~of the types specified~~ ~~in~~ tested and listed in accordance with Sections 713.3.1.2, 713.4.1.2, 714.3 and 714.4 shall be in accordance with Sections 1704.15.1 or 1704.15.2.

1704.15.1 Penetration firestops. Inspections of penetration firestop systems ~~of the types specified~~ ~~in~~ tested and listed in accordance with Sections 713.3.1.2 and 713.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1704.15.2 Fire-resistant joint systems. Inspection of fire resistant joint systems ~~of the types specified~~ ~~in~~ tested and listed in accordance with Sections 714.3 and 714.4 shall be conducted by an approved inspection agency in accordance with ASTM E 2393.

(Portions of the proposal not shown remain unchanged)

Committee Reason: The committee agreed that these installations were critical and that special inspections should be required for these installations in buildings assigned an Occupancy Category of III or IV. The modification more appropriately identifies the systems as those that are tested and listed.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dave Frable, U.S. General Services Administration, requests Disapproval.

Commenter's Reason: We do not concur with the action of the Fire Safety Code Committee to require the need for special inspections to be conducted by an approved inspection agency in accordance with ASTM E 2174 for all penetration firestop systems and ASTM E 2393 for all fire-resistant joint systems in all Occupancy Category Class III and IV buildings.

Typically, special inspections are only required for complex engineering systems or systems that are unusual in nature. It is our opinion that penetration firestop systems and fire resistant joint systems typically occur on every new construction project and are currently adequately addressed in Sections 110.3.6 and 110.3.8. Therefore, the need to require special inspections in all Occupancy Category Class III and IV buildings is not warranted.

In addition, the proponent has failed to provide any technical data or life loss data to substantiate that if the penetration firestop systems and fire resistant joint systems fail within any of the Occupancy Category Class III and IV buildings, a substantial hazard to human life would occur (e.g., an office building having an occupancy greater than 5000, a fire station, a police station, etc.).

It should also be pointed out that ASTM E 2174 and ASTM E 2393 do not provide any minimum qualification requirements for an "inspection agency" but does have qualification requirements for the inspector. For example, one acceptable qualification includes having a minimum of two years experience in construction field inspections and have education, credentials, and experience acceptable to the authorizing authority (i.e., architect, engineer, building owner). Therefore, we feel that these requirements should be in the project specification and not the Code.

Lastly, we also disagree with the proponent that the requirement for special inspections will not increase construction costs.

Public Comment 2:

Steve Orlowski, National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: The authority having jurisdiction, under the auspice of section 1704.15 as found in the current 2009 IBC, already has the authority to require certain methods and materials to be certified by a third party. The proponent has provide no technical justification nor any historical data showing that AHJ or their inspectors are unqualified to conduct these inspection or have failed in their duties due to a loss of any magnitude. In the proponent's written testimony, there are numerous examples referencing the misapplication of products by unqualified installers, yet the proposed change takes away the ability for the AHJ to perform inspections on these products unless they are an approved inspection agency in accordance with the two ASTM standards, as referenced. NAHB requests the final assembly to reject this proposal given that the AHJ already has the option to request special inspections be conducted if they are unfamiliar with products and that this needlessly increases the number of special inspection required by the code.

Final Action: AS AM AMPC____ D

S128-09/10
1704.15 (New), Chapter 35

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc., representing Firestop Contractors International Association

1. Add new text as follows:

1704.15 Fire-resistant penetrations and joints. In buildings having occupied floors located more than 75 feet (22860 mm) above the lowest level of fire department vehicle access, special inspections for through penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems of the types specified in Sections 713.3.1.2, 713.4.1.2, 714.3 and 714.4 shall be in accordance with Sections 1704.15.1 or 1704.15.2.

1704.15.1 Penetration firestops. Inspections of penetration firestop systems of the types specified in Sections 713.3.1.2 and 713.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1704.15.2 Fire-resistant joint systems. Inspection of fire resistant joint systems of the types specified in Sections 714.3 and 714.4 shall be conducted by an approved inspection agency in accordance with ASTM E 2393.

2. Add standards to Chapter 35 as follows:

ASTM International

E 2174-09	Standard Practice for On-Site Inspection of Installed Fire Stops
E 2393-09	Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barrier

Reason: Through penetration and joint firestop systems are critical to maintaining the fire resistance rating of fire resistance rated construction, including fire barriers, smoke barriers, and fire resistance rated horizontal assemblies. Every construction trade has very unique requirements that are specific to that trade, with technical knowledge built through cumulative continued work in the trade. Firestopping is no different. The concept has been proposed in the past and some felt the scope was too broad. Therefore, the scope of the proposed requirement has been limited to high-rise buildings.

In order to meet the requirements of a listed firestop system from the UL Fire Resistance, Intertek, FM Approvals or other testing laboratory directories, a 'zero tolerance' systems installation protocol is needed, or a system can be violated and rendered ineffective. The violation can be as small as a minor annular space size variance, joint width exceeding system requirements, penetrating item size or type not as listed. There are no typical 'construction tolerances' allowed in firestopping for fire and life safety.

Firestop Systems must be selected from the listing directories, then applied in the correct manner, in the right place. With endless variations to penetrating items, hole sizes and shapes, plus the classified systems to restore the fire ratings, firestop systems selection looks easy to the untrained eye.

The UL Fire Resistance Directories have over 8,500 listed firestop systems, each with variations that multiplies possible systems for a building exponentially. Systems selection is not a 'generic process'. Systems selection is an exacting exercise by skilled contractors who submit appropriate systems for approval, then communicate these systems to the educated firestop – containment workers they employ….which becomes the inspection document for a qualified inspector of firestop systems to leading documents such as International Accreditation Services Accreditation Criteria, AC 291, section 6.11, Firestop Systems.

Should a penetration or joint condition in the field vary from the system design listing from the directories, the firestop system may not perform as intended, opening risk to the structure, and the occupants on the other side of the fire. Structurally, the floor, floor-ceiling or wall assemblies are not tested with unprotected holes with penetrating items or joints allowing fire attack to take place from both sides at once. They are tested with fire attack from one side, with all openings and penetrating items and joints firestopped.

On construction projects, there are three ways firestopping is installed currently. First, the 'he or she who pokes the hole fills it with firestopping' takes place, about 1/3 the time. A specialty firestop contractor installs for about another 1/3 of installations. The final 1/3 is a combination of specialty firestop contractors and the 'he or she who pokes the hole fills it' method. In other words, about ½ of the installations are installed by companies who most likely do not understand firestop systems selection nor the zero tolerance installation protocol. And, with the 20+ trades who potentially touch firestopping, many who perform the work as a 'sideline', the potential for a mistake increases exponentially when inexperienced companies install firestopping. However, firestopping is a complex operation, just like any other trade. Mastering more than one trade by attending a 30 minute to 16 hour class is nearly impossible for workers of any trade background.

In simple terms, inadequate firestopping makes the fire resistance rated floor or wall assembly become swiss cheese like, and not representative of testing. The risks of inadequate firestopping are apparent due to the many trades who install firestopping as a sideline…who just don't get the 'zero tolerance' systems oriented approach needed to get firestopping done right. Inspection to ASTM E 2174 and ASTM E 2393 brings a needed check to this important discipline, whether a FCIA Member specialty firestop contractor is installing or not.

Cost Impact: This will increase cost of construction when a contractor installing firestopping does not understand the zero tolerance protocol for firestopping. It will not increase the cost of construction when a contractor knowledgeable in the zero tolerance protocol for firestopping is used.

Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM E2174-09 and ASTME E2393-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: KOFFELL-S4-1704.15 NEW

Public Hearing Results

This code change was contained in the errata posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/09-10ProposedChanges.aspx.

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standards ASTM E 2174 and ASTM E 2393 indicated that, in the opinion of ICC Staff, the standards comply with ICC standards criteria.

Committee Action: Approved as Modified

Modify the proposal as follows:

1704.15 Fire-resistant penetrations and joints. In buildings having occupied floors located more than 75 feet (22860 mm) above the lowest level of fire department vehicle access, special inspections for through penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems ~~of the types specified~~ ~~in~~ <u>tested and listed in accordance with</u> Sections 713.3.1.2, 713.4.1.2, 714.3 and 714.4 shall be in accordance with Sections 1704.15.1 or 1704.15.2.

1704.15.1 Penetration firestops. Inspections of penetration firestop systems ~~of the types specified~~ ~~in~~ <u>tested and listed in accordance with</u> Sections 713.3.1.2 and 713.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1704.15.2 Fire-resistant joint systems. Inspection of fire resistant joint systems ~~of the types specified~~ ~~in~~ <u>tested and listed in accordance with</u> Sections 714.3 and 714.4 shall be conducted by an approved inspection agency in accordance with ASTM E 2393.

(Portions of the proposal not shown remain unchanged)

Committee Reason: The committee agreed that these installations were critical and that special inspections should be required for these installations in buildings having occupied floors located more than 75 feet above the lowest level of fire department vehicle access. The modification more appropriately identifies the systems as those that are tested and listed.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Dave Frable, U.S. General Services Administration, requests Disapproval.

Commenter's Reason: We do not concur with the action of the Fire Safety Code Committee to require the need for special inspections to be conducted by an approved inspection agency in accordance with ASTM E 2174 for all penetration firestop systems and ASTM E 2393 for all fire-resistant joint systems in all high-rise buildings.

Typically, special inspections are only required for complex engineering systems or systems that are unusual in nature. It is our opinion that penetration firestop systems and fire resistant joint systems typically occur on every new construction project and are currently adequately addressed in Sections 110.3.6 and 110.3.8. Therefore, the need to require special inspections in all high-buildings is not warranted.

In addition, the proponent has failed to provide any technical data or life loss data to substantiate that if the penetration firestop systems and fire resistant joint systems fail within any high-building, a substantial hazard to human life would occur (e.g., a fully sprinklered six story office building, etc.).

It should also be pointed out that ASTM E 2174 and ASTM E 2393 do not provide any minimum qualification requirements for an "inspection agency" but does have qualification requirements for the inspector. For example, one acceptable qualification includes having a minimum of two years experience in construction field inspections and have education, credentials, and experience acceptable to the authorizing authority (i.e., architect, engineer, building owner). Therefore, we feel that these requirements should be in the project specification and not the Code.

Lastly, we also disagree with the proponent that the requirement for special inspections will not increase construction costs.

Public Comment 2:

Steve Orlowski, National Association of Home Builders, requests Disapproval.

Commenter's Reason: The authority having jurisdiction, under the auspice of section 1704.15 as found in the current 2009 IBC, already has the authority to require certain methods and materials to be certified by a third party. The proponent has provide no technical justification nor any historical data showing that AHJ or their inspectors are unqualified to conduct these inspection or have failed in their duties due to a loss of any magnitude. In the proponent's written testimony, there are numerous examples referencing the misapplication of products by unqualified installers, yet the proposed change takes away the ability for the AHJ to perform inspections on these products unless they are an approved inspection agency in accordance with the two ASTM standards, as referenced. NAHB requests the final assembly to reject this proposal given that the AHJ already has the option to request special inspections be conducted if they are unfamiliar with products and that this needlessly increases the number of special inspection required by the code.

Final Action: AS AM AMPC____ D

S141-09/10
1715.5.1

Proposed Change as Submitted

Proponent: William E. Koffel, Koffel Associates, Inc., representing Glazing Industry Code Committee

Revise as follows:

1715.5.1 Exterior windows and doors. Exterior windows and sliding doors shall be tested and labeled as conforming to AAMA/WDMA/CSA 101/I.S.2/A440. The label shall state the name of the manufacturer, the approved labeling agency, and the product designation as specified in AAMA/WDMA/CSA101/I.S.2/A440. Exterior side-hinged doors shall be tested and labeled as conforming to AAMA/WDMA/CSA 101/I.S.2/A440 or comply with Section 1715.5.2. Products <u>installed in buildings of Group R not more than three stories above grade plane that are</u> tested and labeled as conforming to AAMA/WDMA/CSA 101/I.S.2/A440 shall not be subject to the requirements of Sections 2403.2 and 2403.3.

Reason: The purpose of this proposal is to restrict the application of the exemption that fenestration products labeled to AAMA/WDMA/CSA 101/I.S.2/A440 do not have to meet the requirements of sections 2403.2 and 2403.3, which ensure safe performance through proper support of glass. Specifically, section 2403.3 requires that the deflection of framing members supporting glass may not exceed 1/175 of the glass edge length (or ¾ inch, whichever is less) when subjected to the design load. Chapter 24 of the IBC relies on glass design curves that are contained in ASTM E 1300. This ASTM standard recognizes the importance of limiting edge deflection of the glass and also recommends a limitation of 1/175 of the glass edge length. Prior to the IBC, the legacy codes required deflection limitations of 1/175 of the span for glass holding members. It was not until the IBC was published that this exemption was allowed.

AAMA/WDMA/CSA 101/I.S.2/A440 does require testing in accordance with ASTM E330 and measurement of deflection. However, AAMA/WDMA/CSA 101/I.S.2/A440 only places a limit on the frame and sash deflection for heavy commercial (HC) and architectural products (AW), and has no requirement on deflection for residential (R), light commercial (LC), and commercial (C) products. Excessive deflection of the frame or sash can have an adverse effect on stress in the glass and could result in glass breakage at or below design loads creating a safety concern. The single ASTM E330 load test required in AAMA/WDMA/CSA 101/I.S.2/A440 is not statistically significant in ensuring that the stress does not increase the probability of breakage beyond the industry standard of eight lites per thousand when the deflection limitation of 1/175 is exceeded. Although the deflection exemption remains in the IRC for residential buildings and as proposed in the IBC for low-rise residential, it is inappropriate to have an exemption for these products when used in more diverse and larger buildings built to the IBC. This proposal would ensure that an appropriate limit on frame deflection is placed on fenestration products from all performance classes. Because the deflection is already being measured for all these products (but not limited for R, LC, and C classes), there is no cost impact except for products which do not comply with this more conservative and appropriate requirement.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KOFFELL-S1-1714.5.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproved for same reasoning as S140 – 09/10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee (GICC), a committee of the Glass Association of North America (GANA) and Thomas D. Culp, Ph.D, Birch Point Consulting LLC, representing Aluminum Extruders Council, request Approval as Submitted.

Commenter's Reason: The adoption of this proposal will 1- strengthen the structural integrity of exterior window and door assemblies, 2- decrease the likelihood they will break, and, thus, 3- make them safer when subjected to design loads.

Chapter 24 of the IBC and ASTM E1300 both establish maximum deflection limits for glazing in order to ensure that the glazing is firmly supported and does not break when subjected to design loads. However, Section 1715.5.1 provides an exemption from deflection limits for products labeled to the AAMA/WDMA/CSA 101/I.S.2/A440 standard. This exemption applies to all product types and to all occupancies and is, therefore, far too broad. This proposal would correct the overbreadth of Section 1715.5.1 by removing it from most occupancies, thus, restoring an appropriate safety margin of less than an 8 in 1000 probability of glass breakage under design loads.

In disapproving the proposal, the committee questioned why the proposal retained the exemption from deflection limits for low-rise Group R occupancies (ie., those that are not more than three stories above grade) but eliminated it as to other occupancies. The reason for retaining the exemption for low-rise Group R occupancies is, simply, that an exemption for the lighter products used in low-rise residential construction may well be appropriate. However, just because it is appropriate for the very light construction used in those applications, does not make it appropriate to exempt all other occupancies from the deflection limits mandated by Chapter 24 and ASTM E1300. Moreover, retaining the exemption for low-rise Group R occupancies will maintain consistency with the IRC, where detached one- and two-family dwellings and townhouses with a separate means of egress are currently exempt from deflection limit requirements.

Final Action Agenda voters are urged to vote against the standing motion to disapprove this proposal in order to vote in favor of a motion to approve S141 As Submitted.

Final Action: AS AM AMPC____ D

S143-09/10
1715.4.2, Chapter 35

<u>Proposed Change as Submitted</u>

Proponent: John Woestman, The Kellen Company, representing the Door Safety Council (DSC)

1. Add new text as follows:

1715.5.2 Exterior windows and door assemblies not provided for in Section 1715.5.1. Exterior window and door assemblies shall be tested in accordance with ASTM E 330. <u>Structural performance of exterior side-hinged door assemblies shall be determined in accordance with either ASTM E330 or ANSI A250.13.</u> Structural performance of garage doors shall be determined in accordance with either ASTM E 330 or ANSI/DASMA 108, and shall meet the acceptance criteria of ANSI/DASMA 108. Exterior window and door assemblies containing glass shall comply with Section 2403. The design pressure for testing shall be calculated in accordance with Chapter 16. Each assembly shall be tested for <u>a minimum of</u> 10 seconds at a load equal to 1.5 times the design pressure.

2. Add new standard to Chapter 35 as follows:

ANSI
<u>ANSI A250.13-08</u> <u>Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies</u>

Reason: This proposal helps resolve performance and code compliance issues when exterior side-hinged door openings are comprised of components from multiple sources and include interchangeable elements (ie; doors, frames, hinging and latching hardware, etc.).

Through the ANSI standards development process, stake-holders, comprising most major manufacturing associations, testing and certification organizations, specifiers, code officials and end users, developed a national standard for a component-based approach to testing for windstorm resistance of swinging door openings. The test procedures used in this standard represent the most severe requirements found in the windstorm resistance standards referenced in today's building codes. These procedures are designed to isolate the loads, conditions and critical performance requirements that a particular component is subjected to in full assembly tests and duplicate these specific conditions. Using a combination of worst-case scenario design and safety factors, this standard is designed to provide a component rating that relates directly to the component's ability to withstand the conditions that occur in full assembly tests.

This proposed change allows an alternative method to demonstrate structural performance for side-hinged door openings by requiring components to be tested per ANSI A250.13-2008. A250.13 contains language that prescribes how components are to be selected to create complete swinging door openings expected to perform equivalently to those tested to ASTM E 330. ANSI A250.13 has additional requirements that are more stringent than those in the current 1714.5.2, including testing for a minimum of <u>30</u> seconds at a load equal to 1.5 times the design pressure. Currently 1714.5.2 requires testing for <u>10</u> seconds at a load equal to 1.5 times the design pressure.

Prior to releasing the current revision, validation tests were performed at three design-load levels, using the A250.13 test protocol to establish performance ratings. The study confirmed that at the same design-load level, openings comprised of such components will perform in the same manner as those in assembly based test protocols. The validation tests also showed that where an element was identified as the weakest in an opening during component testing, it would perform similarly when tested as part of an assembly at the same design-load.

Building designers will use the performance based criteria of ANSI A250.13 to select appropriate components to construct swinging door openings by conducting the presently required opening-by-opening design analysis, verify code compliance, and submit the results through the normal plans review process. Code authorities will therefore need only to verify the design load calculations and compliance analysis are correct and that ANSI A250.13 compliant products are utilized and installed in accordance with the manufacturer's instructions during construction.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, ANSI A250 13-08 for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: WOESTMAN-S2-1714.5.2

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard ANSI A250.13 indicated that, in the opinion of ICC Staff, the standard complies with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: There are concerns on the applicability of the proposed referenced standard to this portion of the IBC. There is also a question of who takes responsibility for the entire door assembly, when only the individual parts are tested by the standard.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

John Woestman, The Kellen Company, representing Builders Hardware Manufacturers Association (BHMA), Bud Bulley, representing the National Association of Architectural Metal Manufacturers (NAAMM) and representing the Hollow Metal Manufacturer's Association (HMMA); Jeff Wherry, representing the Steel Door Institute (SDI); Jerry Heppes, representing the Door and Hardware Institute (DHI), requests Approval as Submitted.

Commenter's Reason: This proposal helps resolve performance and code compliance issues when exterior side-hinged door openings are comprised of components from multiple sources and include interchangeable elements (ie; doors, frames, hinging and latching hardware, etc.).

Through the ANSI standards development process, stake-holders, comprising most major manufacturing associations, testing and certification organizations, specifiers, code officials and end users, developed a national standard for a component-based approach to testing for windstorm resistance of swinging door openings.

The test procedures used in this standard represent the most severe requirements found in the windstorm resistance standards referenced in today's building codes. These procedures are designed to isolate the loads, conditions and critical performance requirements that a particular component is subjected to in full assembly tests and duplicate these specific conditions. Using a combination of worst-case scenario design and engineering safety factors, this standard is designed to provide a component rating that relates directly to the component's ability to withstand the conditions that occur in full assembly tests. The developers of the standard recognized the complexity and variables of door components interacting as an assembly and incorporated stringent test criteria and engineering safety factors in the standard to address these variables.

This proposed change to the IBC allows an alternative method to demonstrate structural performance for side-hinged door openings by requiring components to be tested per ANSI A250.13-2008. A250.13 prescribes how components are to be selected to create complete swinging door assemblies expected to perform equivalently (or better) to those tested to ASTM E 330. ANSI A250.13 has additional requirements that are more stringent than those in the current 1715.5.2, including testing for a minimum of 30 seconds at a load equal to 1.5 times the design pressure. Currently 1715.5.2 requires testing for 10 seconds at a load equal to 1.5 times the design pressure.

Prior to releasing the current revision, validation tests were performed at three design-load levels, using the A250.13 test protocol to establish performance ratings. The study confirmed that at the same design-load level, door assemblies comprised of such components will perform the same (or better) as those in assembly-based test protocols (ASTM E330). The validation tests also showed that where a door component was identified as the weakest in a door assembly during component testing, it would perform similarly when tested as part of an entire door assembly at the same design-load.

Building designers will use the performance based criteria of ANSI A250.13 to select appropriate components to construct swinging door assemblies by conducting the presently required opening-by-opening design analysis, verify code compliance, and submit the results through the normal plans review process. Code authorities will therefore need only to verify the design load calculations and compliance analysis are correct and that ANSI A250.13 compliant products are utilized and installed in accordance with the manufacturer's instructions during construction.

Addressing the committee's question of "who takes responsibility for the entire door assembly, when only individual parts are tested by the standard", Section 1703.4 of the IBC addresses this question by requiring specific and sufficient information be provided to the building official. With the introduction to the IBC of A250.13 for door component selection for side-hinged doors, similar to door component selection for fire-rated doors, each component of the side-hinged door would be selected to meet or exceed the code-required design criteria of the opening.

The committee's other concern of the applicability of ANSI A250.13 to this section of the code, this standard was developed explicitly as an optional alternative to ASTM E330 testing (as required by the code). Door assemblies designed and assembled for hurricane-prone areas generally exceed the design pressure requirements required outside hurricane-prone areas. As a result, doors assembled of components tested and evaluated to A250.13 (i.e. meeting the required design pressure of a specific project in a hurricane-prone area) could be used in a building where the design pressure is considerably lower.

This proposal will not increase the cost of construction – it should decrease the testing costs of complying with the building code resulting in a slight decrease of the cost of door components.

Public Comment 2:

Larry J. Tanner, P.E., Texas Tech University, representing Wind Science & Engineering Research Center, Debris Impact Test Laboratory, requests Disapproval

Commenter's Reason: The ANSI A250 Standard, along with the ASTM 1886/1996 standards, were developed to prevent the proliferation of envelope perforations and the resulting inundation of rainwater from hurricane events. Evidence from hurricane investigations has revealed that indeed buildings designed to these standards performed better than buildings without said protection. However, it should be understood and specifically included in technical specifications by the manufacturers and advertisements to the consumers, that such products are intended only for non-catastrophic property protection from rainwater inundation and not for the protection of building occupants (Life Safety). I was a coauthor of both FEMA 320 and FEMA 361 which utilize Tornado and Hurricane Saferoom Design Wind Speed Maps. Never were the above referenced ANSI and ASTM standards considered suitable for FEMA 320 Saferooms or FEMA 361 Community Shelters. Specifics to the proposed changes to the ANSI A250.13-2008 Standard:

1. From a quantitative standpoint the "stiffness theory" appears reasonable; however laboratory tests have proven otherwise. Texas Tech University has been the leading "storm debris impact researcher" for over 35 years. Tests on door assemblies have proven that success or failure from wind pressures and debris impacts is unique to the door (or window unit) and the hardware components installed. A heavily constructed door absorbs little energy and directs most of the energy to the attaching components and has proven to fail components that previously passed on other less massive doors. Lighter constructed doors can bend excessively and either pull out locking bolts or cause bolting bending and ultimate failure. Doors passing the impact tests must have a unique set of hardware that matches the door performance, thus doors are rated as a complete assembly, inclusive of frame, door(s), hinging, and locking hardware. Window lites in doors compromise the strength of the door and present another set of unique circumstances which require the unit to be rated as a complete assembly. Window unit performance is unique to the opening size, frame type, and the glazing. The elasticity of the glazing is a function of size and type. Based on size, some glazing is so elastic that it bounces out of the frame. Smaller is not always better; some glazing will destroy the framing system and be pushed out. Thus, the only way to predict window behavior under impact is by full scale testing in the laboratory in "as specified and installed" condition.
2. Though these Standards were developed for "envelope" protection to reduce rainwater intrusion, these components that are now rated as "Hurricane Tested" are now being used in hardened "Hurricane Shelters" which are intended to protect lives. This is the result of misleading specification sheets, and uninformed dealers and consumers.
3. The "component rating" system does not consider the size of doors or glazed openings; the stiffness of doors with various sizes of lites, nor the quantity of hinges or latches required per size to carry the loads.
4. The Standard requires the component to be rated by ultimate load, but there is no guidance regarding the "assembly rating" based upon mixture of components with various ratings.
5. The Standard does not require engineering review or oversight.
6. According to the Test Procedure stated in Section 5.2.2, the impact energy should be 350 foot-pounds. However, for hinges, Section 6.1.1.2 and Latching Hardware, Section 7.1.1.3, the impact kinetic energy has been reduced to 125 foot-pounds. I understand the "stiffness" theory of the test fixture and product configuration, but this assumes that every laboratory will have the same fixtures and the same laboratory conditions.
7. The wind speed range has changed from 110-150 mph for the 2003 Standard to 110-170 mph for the 2008 Standard, but the test loads and impact criteria has not changed.
8. The impact location 6" above the floor on Figure 4, page 6 is unrealistic. In researching most all of the severe tornadoes and hurricanes since 1989, I have never seen an impact lower than 2.5 feet on a vertical surface.
9. Although there is not the opportunity at this time, to prevent the misuse of these products as describe above, I would suggest that the title of the standard be changed to: *Testing and Rating of Windstorm Resistant Components for Swinging Doors for Non-Life Safety Uses.*

Final Action: AS AM AMPC____ D

S144-09/10-PART I

1715.6 (New), 202

Proposed Change as Submitted

Proponent: Julie Ruth, PE, JRuth Code Consulting, representing American Architectural Manufacturers Association

PART I – IBC STRUCTURAL

1. Revise as follows:

SECTION 202

SKYLIGHT, UNIT. A factory-assembled, glazed fenestration unit, containing one panel of glazing material that allows for natural lighting through an opening in the roof assembly while preserving the weather-resistant barrier of the roof. Unit skylights include, but are not limited to, tubular daylighting devices (TDDs).

2. Add new text as follows:

1715.6 Skylights and sloped glazing. Unit skylights shall comply with the requirements of Section 2405. All other skylights and sloped glazing shall comply with the requirements of Chapter 24.

(Renumber subsequent sections)

Reason: This proposal clarifies that tubular daylighting devices (TDDs) are unit skylights and therefore subject to the testing and labeling requirements of Section 2405 for these devices. It also points the code user to the appropriate location in the IBC for the structural requirements for unit skylights, TDDs and all other types of sloped glazing.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME: RUTH-G1-202

Public Hearing Results

PART I- IBC STRUCTURAL
Committee Action: Disapproved

Committee Reason: There was concern with the proposed Section 1715.6 being located in the section on testing.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Julie Ruth, JRuth Code Consulting, representing American Architectural Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IBC STRUCTURAL

SECTION 202

SKYLIGHT, UNIT. A factory-assembled, glazed fenestration unit, containing one panel of glazing material that allows for natural lighting through an opening in the roof assembly while preserving the weather-resistant barrier of the roof. Unit skylights include, but are not limited to, tubular daylighting devices (TDDs).

~~**1715.6 Skylights and sloped glazing.** Unit skylights shall comply with the requirements of Section 2405. All other skylights and sloped glazing shall comply with the requirements of Chapter 24.~~

Commenter's Reason: The intent of S144 was to clarify within both the IBC and IRC that tubular daylighting devices are unit skylights, and therefore shall be tested and labeled in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, as required for unit skylights in IBC Section 2405 and IRC Section R308.6.9.

S144, Part I also included a pointer from Section 1715 of the IBC, where AAMA/WDMA/CSA 101/I.S.2/A440 is referenced for windows and sliding doors, to Section 2405, which contains the reference to the same standard for unit skylights. The IBC Structural Committee did not agree with the addition of this pointer in Section 1715 of the IBC, and therefore they disapproved S144, Part I.

S144, Part II, which only added tubular daylight devices to the definition of unit skylights, and did not contain a pointer to another code section for reference to the applicable standard, was approved by the IRC Building and Energy Committee.

This Public Comment removes the proposed pointer, and simply seeks the addition of tubular daylighting devices to the definition of unit skylights in the IBC. Its approval would be consistent with the action taken on S144, Part II.

Public Comment 2:

Gary J. Ehrlich, PE, National Association of Home Builders, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IBC STRUCTURAL

SECTION 202

SKYLIGHT, UNIT. A factory-assembled, glazed fenestration unit, containing one panel of glazing material that allows for natural lighting through an opening in the roof assembly while preserving the weather-resistant barrier of the roof. ~~Unit skylights include, but are not limited to, tubular daylighting devices (TDDs)~~.

<u>**TUBULAR DAYLIGHTING DEVICE (TDD).** A non-operable fenestration unit primarily designed to transmit daylight from a roof surface to an interior ceiling via a tubular conduit. The basic unit consists of an exterior glazed weathering surface, a light-transmitting tube with a reflective interior surface, and an interior-sealing device such as a translucent ceiling panel. The unit may be factory assembled, or field-assembled from a manufactured kit.</u>

1715.6 Skylights and sloped glazing. Unit skylights and tubular daylighting devices (TDDs) shall comply with the requirements of Section 2405. All other skylights and sloped glazing shall comply with the requirements of Chapter 24.

Commenter's Reason: The purpose of this public comment is to amend the proposed requirements for tubular daylighting devices. A tubular daylighting device (TDD) is typically field-assembled from a manufactured kit, unlike a unit skylight which is typically shipped as a factory-assembled unit. If the current unit skylight definition is applied to TDDs, some code users will expect that TDDs be entirely assembled in the factory. Also, the dome of a TDD is not necessarily constructed out of a single panel of glazing material. As such, a separate definition from that of a unit skylight is needed. The proposed definition is adapted from the definition in AAMA/WDMA A440. A reference to TDDs is added to Section 1715.6.

Final Action: AS AM AMPC____ D

S144-09/10-PART II
IRC R308.6.1

Proposed Change as Submitted

Proponent: Julie Ruth, PE, JRuth Code Consulting, representing American Architectural Manufacturers Association

PART II – IRC BUILDING/ENERGY

Revise as follows:

R308.6.1 Definitions.

~~UNIT SKYLIGHT~~ SKYLIGHT, UNIT. A factory assembled, glazed fenestration unit, containing one panel of glazing material, that allows for natural daylighting through an opening in the roof assembly while preserving the weather-resistant barrier of the roof. Unit skylights include, but are not limited to, tubular daylighting devices (TDDs).

Reason: This proposal clarifies that tubular daylighting devices (TDDs) are unit skylights and therefore subject to the testing and labeling requirements of the IRC for same.

Cost Impact: The code change will not increase the cost of construction.

ICCFILENAME: RUTH-G1-202

Public Hearing Results

PART II- IRC B/E
Committee Action: **Approved as Submitted**

Committee Reason: This change clarifies that a tubular daylighting devices (TDDs) is a unit skylight. The TDD was added to the energy conservation part of the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, PE., National Association of Home Builders, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART II – IRC BUILDING/ENERGY

R308.6.1 Definitions.

SKYLIGHTS AND SLOPED GLAZING. Glass or other transparent or translucent glazing material installed at a slope of 15 degrees (0.26 rad) or more from vertical. Glazing materials in skylights, including unit skylights, tubular daylighting devices, solariums, sunrooms, roofs and sloped walls are included in this definition.

SKYLIGHT, UNIT. A factory assembled, glazed fenestration unit, containing one panel of glazing material, that allows for natural daylighting through an opening in the roof assembly while preserving the weather resistant barrier of the roof. ~~Unit skylights include, but are not limited to, tubular daylighting devices (TDDs).~~

<u>**TUBULAR DAYLIGHTING DEVICE (TDD).** A non-operable fenestration unit primarily designed to transmit daylight from a roof surface to an interior ceiling via a tubular conduit. The basic unit consists of an exterior glazed weathering surface, a light-transmitting tube with a reflective interior surface, and an interior-sealing device such as a translucent ceiling panel. The unit may be factory assembled, or field-assembled from a manufactured kit.</u>

R308.6.9 Testing and labeling. Unit skylights <u>and tubular daylighting devices</u> shall be tested by an *approved* independent laboratory, and bear a *label* identifying manufacturer, performance *grade* rating and *approved* inspection agency to indicate compliance with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440.

Commenter's Reason: The purpose of this public comment is to amend the proposed requirements for tubular daylighting devices. A tubular daylighting device (TDD) is typically field-assembled from a manufactured kit, unlike a unit skylight which is typically shipped as a factory-assembled unit. If the current unit skylight definition is applied to TDDs, some code users will expect that TDDs be entirely assembled in the factory. Also, the dome of a TDD is not necessarily constructed out of a single panel of glazing material. As such, a separate definition from that of a unit skylight is needed. The proposed definition is adapted from the definition in AAMA/WDMA A440. A reference to TDDs is added to Sections R308.6.1 and R308.6.9.

Final Action: AS AM AMPC____ D

S149-09/10
1803.5.12

<u>Proposed Change as Submitted</u>

Proponent: Ali M. Fattah, City of San Diego, representing SD Area Chapter ICC Code Committee

Revise as follows:

1803.5.12 Seismic Design Categories D through F. For structures assigned to *Seismic Design Category* D, E or F in accordance with Section 1613, the geotechnical investigation required by Section 1803.5.11, shall also include:

1. The determination of lateral <u>earth</u> pressures on foundation walls and retaining walls <u>supporting more than 12 feet (3.66 m) of backfill height,</u> due to earthquake motions.
2. The potential for liquefaction and soil strength loss evaluated for site peak ground accelerations, magnitudes and source characteristics consistent with the design earthquake ground motions. Peak ground acceleration shall be permitted to be determined based on a site-specific study taking into account soil amplification effects, as specified in Chapter 21 of ASCE 7, or, in the absence of such a study, peak ground accelerations shall be assumed equal to $S_{DS}/2.5$, where S_{DS} is determined in accordance with Section 1613.5.4.
3. An assessment of potential consequences of liquefaction and soil strength loss, including estimation of differential settlement, lateral movement, lateral loads on foundations, reduction in foundation soil-bearing capacity, increases in lateral pressures on retaining walls and flotation of buried structures.
4. Discussion of mitigation measures such as, but not limited to, ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements and forces, or any combination of these measures and how they shall be considered in the design of the structure.

Reason: The proposed code change deletes a current requirement. The current requirement is onerous on small structures and light framed structures as well as for retaining walls. The California Building Code has had an amendment that was added in the 1990's that addresses this issue and limits the requirement to retaining walls higher than 12 ft. The amendment only applies to hospitals projects, school projects and State owned buildings (See Section 1806A.1 General, http://www.bsc.ca.gov/default.htm).

Evidence from recent earthquakes and recent experimental research results, including work recently completed at the University of California, Berkeley, CA (Al Atik and Sitar, 2008) have demonstrated that the retaining walls structures would have to move in order to develop the failure wedge postulated in the so-called Mononobe and Okabe method. This method was developed by Okabe (1926) and Mononobe & Matsuo (1929) as an extension of Coulomb's static earth pressure theory to include the inertial forces due to the horizontal and vertical back-fill accelerations. The M-O method was developed for dry cohesionless backfill retained by a gravity wall and is mainly based on the following assumptions (Seed & Whitman 1970):

1. The wall yields sufficiently to produce minimum active pressure and the soil is assumed to satisfy the Mohr-Coulomb failure criterion;
2. When the minimum active pressure is attained, a soil wedge behind the wall is at the point of incipient failure, and the maximum shear strength is mobilized along the potential sliding surface; and
3. The soil wedge behaves as a rigid body, and accelerations are constant throughout the mass.

However, this condition can only occur when the wall has already failed due to other causes and the current body of field evidence does not provide any evidence of existence of this proposed mechanism of failure.

Retaining wall backfill is what imposes the inertial forces and is controlled backfill, usually not cohesionless and is compacted.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME:Fattah-S2-1803.5.1.2

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: This code change relieves the geo-technical requirement for determination of lateral earth pressure on small structures as well as retaining walls that support backfill no more than 12 feet in height. It is the height of the backfill that imposes the inertial force. This is based on a California Building Code requirement that recognizes earthquake is not controlling loading on these structures.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Ali M. Fattah, PE., City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1803.5.12 Seismic Design Category D, E or F.

For structures assigned to Seismic Design Category D, E or F in accordance with Section 1613, the geotechnical investigation required by Section 1803.5.11, shall also include:

1. The determination of lateral earth pressures on foundation walls, and retaining walls supporting more than ~~12~~ 6 feet of backfill height, due to earthquake motions.
2. The potential for liquefaction and soil strength loss evaluated for site peak ground accelerations, magnitudes and source characteristics consistent with the design earthquake ground motions. Peak ground acceleration shall be permitted to be determined based on a site-specific study taking into account soil amplification effects, as specified in Chapter 21 of ASCE 7, or, in the absence of such a study, peak ground accelerations shall be assumed equal to $S_{DS}/2.5$, where S_{DS} is determined in accordance with Section 1613.5.4.
3. An assessment of potential consequences of liquefaction and soil strength loss, including estimation of differential settlement, lateral movement, lateral loads on foundations, reduction in foundation soil-bearing capacity, increases in lateral pressures on retaining walls and flotation of buried structures.
4. Discussion of mitigation measures such as, but not limited to, ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements and forces, or any combination of these measures and how they shall be considered in the design of the structure

Commenter's Reason: This public comment requests that the voting membership support the IBC Structural Committee's assessment of the need for this code change and to support a modification to the height threshold that may allay the concerns of other interested parties that may not be in support of the Committee's action.

The proposed code change was concurrently submitted for adoption into the 2010 California Building Code and the Structural Design - Lateral Forces Committee Code Advisory Committee recommended that the California Building Standard Commission adopt a similar code change that was limited to 6 ft height and not 12 ft as was proposed in the IBC.

The public comment reduces the height exemption to 6 ft to satisfy the concerns of certain stakeholders that disagree with the IBC Structural Committee decision. The SEAOC Code Committee saw the merits of the code change as proposed to both bodies and took a neutral stance. The proponent was not able to attend the meeting but was informed that NCSEA offered support to the IBC proposal.

The Division of the State Architect and the Office of Statewide Health Planning and Development repealed the 12 ft height exemption that has been published in editions of the California Building Code prior to the 2010 edition and decided to defer to Section 11.8 of ASCE 7-05. The proponent acknowledges that the code change will result in a conflict with Section 11.8 of ASCE 7-05 however the building code governs over the referenced standard. Had the requirements been struck from the Building Code as was the case for most of the seismic requirements in Chapter 16 the proponent would have sought to change the ASCE 7-05.

The proponent was not able to attend the Structural Committee meeting to explain that the justification for the code change was not only based on the CBC. The justification included a research study on the issue performed at the University of California as well as post earthquake reconnaissance. The committee action report seems to imply that the basis of approval was because a similar provision existed in the CBC.

The proposed code change is necessary for uniform enforcement and to avoid non-enforcement of the requirement on many miscellaneous structures such as swimming pools, minor earth retaining structures, some of which many not require a building permit. As structured, the code requirement in both ASCE 7-05 and the IBC places an enormous burden on an applicant to investigate a site for a structure that will be located on native undisturbed ground, that does not include fill materials or expansive soils and where ASCE 7-05 and the IBC provide adequate lateral earth design parameters that negate the need for a report. We urge the voting memberships support.

Public Comment 2:

Steven Winkel, FAIA, PE; Susan Dowty, SE; John Gillengerten, SE, representing the Federal Emergency Management Agency/Building Seismic Safety Council Code Resource Support Committee (FEMA/BSSC CRSC), request Disapproval.

Commenter's Reason: The committee reason for support of this proposal, that it "…is based on a California Building Code (CBC) requirement that recognizes earthquake is not controlling on these structures" is not valid. This CBC requirement was repealed in 2009 in favor of the requirements in ASCE 7-05 Section 11.8.3. This ASCE 7 provision requires that determination of lateral pressures on basement and retaining walls due to earthquake motions for structures Seismic Design Categories D, E, and F be included in a geotechnical investigations. Also, it should be noted that ASCE 7 Section 15.6.1, Earth-Retaining Structures, references Section 11.8.3 for determining lateral earth pressures due to earthquake ground motions.

Final Action: AS AM AMPC____ D

S164-09/10
1908.1.2

<u>Proposed Change as Submitted</u>

Proponent: Alan Robinson, SE, representing Structural Engineers Association of California

Revise as follows:

1908.1.2 ACI 318, Section 21.1.1. Modify ACI 318 Sections 21.1.1.3 and 21.1.1.7 to read as follows:

21.1.1.3 – Structures assigned to Seismic Design Category A shall satisfy requirements of Chapters 1 to 19 and 22; Chapter 21 does not apply. Structures assigned to Seismic Design Category B, C, D, E or F also shall satisfy 21.1.1.4 through 21.1.1.8, as applicable. Except for structural elements of plain concrete complying with Section 1908.1.8 of the International Building Code, structural elements of plain concrete are prohibited in structures assigned to Seismic Design Category C, D, E or F.

21.1.1.7 – Structural systems designated as part of the seismic-force-resisting system shall be restricted to those *permitted by ASCE 7*. Except for *Seismic Design Category* A, for which Chapter 21 does not apply, the following provisions shall be satisfied for each structural system designated as part of the seismic-force-resisting system, regardless of the *Seismic Design Category*:

(a) Ordinary moment frames shall satisfy 21.2.
(b) Ordinary reinforced concrete structural walls *and ordinary precast structural walls* need not satisfy any provisions in Chapter 21.
(c) Intermediate moment frames shall satisfy 21.3.
(d) Intermediate precast *structural* walls shall satisfy 21.4.
(e) Special moment frames shall satisfy 21.5 through 21.8.
(f) Special structural walls shall satisfy 21.9.
(g) Special structural walls constructed using precast concrete shall satisfy 21.10.
<u>(h) In Seismic Design Category D, E or F, concrete tilt-up wall panels that exceed the limitations of intermediate precast structural wall system shall satisfy 21.9 in addition to 21.4.2 and 21.4.3.</u>

All special moment frames and special structural walls shall also satisfy 21.1.3 through 21.1.7.

Reason: Concrete tilt-up wall panels is an alternative forming system of site-cast concrete wall panels which are tilted or lifted in place. They do not qualify for special precast structural wall system, which must meet the PRESSS test protocol or ACI ITG-5.2. Unlike earlier construction of box-liked industrial buildings, current practice in commercial buildings constructed using tilt-up panel wall system commonly consists of large window and door openings in consecutive panels. Wall panels varying up to three stories high with openings in consecutive panels tend to resemble wall frame, which is not currently recognized under any of the defined seismic-force resisting systems other than consideration as one of the precast structural wall systems. While special boundary elements are probably not required by calculation if there are a number of panels in one shear line, spandrel panels often should be investigated for requirements of coupling beams.

Large tilt-up buildings with flexible diaphragm also may include isolated interior structural wall panels, either cast-in-place or precast, which are designed to resist high required shear strength demand. These isolated structural wall panels must be investigated for special boundary elements. Based on the current code language, intermediate precast structural wall are exempt from requirements of ACI 318-08 section 21.9 and thus design for boundary element, coupling beam and ductile detailing will be absent. This proposal does not affect the selection of seismic response R-factor given in ASCE 7 Table 12.2-1. This proposal gives requirement under which design and detailing need to conform to special structural wall system provisions in ACI-318 section 21.9. This proposal further enhances minimum life safety building performance under earthquake forces in SDC D, E or F.

Cost Impact: The code change proposal will not increase the cost of construction for typical tilt-up buildings in higher SDC.

ICCFILENAME: ROBINSON-S1-1908.1.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The current requirements on intermediate precast structural wall systems are clear, making this proposal unnecessary.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Alan Robinson, SE., Structural Engineers Association of California, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1908.1.2 ACI 318, Section 21.1.1. Modify ACI 318 Sections 21.1.1.3 and 21.1.1.7 to read as follows:

21.1.1.3 – Structures assigned to Seismic Design Category A shall satisfy requirements of Chapters 1 to 19 and 22; Chapter 21 does not apply. Structures assigned to Seismic Design Category B, C, D, E or F also shall satisfy 21.1.1.4 through 21.1.1.8, as applicable. Except for structural elements of plain concrete complying with Section 1908.1.8 of the International Building Code, structural elements of plain concrete are prohibited in structures assigned to Seismic Design Category C, D, E or F.

21.1.1.7 – Structural systems designated as part of the seismic-force-resisting system shall be restricted to those *permitted by ASCE 7*. Except for *Seismic Design Category* A, for which Chapter 21 does not apply, the following provisions shall be satisfied for each structural system designated as part of the seismic-force-resisting system, regardless of the *Seismic Design Category*:

(a) Ordinary moment frames shall satisfy 21.2.
(b) Ordinary reinforced concrete structural walls *and ordinary precast structural walls* need not satisfy any provisions in Chapter 21.
(c) Intermediate moment frames shall satisfy 21.3.
(d) Intermediate precast *structural* walls shall satisfy 21.4.
(e) Special moment frames shall satisfy 21.5 through 21.8.
(f) Special structural walls shall satisfy 21.9.
(g) Special structural walls constructed using precast concrete shall satisfy 21.10.
~~(h) In Seismic Design Category D, E or F, concrete tilt-up wall panels that exceed the limitations of intermediate precast structural wall system shall satisfy 21.9 in addition to 21.4.2 and 21.4.3.~~

All special moment frames and special structural walls shall also satisfy 21.1.3 through 21.1.7. <u>In Seismic Design Category D, E or F, concrete tilt-up wall panels classified as intermediate precast structural wall system shall satisfy 21.9 in addition to 21.4.2 and 21.4.3.</u>

Commenter's Reason: After further research in ACI 318, it was noted that by virtue of ACI 318 Sec. 21.1.1.7(d), intermediate precast structural walls designed under Sec. 21.4, material requirements intended under provisions 21.1.4, 21.1.5, 21.1.6, and 21.1.7 would be excluded for structures assigned to SDC D, E or F. Since the deliberation at the code development hearing, we have had further discussions with ACI 318-H in their meeting in New Orleans. It was a consensus that clarification of ACI 318 chapter 21 is needed to ensure that structural walls designed under ASCE 7 using the intermediate wall panel category would conform to ductility requirements comparable to special structural wall; and conformance to the long standing practice of ACI 318 to impose special requirements for high seismic design regions. This public comment gives explicit requirement under which design and detailing need to conform to special structural wall system provision in ACI-318 section 21.9, which covers both cast-in-place as well as precast. This public comment further gives building officials the tools to enforce minimum life safety building performance under earthquake forces in SDC D, E or F.

Final Action: AS AM AMPC____ D

S166-09/10
1908.1.8

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, City of San Jose**,** representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay)

Revise as follows:

1908.1.8 ACI 318, Section 22.10. Delete ACI 318, Section 22.10, and replace with the following:

22.10 – Plain concrete in structures assigned to Seismic Design Category C, D, E or F.

22.10.1 – Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:

(a) Structural plain concrete basement, foundation or other walls below the base are permitted in detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall not be less than 71/2 inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 22.6.6.5.

(b) Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.

Exception: In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.

(c) Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.

Exceptions:

1. In <u>Group U occupancies</u> ~~detached one-and two-family dwellings three stories or less in height and~~ constructed with stud-bearing walls, plain concrete footings without longitudinal reinforcement supporting walls are permitted.
2. <u>In structures assigned to Seismic Design Categories D, E and F,</u> ~~For~~ foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one <u>No. 4</u> bar shall be provided at the top of the stemwall and at the bottom of the footing.
3. Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.

Reason: If any occupancy warrants no reinforcing, it is a U occupancy. A three story dwelling in Seismic Design Category D, E or F should have at least 1 #4 bar at the top and bottom of the footing. Concrete cracks without reinforcing. A minimal amount of reinforcing will limit cracks during a seismic event.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MAIEL-S5-1908.1.8

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There are concerns with revising the exemption to now apply to Group U. In addition these proposed changes would be inconsistent with the NEHRP Provisions.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Homer Maiel, PE, CBO, City of San Jose, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Chapters), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1908.1.8 ACI 318, Section 22.10. Delete ACI 318, Section 22.10, and replace with the following:

22.10 – Plain concrete in structures assigned to Seismic Design Category C, D, E or F.

22.10.1 – Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:

(a) Structural plain concrete basement, foundation or other walls below the base are permitted in detached one and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall not be less than 71/2 inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 22.6.6.5.

(b) Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.

Exception: In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.

(c) Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.

Exceptions:

1. In <u>Seismic Design Categories A, B and C</u>, detached one-and two-family dwellings three stories or less in height ~~and~~ constructed with stud-bearing walls, <u>are permitted to have</u> plain concrete footings without longitudinal reinforcement ~~supporting walls are permitted~~.
2. For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.
3. Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.

Commenter's Reason: In seismic design categories D, E and F, the flexural demands placed upon footings of stud wall framed detached one- and two-family dwellings make the use of plain concrete footings devoid of any longitudinal reinforcing unacceptable. The footing is an integral part of the seismic force-resisting load path and deserves to be constructed in a manner consistent with the seismic-resisting braced walls or shear wall panels it is supporting. The current specific allowance for absence of any longitudinal reinforcing will also prevent any vertical reinforcing from being placed in the footing, since there is nothing to tie any vertical bar to; consequently the current provision is allowing totally unreinforced footings in dwellings up to three stories in height.

Since the mid-1990's wood light-frame prescriptive provisions (currently in IBC Section 2308.9.3.1) for alternative wall bracing using tie-downs have required that the foundation at these alternative panels utilize one No. 4 bar top and bottom. Also, more recent alternative wall bracing provisions (Section 2308.9.3.2) that use tie-downs similarly specify footings with one No. 4 bar top and bottom. In addition, since the 2003 IBC, provisions for tie-downs at braced walls of buildings having stone or masonry veneer have been specified (Sections 2308.11.2 and 2308.12.2), but without any mention of minimum foundation reinforcing. Each time a tie-down is installed, the footing should be capable of resisting the flexural demands induced by that connection, yet the current 1918.1(c) exception 1 ignores this need.

There are additional reasons that this provision should be revised. The 2006 IBC reduced the number of stories permitted when using conventional construction provisions to two stories in Seismic Design Category C (Section 2308.11.1) and to one story in Seismic Design Categories D and E (Section 2308.12.1), while section 1908.1.8 continues to allow plain concrete footings for stud bearing wall of one- and two-family dwellings up to <u>three stories in height</u>. This implies that plain concrete footings are permitted even in engineered one- and two-family dwelling construction. The IBC also explicitly deems the use of AF&PA Wood frame Construction Manuel (WFCM) as permitted to substitute for the traditional 2308 bracing provisions, but in that document all walls providing lateral resistance are required to use various types of tie-downs.

To address the concern of the ICC Structural Committee in Baltimore regarding the original proposal's application of the exception 2 to U occupancies, that change has been removed in this amended public comment proposal. With regard to any inconsistency of this proposal with the NEHRP Provisions, it must be noted that the applicable NEHRP provision (Sec. 9.4.2.2 Exception 1) has not been updated since its publication in 2004 (FEMA 450-1/2003) while conventional construction limits on number of permitted story levels and the use of tie-downs have progressed in the IBC since that time, as noted above.

While we recognize there is a cost of installing this minimum reinforcing, we believe that most builders of dwellings in Seismic Design Categories D through F are already providing this level of reinforcing, and that the cost of repairing cracks caused to interior and exterior finishes not to mention the foundation itself would far exceed the cost of minimal reinforcement of footings during the original construction.

Final Action: AS AM AMPC____ D

S167-09/10
1908.1.9

Proposed Change as Submitted

Proponent: Kevin Moore, PE, SE, SECB and Edwin Huston, PE, SE, SECB, representing National Council of Structural Engineers Associations

Revise as follows:

1908.1.9 ACI 318, Section D.3.3. Modify ACI 318, Sections D.3.3.1, D3.3.4 and D3.3.5, and add Section D.3.3.7 to read as follows:

D.3.3.1 – The provisions of Appendix D do not apply to the design of anchors in plastic hinge zones of concrete structures under earthquake forces or to anchors that meet the requirements of Section D.3.3.7.

D.3.3.4 – Anchors shall be designed to be governed by the steel strength of a ductile steel element as determined in accordance with D.5.1 and D.6.1, unless either D.3.3.5 or D.3.3.6 is satisfied.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.4.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.4.

D.3.3.5 – Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.5.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.5.

D.3.3.7 – For anchors installed in wood sill plates a maximum of 2 ½ inches (38 mm) in net thickness, the allowable lateral design values for shear in the cast-in-place anchor, parallel to the grain of the wood sill plate, are permitted to be determined in accordance with Section 2305 of the *International Building Code*, provided the anchor installation complies with all of the following:

1. Anchor nominal diameter is 5/8 inches (16 mm);
2. Anchors are embedded into concrete a minimum of 7 inches (178 mm);
3. Anchors are located a minimum of 2 ½ anchor diameters from the edge of the concrete parallel to the length of the wood sill plate; and
4. Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate

Reason: Current design provisions require calculation of the capacity of anchor bolt fastening wood sill plates to concrete foundations via methods promulgated in ACI 318, Appendix D. These methods result in significantly reduced capacities for this connection when compared to historical values and legacy code requirements. The state of knowledge regarding this connection is ambiguous and does not support such a large reduction for a common assembly.

Recent experimental testing and analysis indicates that actual capacities of the considered connection far exceed those historically used for design, supporting the use of wood dowel design values for the connection. The experimental data used to support this code change proposal indicates that concrete failure modes do not control the capacity of the connection, so the need to calculate the capacity of the bolt related to concrete strength for proper embedment and edge spacing is superfluous.

Reference: W. Andrew Fennell, et al. *Report on laboratory testing of anchor bolts connecting wood sill plates to concrete with minimum edge distances.* March 29, 2009.

Cost Impact: The code change proposal will decrease the cost of construction.

ICCFILENAME: MOORE-HUSTON-S1-1908.1.9 D.3.3.1

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

1908.1.9 ACI 318, Section D.3.3. Modify ACI 318, Sections ~~D.3.3.1,~~ D3.3.4 and D3.3.5~~, and add Section D.3.3.7~~ to read as follows:

~~D.3.3.1 The provisions of Appendix D do not apply to the design of anchors in plastic hinge zones of concrete structures under earthquake forces or to anchors that meet the requirements of Section D.3.3.7.~~

D.3.3.4 – Anchors shall be designed to be governed by the steel strength of a ductile steel element as determined in accordance with D.5.1 and D.6.1, unless either D.3.3.5 or D.3.3.6 is satisfied.

Exceptions:

~~1.~~ ~~Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.4.~~

~~2~~ 1. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.4.

2. In light-frame wood structure bearing or non-bearing walls, for the design of anchors used to attach wood sill plates to foundations or foundation stem walls, it shall be permitted to take the allowable in-plane shear strength of the anchors in accordance with Section 2305.1.2 of the International Building Code.

D.3.3.5 – Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.5.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.5.

~~D.3.3.7 – For anchors installed in wood sill plates a maximum of 2 ½ inches (38 mm) in net thickness, the allowable lateral design values for shear in the cast-in-place anchor, parallel to the grain of the wood sill plate, are permitted to be determined in accordance with Section 2305 of the *International Building Code*, provided the anchor installation complies with all of the following:~~

2305.1.2 Sill plate anchor bolts. For sill plates of 2x or 3x nominal thickness, the allowable lateral design for shear parallel to the grain of sill plate anchor bolts is permitted to be determined using the lateral design value for a bolt attaching a wood sill plate to concrete, as specified in AF&PA NDS Table 11E, provide the anchor bolts comply with all of the following:

1. The maximum anchor nominal diameter is 5/8 inches (16 mm);
2. Anchors are embedded into concrete a minimum of 7 inches (178 mm);
3. Anchors are located a minimum of ~~2 ½ anchor diameters~~ 1-3/4 inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate; and
4. Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.

Committee Reason: This proposal revises the determination of anchor bolt capacity under Appendix D of ACI 318, in recognition that both lab tests and field experience show that failure of the wood sill plate controls the capacity. In these instances there is no need for laborious concrete strength calculations. The modification removes an exception that is no longer needed with the updates in the next edition of the ASCE 7 Standard. It also reformats the proposal as new Exception 3 and places the sill plate anchor details in new Section 2305.1.2. This also combines and addresses issues raised by code changes S170- 09/10 and S209 – 09/10.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Don Allen, Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1908.1.9 ACI 318, Section D.3.3. Modify ACI 318, Sections D3.3.4 and D3.3.5 to read as follows:

D.3.3.4 – Anchors shall be designed to be governed by the steel strength of a ductile steel element as determined in accordance with D.5.1 and D.6.1, unless either D.3.3.5 or D.3.3.6 is satisfied.

Exceptions:

1. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.4.
2. In light-frame wood structure bearing or non-bearing walls, for the design of anchors used to attach wood sill plates to foundations or foundation stem walls, it shall be permitted to take the allowable in-plane shear strength of the anchors in accordance with Section 2305.1.2 of the International Building Code.
3. <u>In cold-formed steel light-frame construction, for the design of anchors used to attach cold-formed steel track to foundations or foundation stem walls, it shall be permitted to take the allowable in-plane shear strength of the anchors in accordance with Section 2210.8 of the International Building Code.</u>

D.3.3.5 – Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.5.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.5.

Add new text as follows:

<u>**2210.8 Sill plate anchor bolts.** For cold-formed steel light-frame tracks of 33 to 68 mil designation thickness, the allowable lateral design for shear parallel to the track with anchor bolts is permitted to be determined using the lateral design value for a bolt attaching a cold-formed steel light-frame track to concrete, as specified in AISI S100, Section E.3.3.1, provided the anchor bolts comply with all of the following:</u>

1. <u>The maximum anchor nominal diameter is 5/8 inches (16 mm);</u>
2. <u>Anchors are embedded into concrete a minimum of 7 inches (178 mm);</u>
3. <u>Anchors are located a minimum of 1-3/4 inches (45 mm) from the edge of the concrete parallel to the length of the track; and</u>
4. <u>Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.</u>

(Portions of proposal not shown remain unchanged)

Commenter's Reason: ACI 318 Appendix D design provisions are required for calculation of the capacity of anchor bolt fastening cold-formed steel (CFS) bottom track sill plates to concrete foundations. These methods result in significantly reduced capacities for this connection when compared to historical values and legacy code requirements. The state of knowledge regarding this connection is ambiguous and does not support such a large reduction for a common assembly.

Recent experimental testing and analysis indicates that actual capacities of the track-to-concrete anchor bolt connection far exceed those historically used for design, supporting the use of AISI bolt-bearing design values for the connection. The experimental data used to support this code change proposal indicates that ductile steel failure rather than concrete failure modes control the capacity of the connection, so the need to calculate the capacity of the bolt related to concrete strength for proper embedment and edge spacing is superfluous.

Please note that testing results will be posted at www.steel.org by April 15, 2010.

Public Comment 2:

Bonnie Manley, American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1908.1.9 ACI 318, Section D.3.3. Modify ACI 318, Sections D3.3.4 and D3.3.5 to read as follows:

D.3.3.4 – Anchors shall be designed to be governed by the steel strength of a ductile steel element as determined in accordance with D.5.1 and D.6.1, unless either D.3.3.5 or D.3.3.6 is satisfied.

Exceptions:

1. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.4.
2. In light-frame wood structure bearing or non-bearing walls, for the design of anchors used to attach wood sill plates to foundations or foundation stem walls, it shall be permitted to take the allowable in-plane shear strength of the anchors in accordance with Section 2305.1.2 of the International Building Code.
3. Section D.3.3.4 need not apply and the design shear strength in accordance with Section D.6.2.1(c) need not be computed for anchor bolts attaching cold-formed steel track of bearing or non-bearing walls of light-frame construction to foundations or foundation stem walls provided all of the following are satisfied:

    1. The maximum anchor nominal diameter is 5/8 inches (16 mm).
    2. Anchors are embedded into concrete a minimum of 7 inches (178 mm).
    3. Anchors are located a minimum of 1-3/4 inches (45 mm) from the edge of the concrete parallel to the length of the track.
    4. Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.
    5. The track is 33 to 68 mil designation thickness.

    Allowable in-plane shear strength of exempt anchors, parallel to the edge of concrete shall be permitted to be determined in accordance with AISI S100 Section E3.3.1.

D.3.3.5 – Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.5.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.5.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: ACI 318 Appendix D design provisions are required for calculation of the capacity of anchor bolt fastening cold-formed steel (CFS) bottom track sill plates to concrete foundations. These methods result in significantly reduced capacities for this connection when compared to historical values and legacy code requirements. The state of knowledge regarding this connection is ambiguous and does not support such a large reduction for a common assembly.

Recent experimental testing and analysis indicates that actual capacities of the track-to-concrete anchor bolt connection far exceed those historically used for design, supporting the use of AISI bolt-bearing design values for the connection. The experimental data used to support this code change proposal indicates that ductile steel failure rather than concrete failure modes control the capacity of the connection, so the need to calculate the capacity of the bolt related to concrete strength for proper embedment and edge spacing is superfluous.

Please note that testing results will be posted at www.steel.org by April 15, 2010.

Public Comment 3:

James E. Russell, Building Codes Consultant and Brad Douglas AF&PA and American Wood Council, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1908.1.9 ACI 318, Section D.3.3. Modify ACI 318, Sections D3.3.4 and D3.3.5 to read as follows:

D.3.3.4 – Anchors shall be designed to be governed by the steel strength of a ductile steel element as determined in accordance with D.5.1 and D.6.1, unless either D.3.3.5 or D.3.3.6 is satisfied.

Exceptions:

1. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.4.

~~2. In light-frame wood structure bearing or non-bearing walls, for the design of anchors used to attach wood sill plates to foundations or foundation stem walls, it shall be permitted to take the allowable in-plane shear strength of the anchors in accordance with Section 2305.1.2 of the International Building Code.~~

2. D.3.3.4 need not apply and the design shear strength in accordance with D.6.2.1(c) need not be computed for anchor bolts attaching wood sill plates of bearing or non-bearing walls of light-frame wood structures to foundations or foundation stem walls provided all of the following are satisfied:

    1. The allowable in-plane shear strength of the anchor is determined in accordance with AF&PA NDS Table 11E for lateral design values parallel to grain.
    2. The maximum anchor nominal diameter is 5/8 inches (16 mm).
    3. Anchor bolts are embedded into concrete a minimum of 7 inches (178 mm).
    4. Anchor bolts are located a minimum of 1-3/4 inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate.

5. <u>Anchor bolts are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.</u>
6. <u>The sill plate is 2-inch or 3-inch nominal thickness.</u>

D.3.3.5 – Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.5.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.5.

~~**2305.1.2 Sill plate anchor bolts.** For sill plates of 2x or 3x nominal thickness, the allowable lateral design for shear parallel to the grain of sill plate anchor bolts is permitted to be determined using the lateral design value for a bolt attaching a wood sill plate to concrete, as specified in AF&PA NDS Table 11E, provide the anchor bolts comply with all of the following:~~

1. ~~The maximum anchor nominal diameter is 5/8 inches (16 mm);~~
2. ~~Anchors are embedded into concrete a minimum of 7 inches (178 mm);~~
3. ~~Anchors are located a minimum of 1-3/4 inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate; and~~
4. ~~Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.~~

Commenter's Reason: The addition of 2305.1.2 in the "As Modified" approval of S167 as currently worded limits the use of NDS provisions for sill anchor bolts to applications with 2x or 3x sill plates, parallel to grain applications, and anchor diameters of 5/8" or less for <u>all lateral and shear loads</u> including those from wind and low seismic areas. Anchor bolt limitations were originally intended to define a specific range of sill plate anchor conditions for which relief from specific concrete anchor strength provisions for <u>seismic design</u> was warranted, based on results of cyclic testing. Concrete anchor strength provisions for which relief is provided are (i) ductility requirements of D.3.3.4, and (ii) required concrete breakout strength in shear parallel to the edge in accordance with D.6.2.1(c). To restore the original intent of the proposal, provisions of the proposed new section 2305.1.2 , that specify exactly what size sill plates, anchor bolts and bolt locations in concrete were tested, are relocated by this public comment to the section from which they are referenced (e.g. 1908.1.9 Exception 2).

This revision is necessary to accomplish two purposes: First it avoids the unintended interpretation that new section 2305.1.2 limits the use of the NDS as it applies to anchor bolt installations, and second it clarifies that in lieu of computing the concrete breakout strength in shear parallel to the edge for the anchor, it is the intent to allow the allowable load parallel to the edge of the foundation to be based on AF&PA NDS Table 11E for a limited range of sill plate anchor conditions.

Final Action: AS AM AMPC____ D

S168-09/10
1908.1.9

<u>Proposed Change as Submitted</u>

Proponent: Alan Robinson, SE, representing Structural Engineers Association of California

Revise as follows:

1908.1.9 ACI 318, Section D.3.3. Modify ACI 318, Sections D.3.3.4 and D.3.3.5 <u>delete and replace D.3.3.6 and add D.3.3.7</u> to read as follows:

D.3.3.4 - Anchors shall be designed to be governed by the steel strength of a ductile steel element as determined in accordance with D.5.1 and D.6.1, unless either D.3.3.5 or D.3.3.6 is satisfied.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.4.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.4.
3. <u>In light-frame wood construction, design of anchors in concrete shall be permitted to satisfy D.3.3.7.</u>

D.3.3.5 - Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.5.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.5.

<u>D.3.3.6 - As an alternative to D.3.3.4 and D.3.3.5, it shall be permitted to take the design strength of the anchors as 0.4 times the design strength determined in accordance with D.3.3.3.</u>

<u>D.3.3.7 – In light-frame wood structures, bearing or non-bearing walls, concrete anchors of sill plate to foundation or foundation stem wall need not satisfy D.3.3.5 and D.3.3.6 when the design strength of the anchors is determined in accordance with D.3.3.3.</u>

Reason: Development of Appendix D was based primarily on tests of concrete anchor using steel plates with substantially larger edge distance than common practice in light-frame construction. There are insufficient tests of concrete anchors with wood sill plate at minimum side cover distance to justify the arbitrary assignment of 50 per cent reduction of the design strength stated in D.3.3.6. Additional limitation for anchorage of wood stud wall is removed from current ACI 318-08 D.3.3.6 (i.e. D.3.3.6 - As an alternative to D.3.3.4 and D.3.3.5, it shall be permitted to take the design strength of the anchors as 0.4 times the design strength determined in accordance with D.3.3.3. A new section D.3.3.7 is introduced under this proposal to further modify ACI code for concrete anchors used in light-framed wood construction.

In common construction practice of light-frame construction, bolts are centered on sill plates giving an side edge distance of $1^3/_4$ inches. Current code requirements under ACI 318 Appendix D lead to substantial reduction of design capacity based on breakout strength of a single anchor under Section D.6.2.1(c) or D.6.2.2. As an example, the design strength for 5/8 inch diameter anchor bolt strength under D.3.3.3 is 1116 lbs. Requirement under D.3.3.6 will further reduce the design strength to 558 lbs. for use in sill bolts. The ASD value would be 398 lbs. This is a substantial reduction from prior codes leading to impractical bolt spacing for most wood shear panel nail spacing range. A comparison between ACI Appendix D to IBC Table 1911.2, Allowable Service Loads on Embedded Bolts, shows the disparity of concrete anchor value.

The primary mode of failure of plywood sheathed panels attached to wood sill plate has been through nail slippage and yielding. This mode of failure together with bending of bolt offers the ductility and toughness of wood wall panels. Over-strength factor does not apply in the transfer of seismic forces from wood shear panel to concrete. Additional reduction factor is not warranted based on recent laboratory test conducted under SEAOC Seismology Committee purview. Result of the test is summarized below.

Attachment:

Excerpt from Report on laboratory testing of anchor bolts connecting wood sill plates to concrete with minimum edge distances

IBC-06 references ACI 318-05 Appendix D for the determination of anchor bolt capacity (in single-shear) when attaching wood sill plates to concrete foundations. Engineers have historically anticipated the controlling failure of this connection to occur between the anchor bolts and the wood sill plate. Under the IBC, the wind resistance values of anchor bolts are about the same as in historical practice. However, design capacities seismic forces based on break-out strength in shear determined in accordance with ACI 318-05 Appendix D are greatly reduced and less than the wood to concrete connection design capacity for small side edge distances. Many practicing engineers and building officials are mystified by the substantial reduction of anchor bolt capacities obtained from the application of Appendix D equations for wood framed construction in seismic design categories D, E and F. In the absence of available test data, members of SEAOC Seismology Committee undertook a study of typical anchor bolted connections to establish a basis for evaluating design capacities while better understanding the behavior of this traditional connection.

Test parameters and procedures were established. The testing consisted of typical anchor bolt connections found in wood framed shear walls using pressure treated wood 2x4, 3x4, 2x6 and 3x6 sill plates and 5/8 inch diameter by seven inches embedment anchor bolts with code prescribed washers. Side edge distance of 1-3/4 inches for 2x4 and 3x4 and 2-3/4 inches for 3x4 and 3x6 sill plates. This Testing Program was completed in December 2008 and the results can be downloaded on the SEAOC website: http://www.SEAOC.org/bluebook.

The load protocol adopted for the tests was a displacement-controlled load protocol. Peak loads from monotonic tests were used to establish the reference force, which was used to prescribe the load steps in the pseudo-cyclic testing. Monotonic tests were run at a sufficiently slow rate to pick up the internal flaws forming within the concrete by using impact-echo testing. The Pseudo-cyclic tests were based on the CUREE load protocol but with cycles added at low load levels. All tests were conducted without intentionally pre-cracked concrete.

Impact-echo method was used to detect concrete side break-out, if any, during the tests. When concrete deterioration was detected, the corresponding load and displacement were recorded for each specimen. It was observed that the first stage of deterioration is a series of cracks that form within the concrete propagated from the centerline of the anchor bolt and angling out towards the outer free face of the concrete. The cracks ultimately reach the outer face and became shallow spall shapes. It is important to note that the early stages of concrete deterioration are not always visually apparent. A strong correlation between the "peak" envelope values with the onset of concrete side break-out was, however, observed. Peak values were in the range of 7,200 lb to 8,500 lb.

All cyclic test data was analyzed in accordance with ASTM E 2126 Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Walls for Buildings. Result of cycle test of specimen 296/ 302 is shown in Figure A-1. The positive and negative envelop curves for each specimens were combined to produce an average envelope curve used to establish peak load, displacement at peak load, ultimate load, and displacement at ultimate load and summarized in Figures A-2 and A-3.

Findings of the anchor bolt test program were as follows:

1. The results of the Anchor Bolt Testing Program has shown that wood components attached to concrete with minimum edge distances exhibited ductile behavior. The wood "yield" is the first material limit state.
2. The tests indicated that concrete cracks were not produced at service level loads. In the non-linear range of performance, delamination generally produced a decline in capacity corresponding to a wood displacement of about 0.60 inches, with the bolt experiencing considerable deformation.
3. Further excursion of the wood plate in some cases produced a complete concrete spall, however the bolt head remained intact and considerable residual strength was provided as the bolt remained in tension.
4. Cracking through the section did not occur at any point. For these reason, cracked section reduction appears overly conservative. It should also be noted that according to the available literature reductions are generally not required for shear anchorage applied perpendicular to a crack.
5. Test support design bolt values based on ACI 318 section D.3.3.3 using $0.75\Phi V_n$.

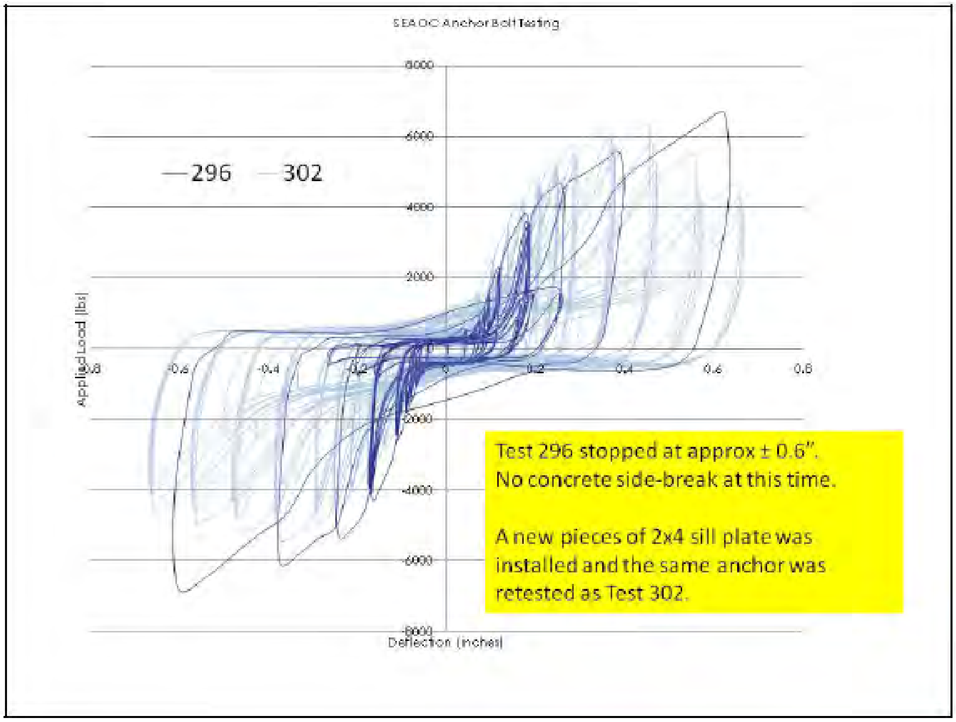


Figure A1 - Result of cycle test specimen 296 and 302

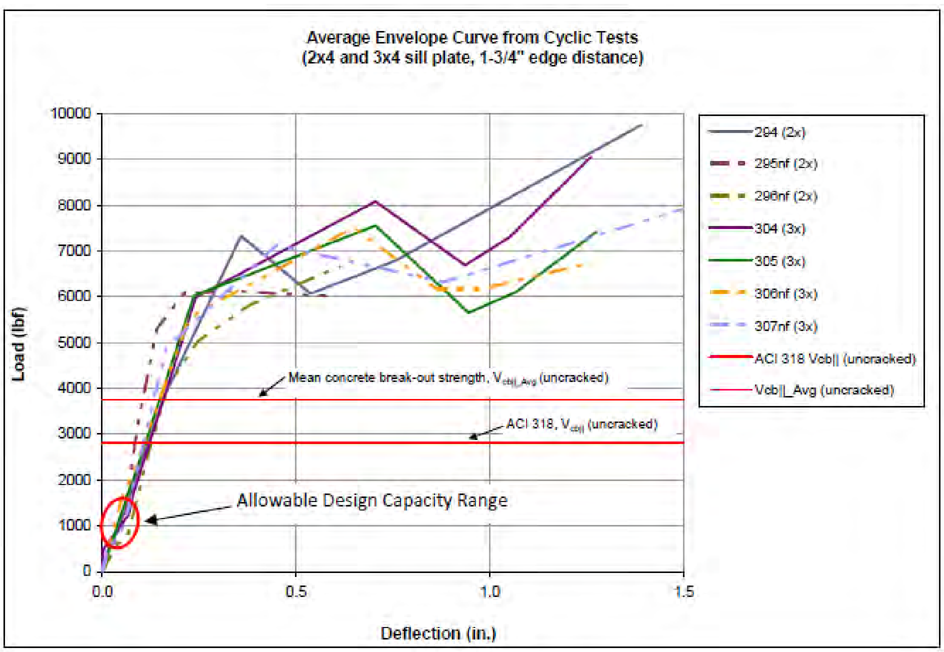


Fig. A2 – Average envelope curve of cyclic tests for concrete anchor of 2x4 and 3x4 sill plate

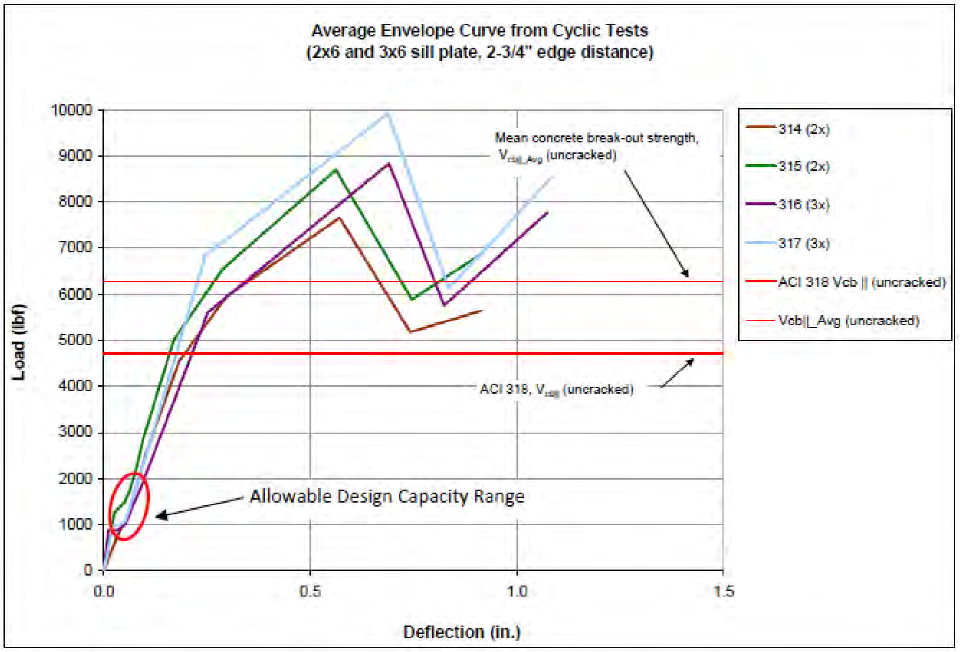


Fig. A3 – Average envelope curve of cyclic tests for concrete anchor of 2x6 and 3x6 sill plate

Ref. Fennel, Mochizuki, Moore (2008) "Report on laboratory testing of anchor bolts connection wood sill plates to concrete with minimum edge distances" SEAONC, San Francisco, CA

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: ROBINSON-S3-1908.1.9

Public Hearing Results

Committee Action: Disapproved

Committee Reason: With the liberalization of concrete anchorage approved in S167–09/10 a significant portion of problems posed in light-frame construction has been addressed. There is concern about the proposed extrapolation of data from testing that is ongoing. When dealing with an edge distance of only a little over an inch and considering typical construction tolerances, some anchor bolts could be installed awfully close to the edge of the concrete. Approval could possibly conflict with some portions of S167-09/10. The proponent is encouraged to provide better justification in the public comment phase.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Alan Robinson, SE, representing Structural Engineers Association of California, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1908.1.9 ACI 318, Section D.3.3. Modify ACI 318, Sections D.3.3.4 and D.3.3.5 delete and replace D.3.3.6 and add D.3.3.7 to read as follows:

D.3.3.4 - Anchors shall be designed to be governed by the steel strength of a ductile steel element as determined in accordance with D.5.1 and D.6.1, unless either D.3.3.5 or D.3.3.6 is satisfied.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.4.

2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.4.

3. In light-frame ~~wood~~ construction, design of anchors in concrete shall be permitted to satisfy D.3.3.7.

D.3.3.5 - Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3.

Exceptions:

1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.5.
2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.5.

D.3.3.6 - As an alternative to D.3.3.4 and D.3.3.5, it shall be permitted to take the design strength of the anchors as 0.4 times the design strength determined in accordance with D.3.3.3.

D.3.3.7 – In light-frame ~~wood structures~~ construction, bearing or non-bearing walls, shear strength of concrete anchors less than or equal to 1 inch [25 mm] in diameter of sill plate or track to foundation or foundation stem wall need not satisfy ~~D.3.3.5 and~~ D.3.3.6 when the design strength of the anchors is determined in accordance with ~~D.3.3.3~~ D.6.2.1(c).

Commenter's Reason: As presented in a companion change proposal S167, which was approved in the Code Development Hearing, based on results of Anchor Bolt Testing Program. The results of the bolt test, summarized under the original submittal of S168, showed the wood components attached to concrete exhibited ductile behavior. The wood "yield" being the first material limit state demonstrated that the reduction factor in ACI 318-08 Section D.3.3.6 need not be satisfied for bolts anchored to footings provided minimum concrete cover under ACI 318 sec. 7.7 is met. ACI 318 is currently considering changes to section 3.3 with various arbitrary reduction factors removed. ACI 318-08 sec. D.6.2.1(c) is specific for the design of concrete anchors parallel to a free edge.

A series of tests are planned by AISI for spring 2010, following closely with the test protocols used in the SEAOC wood sill concrete anchor tests. It is expected that results of the tests will be available prior to the Final Action Hearing. It is anticipated that similar ductile behavior of light gauge metal track as for wood sill plate with yielding of the steel track occurred prior to spalling of concrete. This public comment is amended to apply to light frame construction.

Final Action: AS AM AMPC____ D

S179-09/10
2109.1.1, 2308.2, 2308.2.1

Proposed Change as Submitted

Proponent: T. Eric Stafford, PE, representing Institute for Business and Home Safety

Revise as follows:

2109.1.1 Limitations. The use of empirical design of masonry shall be limited as noted in Section 5.1.2 of TMS 402/ACI 530/ASCE 5. Section 5.1.2.2 of TMS 402/ACI 530/ASCE 5 shall be modified as follows:

5.1.2.2 *Wind* – Empirical requirements shall not apply to the design or construction of masonry for buildings, parts of buildings, or other structures to be located in areas where the basic wind speed exceeds 130 mph (58 m/s) as given in ASCE 7.

The use of dry-stacked, surface-bonded masonry shall be prohibited in *Occupancy Category* IV structures. In buildings that exceed one or more of the limitations of Section 5.1.2 of TMS 402/ACI 530/ASCE 5, masonry shall be designed in accordance with the engineered design provisions of Section 2101.2.1, 2101.2.2 or 2101.2.3 or the foundation wall provisions of Section 1807.1.5.

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the following limitations, and to further limitations of Sections 2308.11 and 2308.12.

1. Buildings shall be limited to a maximum of three *stories above grade plane*. For the purposes of this section, for buildings in *Seismic Design Category* D or E as determined in Section 1613, cripple stud walls shall be considered to be a *story*.

   Exception: Solid blocked cripplewalls not exceeding 14 inches (356 mm)in height need not be considered a *story*.

2. Maximum floor-to-floor height shall not exceed 11 feet, 7 inches (3531 mm). Bearing wall height shall not exceed a stud height of 10 feet (3048 mm).
3. Loads as determined in Chapter 16 shall not exceed the following:
   3.1. Average dead loads shall not exceed 15 psf (718 N/m2) for combined roof and ceiling, exterior walls, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Sections 2308.11.2 and 2308.12.2, stone or masonry veneer up to the lesser of 5 inches (127 mm) thick or 50 psf (2395 N/m2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2438 mm) permitted for gable ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

   3.2. Live loads shall not exceed 40 psf (1916 N/m2) for floors.
   3.3. Ground snow loads shall not exceed 50 psf (2395 N/m2).

4. Wind speeds shall not exceed 130 ~~100~~ miles per hour (mph) (~~44~~ 58 m/s) (3-second gust).

   Exception: Wind speeds shall not exceed 140 ~~110~~ mph (~~48.4~~ 63 m/s) (3-second gust) for buildings in Exposure Category B that are not located in a *hurricane-prone region*.

5. Roof trusses and rafters shall not span more than 40 feet (12 192 mm) between points of vertical support.
6. The use of the provisions for *conventional light-frame construction* in this section shall not be permitted for *Occupancy Category* IV buildings assigned to *Seismic Design Category* B, C, D, E or F, as determined in Section 1613.
7. *Conventional light-frame construction* is limited in irregular structures in *Seismic Design Category* D or E, as specified in Section 2308.12.6.

2308.2.1 Basic wind speed greater than ~~100~~ 130 mph (3-second gust). Where the basic wind speed exceeds 130 ~~100~~ mph (58 m/s) (3-second gust), the provisions of either AF&PAWFCM, or the ICC 600 are permitted to be used. Wind speeds in Figure 1609A, 1609B, and 1609C shall be converted in accordance with Section 1609.3.1 for use with AF&PA WFCM or ICC 600.

Reason: The purpose of this code change is to correlate the prescriptive limits for empirical design of masonry and conventional wood frame construction with other proposals that are updating the wind speed maps in the IBC and the IRC. The wind speed maps in ASCE 7 are being updated to ultimate wind speeds as opposed to the ASD level wind speed maps that currently exist in ASCE 7 and in the IBC and IRC. See IBC code change for information on why the wind speed maps are being updated. While a way to convert the ultimate wind speeds to ASD level wind speeds is proposed in the IBC, the converted wind speeds do not match, from a geographic standpoint, the limitations the code previously imposed. Since the empirical provisions and conventional methods for wood frame construction, typically can't be calculated to equate to the lower level wind speeds at the current limit, including the fact that these provisions are missing some of the key wind resistant construction design methods (e.g. gable end wall bracing, bond beam reinforcement, vertical wall reinforcement, etc.), the proposed limitations will roughly, maintain the current limitations on empirical and conventional methods that currently exist in terms of geographic location on the wind speed map. While some areas of the country will see a reduction in areas where empirical design of masonry or conventional construction would be allowed, other areas will see in increase in areas where these methods would be allowed.

Cost Impact: The code change proposal will increase the cost of construction.

ICCFILENAME: Stafford-S1-2109

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed correlation of wind speed triggers with the updated provisions approved in code change S84-09/10 need to be consistent with the wind terminology.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

T. Eric Stafford, representing Institute for Business and Home Safety, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the following limitations, and to further limitations of Sections 2308.11 and 2308.12.

1. Buildings shall be limited to a maximum of three *stories above grade plane*. For the purposes of this section, for buildings in *Seismic Design Category* D or E as determined in Section 1613, cripple stud walls shall be considered to be a *story*.

   Exception: Solid blocked cripplewalls not exceeding 14 inches (356 mm)in height need not be considered a *story*.

2. Maximum floor-to-floor height shall not exceed 11 feet, 7 inches (3531 mm). Bearing wall height shall not exceed a stud height of 10 feet (3048 mm).
3. Loads as determined in Chapter 16 shall not exceed the following:
   3.1. Average dead loads shall not exceed 15 psf (718 N/m2) for combined roof and ceiling, exterior walls, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Sections 2308.11.2 and 2308.12.2, stone or masonry veneer up to the lesser of 5 inches (127 mm) thick or 50 psf (2395 N/m2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2438 mm) permitted for gable ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

   3.2. Live loads shall not exceed 40 psf (1916 N/m2) for floors.
   3.3. Ground snow loads shall not exceed 50 psf (2395 N/m2).

4. Ultimate Design Wind ~~s~~Speeds, V_{ult} shall not exceed 130 miles per hour (mph) (44 m/s) (3-second gust).

   Exception: Wind speeds shall not exceed 140 mph (48.4 m/s) (3-second gust) for buildings in Exposure Category B that are not located in a *hurricane-prone region*.

5. Roof trusses and rafters shall not span more than 40 feet (12 192 mm) between points of vertical support.
6. The use of the provisions for *conventional light-frame construction* in this section shall not be permitted for *Occupancy Category* IV buildings assigned to *Seismic Design Category* B, C, D, E or F, as determined in Section 1613.
7. *Conventional light-frame construction* is limited in irregular structures in *Seismic Design Category* D or E, as specified in Section 2308.12.6.

2308.2.1 Ultimate Design ~~Basic~~ w Wind ~~s~~Speed, V_{ult} greater than 130 ~~100~~ mph (3-second gust). Where the Ultimate Design ~~basic~~ ~~w~~Wind ~~s~~Speed, V_{ult} exceeds 130 mph (3-second gust), the provisions of either AF&PA WFCM, or the ICC 600 are permitted to be used. Wind speeds in Figure 1609A, 1609B, and 1609C shall be converted in accordance with Section 1609.3.1 for use with AF&PA WFCM or ICC 600.

Add new text as follows:

1405.6.3 Wind requirements. Sections 6.2.2.1 and 6.2.2.11 of TMS 402/ACI 530/ASCE 5 shall be modified as follows:

6.2.2.1 Except as provided in Section 6.2.2.11, prescriptive requirements for anchored masonry veneer shall not be used in areas where the basic wind speed exceeds 130 mph (177 km/hr) as given in ASCE 7.

6.2.2.11 *Requirements in areas of high winds* — The following requirements apply in areas where the basic wind speed exceeds 130 mph (177 km/hr) but does not exceed 150 mph (209 km/hr) and the building's mean roof height is less than or equal to 60 ft (18.3 m):

(a) Reduce the maximum wall area supported by each anchor to 70 percent of that required in Sections 6.2.2.5.6.1 and 6.2.2.5.6.2.
(b) Space anchors at a maximum 18 in. (457 mm) horizontally and vertically.
(c) Provide additional anchors around openings larger than 16 in. (406 mm) in either direction. Space anchors around perimeter of opening at a maximum of 24 in. (610 mm) on center. Place anchors within 12 in. (305 mm) of openings.

(Portions of the proposal not shown remain unchanged)

Commenter's Reason: The purpose of this code change is to correlate the prescriptive limits for empirical design of masonry and conventional wood frame construction with other proposals that are updating the wind speed maps in the IBC and the IRC. The wind speed maps in ASCE 7 are being updated to ultimate wind speeds as opposed to the ASD level wind speed maps that currently exist in ASCE 7 and in the IBC and IRC. See IBC code change for information on why the wind speed maps are being updated. While a way to convert the ultimate wind speeds to ASD level wind speeds is proposed in the IBC, the converted wind speeds do not match, from a geographic standpoint, the limitations the code previously imposed. Since the empirical provisions and conventional methods for wood frame construction, typically can't be calculated to equate to the lower level wind speeds at the current limit, including the fact that these provisions are missing some of the key wind resistant construction design methods (e.g. gable endwall bracing, bond beam reinforcement, vertical wall reinforcement, etc.), the proposed limitations will roughly, maintain the current limitations on empirical and conventional methods that currently exist in terms of geographic location on the wind speed map. While some areas of the country will see a reduction in areas where empirical design of masonry or conventional construction would be allowed, other areas will see in increase in areas where these methods would be allowed.

The modification proposed by this public comment simply makes some editorial corrections and provides a similar correlation for brick veneer as described above.

Final Action: AS AM AMPC____ D

S186-09/10
2208.1

Proposed Change as Submitted

Proponent: Bonnie Manley, representing American Iron and Steel Institute

Revise as follows:

2208.1 Storage racks. The design, testing and utilization of industrial steel storage racks made of cold-formed or hot-rolled steel structural members, shall be in accordance with RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with the <u>additional</u> provisions of Section 15.5.3 of ASCE 7~~, except that items (1), (2)and (3) of Section 15.5.3 of ASCE 7 do not apply when the rack design satisfies RMI/ANSI MH 16.1~~.

Reason: The exception recommended for deletion was inserted last cycle in Proposal S205-07/08 in order to coordinate the 2008 edition of RMI's ANSI/MH 16.1, *Specification for Design, Testing and Utilization of Industrial Steel Storage Racks,* with ASCE 7-05, which had originally adopted the 2002 edition of the RMI standard. The 2010 edition of ASCE 7 adopts and modifies the 2008 edition of ANSI/MH16.1. Consequently, the list of exceptions is no longer needed. Also, the word "additional" is added to emphasize that, for seismic design, steel storage racks must also be designed in accordance with the modifications contained in ASCE 7, Section 15.5.3.

Cost Impact: There is no anticipated impact on the cost of construction.

ICCFILENAME: Manley-S4-2208.1

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

2208.1 Storage racks. The design, testing and utilization of industrial steel storage racks made of cold-formed or hot-rolled steel structural members, shall be in accordance with the RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with the ~~additional~~ provisions of Section 15.5.3 of ASCE 7.

Committee Reason: This proposal will correlate the reference to the RMI rack standard with the earthquake load requirements of ASCE 7. The modification removes a word that would cause confusion.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Steven Winkel, FAIA, PE, and Robert E. Bachman, SE, representing the Federal Emergency Management Agency/Building Seismic Safety Council Code Resource Support Committee (FEMA/BSSC CRSC), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2208.1 Storage racks. The design, testing and utilization of industrial steel storage racks made of cold-formed or hot-rolled steel structural members, shall be in accordance with the RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with the provisions of Section 15.5.3 of ASCE 7 except that the mapped acceleration parameters S_s and S_1 shall be determined in accordance in Section 1613.5.1.

Commenter's Reason: The modification is proposed so that storage racks will be designed to the latest seismic maps that have been adopted in the 2012 IBC and ASCE 7-10. MH16.1 currently is a self-contained document that includes seismic maps that are same as the 2009 IBC and ASCE 7-05 seismic maps.

Public Comment 2:

Bonnie Manley, American Iron and Steel Institute, representing RMI, requests Disapproval.

Commenter's Reason: The 2010 edition of the RMI standard has been completed and is recommended for adoption in Proposal S187-09/10. A comment has been submitted to Proposal S187-09/10 requesting approval as modified. If that comment is successful, then this proposal (Proposal S186-09/10) is not needed and the action on this proposal should be disapproved.

Final Action: AS AM AMPC____ D

S187-09/10
2208.1, Chapter 35

Proposed Change as Submitted

Proponent: Bonnie Manley, American Iron and Steel Institute representing Rack Manufacturers Institute

1. Revise as follows:

2208.1 Storage racks. The design, testing and utilization of industrial steel storage racks made of cold-formed or hot-rolled steel structural members, shall be in accordance with the RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with the additional provisions of Section 15.5.3 of ASCE 7~~,~~ except that items ~~(1),~~ (2) and (3) of Section 15.5.3 of ASCE 7 do not apply when the rack design satisfies RMI/ANSI MH 16.1.

2. Revise Chapter 35 standard as follows:

RMI
ANSI/MH 16.1-~~08~~ 11 Specification for Design, Testing and Utilization of Industrial Steel Storage Rack, 2011

Reason: This proposal updates the edition year of RMI's ANSI/MH 16.1, *Specification for Design, Testing and Utilization of Industrial Steel Storage Racks,* from 2008 to 2011. The document is expected to be completed in early 2010. The modification to the last sentence of Section 2208.1 coordinates the 2011 edition of the RMI standard with ASCE 7-10, which adopts the 2008 edition of the RMI standard. Also, the word "additional" is added to emphasize that, for seismic design, steel storage racks must also be designed in accordance with the applicable modifications contained in ASCE 7, Section 15.5.3.

Cost Impact: There is no anticipated impact on the cost of construction..

ICCFILENAME: Manley-S5-2208.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved at the request of the proponent while work continues on the next edition of the RMI Steel Rack Standard.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bonnie Manley, American Iron and Steel Institute, representing RMI, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 2208
STEEL STORAGE RACKS

2208.1 Storage racks. The design, testing and utilization of industrial steel storage racks made of cold-formed or hot-rolled steel structural members, shall be in accordance with the RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with the ~~additional~~ provisions of Section 15.5.3 of ASCE 7~~ except that items (2) and (3) of Section 15.5.3 of ASCE 7 do not apply when the rack design satisfies RMI/ANSI MH 16.1~~.

RMI
ANSI/MH16.1-~~11~~ 10*Specification for Design, Testing and Utilization of Industrial Steel Storage Racks,* 2010~~2011~~

Commenter's Reason: The 2010 edition of the RMI standard has been completed (instead of the 2011 year as originally thought) and is recommended for adoption in this comment. Also, the exception in the last sentence of Section 2208.1 has been deleted. This language is not needed for coordination between the 2010 edition of MH16.1-10 and ASCE 7-10.

If this comment is approved, then the coordinating comment on Proposal S186-09/10, which requests disapproval, needs to be approved to ensure full coordination.

Final Action: AS AM AMPC____ D

S188-09/10
1604.3.3, 2209.2.1

Proposed Change as Submitted

Proponent: Edwin Huston, representing National Council of Structural Engineers Associations- Code Advisory Committee - General Requirements Subcommittee

1. Delete without substitution:

~~**2209.2.1 Composite slabs on steel decks.** Composite slabs of concrete and steel deck shall be designed and constructed in accordance with ASCE 3.~~

(Renumber subsequent sections)

2. Revise as follows:

1604.3.3 Steel. The deflection of steel structural members shall not exceed that permitted by AISC 360, AISI S100, ~~ASCE 3,~~ ASCE 8, SJI CJ-1.0, SJI JG-1.1, SJI K-1.1 or SJI LH/DLH-1.1, as applicable.

Reason: The referenced standard will be 21 years old by the time the 2012 IBC is available for use. We found no evidence of recent updates. We understand that the standard development organization, ASCE/SEI is beginning the process to update the standard. Until it is updated, it should be removed as a reference standard.

Cost Impact: This code change proposal will increase the cost of construction.

ICCFILENAME: HUSTON-S8-2209.2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code removes the ASCE 3 standard for composite slab construction. The standard is out of print and availability is a problem. There are also some concerns such as not addressing serviceability.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Todd Hawkinson, Hawkinson Associates, LLC, requests Disapproval.

Commenter's Reason: 1. The Section 2209.2.1 should remain requiring the engineer to follow an accepted standard, ASCE 3, for the design of composite slabs on steel deck. The standard, ASCE 3 as well as ASCE 9, "Standard for the Structural Design of Composite Slabs (ANSI/ASCE 3-91)" and "Standard Practice for Construction and Inspection of Composite Slabs (ANSI / ASCE 9-91)", respectively, are available and copies can be purchased from the Linda Hall Library, located at 5109 Cherry Street, Kansas City, MO 64110-2498, Phone: (816) 363-4600 or (800) 662-1545. permission for Reuse can be obtained from the American Society of Civil Engineers, ASCE.

2. Though the standard ASCE 3, as well ASCE 9, while technically do not meet the ICC criteria, the requirements are still valid, the standards are industry accepted and have been proven over time. Given that ASCE/SEI intends to update this standard in the future, maintaining the standard in this code, the International Building Code, requires engineers designing composite slabs on steel deck to adhere to the design requirements for the construction of such slabs and provides code officials design requirements that engineers must adhere to.

Final Action: AS AM AMPC____ D

S189-09/10
2209.1 through 2209.1.1.3, 2209.2 through 2209.3.6 (New)

Proposed Change as Submitted

Proponent: Bonnie Manley, American Iron and Steel Institute representing American Iron and Steel Institute

1. Revise as follows:

2209.1 General. The design of cold-formed carbon and low-alloy steel structural members shall be in accordance with AISI S100. The design of cold-formed stainless-steel structural members shall be in accordance with ASCE 8. Cold-formed steel light-frame construction shall also comply with Section 2210. Where required, the seismic design of cold-formed steel structures shall be in accordance with the additional provisions of Section 2209.2.

~~2209.2~~ 2209.1.1 Steel decks. The design and construction of cold-formed steel decks shall be in accordance with this section.

~~2209.2.1~~ 2209.1.1.1 Composite slabs on steel decks. Composite slabs of concrete and steel deck shall be designed and constructed in accordance with ASCE 3.

~~2209.2.2~~ 2209.1.1.2 Noncomposite steel floor decks. Noncomposite steel floor decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-NC1.0, as modified in Section ~~2209.2.2.1~~ 2209.1.1.2.1.

~~2209.2.2.1~~ 2209.1.1.2.1 ANSI/SDI-NC1.0 Section 2.4B1. Replace Section 2.4B1 of ANSI/SDI-NC1.0 with the following:

1. General: The design of the concrete slabs shall be done in accordance with the ACI *Building Code Requirements for Reinforced Concrete*. The minimum concrete thickness above the top of the deck shall be 11/2 inches (38 mm).

~~2209.2.3~~ 2209.1.1.3 Steel roof deck. Steel roof decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-RD1.0.

2. Add new text as follows:

2209.2 Seismic requirements for cold-formed steel structures. Where a response modification coefficient, R, in accordance with ASCE 7, Table 12.2-1 is used for the design of cold-formed steel structures, the structures shall be designed and detailed in accordance with the requirements of AISI S100, ASCE 8, or AISI S110 as modified in Section 2209.3.

2209.3 Modifications to AISI S110. The text of AISI S110 shall be modified as indicated in Sections 2209.3.1 through 2209.3.6.

2209.3.1 AISI S110, Section D1. Modify AISI S110, Section D1 to read as follows:

D1 Cold-Formed Steel Special Bolted Moment Frames (CFS-SBMF). Cold-formed steel–special bolted moment frames (CFS-SBMF) systems shall withstand significant inelastic deformations through friction and bearing at their bolted connections. Beams, columns, and connections shall satisfy the requirements in this section. CFS-SBMF systems shall be limited to one-story structures, no greater than 35 feet in height, without column splices and satisfying the requirements in this section. The CFS-SBMF shall engage all columns supporting the roof or floor above. The single size beam and single size column with the same bolted moment connection detail shall be used for each frame. The frame is to be supported on a level floor or foundation.

2209.3.2 AISI S110, Section D1.1.1. Modify AISI S110, Section D1.1.1 to read as follows:

D1.1.1 Connection Limitations. Beam-to-column connections .in CFS-SBMF systems shall be bolted connections with snug-tight high-strength bolts. The bolt spacing and edge distance shall be in accordance with the limits of AISI S100, Section E3. The 8-bolt configuration shown in Table D1-1 shall be used. The faying surfaces of the beam and column in the bolted moment connection region shall be free of lubricants or debris.

2209.3.3 AISI S110, Section D1.2.1. Modify AISI S110, Section D1.2.1 to read as follows:

D1.2.1 Beam Limitations. In addition to the requirements of Section D1.2.3, beams in CFS-SBMF systems shall be ASTM A 653 galvanized 55 ksi (374 MPa) yield stress cold-formed steel C-sections members with lips, and designed in accordance with Chapter C of AISI S100. The beams shall have a minimum design thickness of 0.105 inches (2.67 mm). The beam depth shall be not less than 12 in (305 mm) or greater than 20 in (508 mm). The flat depth-to-thickness ratio of the web shall not exceed 6.18 $\sqrt{E/F_y}$.

2209.3.4 AISI S110, Section D1.2.2. Modify AISI S110, Section D1.2.2 to read as follows:

D1.2.2 Column Limitations. In addition to the requirements of D1.2.3, columns in CFS-SBMF systems shall be ASTM A 500 Grade B cold-formed steel hollow structural section (HSS) members painted with a standard industrial finished surface, and designed in accordance with Chapter C of AISI S100. The column depth shall be not less than 8 in (203 mm) or greater than 12 in (305 mm). The flat depth-to-thickness ratio shall not exceed 1.40 $\sqrt{E/F_y}$.

2209.3.5 AISI S110, Section D1.3. Modify AISI S110, Section D1.3 to read as follows:

D1.3 Design Story Drift. Where the applicable building code does not contain design coefficients for CSF-SBMF systems, the provisions of Appendix 1 shall apply. For structures having a period less than T_S, as defined in the applicable building code, alternate methods of computing Δ shall be permitted, provided such alternate methods are acceptable to the authority having jurisdiction.

2209.3.6 AISI S110, Section D1.5. Add a new Section D1.5 to read as follows:

D1.5 Period Determination. The fundamental period of the structure, T, in the direction under consideration shall be established in accordance with the applicable building code using the structural properties and deformational characteristics of the resisting elements in a properly substantiated analysis. Use of the approximate building period, T_a, as an alternative fundamental period shall not be permitted.

3. Add standard to Chapter 35 as follows:

AISI

S110-07 Standard for Seismic Design Of Cold-Formed Steel Structural Systems – Special Bolted Moment Frames.

Reason: This proposal introduces a reference to the first edition of AISI S110, *Standard For Seismic Design Of Cold-Formed Steel Structural Systems – Special Bolted Moment Frames*, which is based upon research conducted by Drs. Uang and Sato at UCSD (2007). Specifically, the standard focuses on providing design provisions for a newly defined seismic force resisting system entitled “Cold-formed Steel – Special Bolted Moment Frame” or CFS-SBMFs. This type of system is expected to experience substantial inelastic deformation during significant seismic events. It is intended that most of the inelastic deformation will take place at the bolted connections, due to slip and bearing. In order to develop the designated mechanism, requirements based on the capacity design principles are provided for the design of the beams, columns and associated connections. Additionally, AISI S110 has specific requirements for the application of quality assurance and quality control procedures.

This system has been vetted through the BSSC process (Proposal 6-4R) and will be included in Part I of the 2009 NEHRP Provisions. Additionally, it has been introduced for consideration in the 2010 edition of ASCE 7 (Proposal TC-6-CH12-102-R3). As a first pass, Appendix 1 of AISI S110 makes recommendations on the seismic design coefficients of the CFS-SBMF system. These parameters have been introduced for consideration in the ASCE 7-10 proposal. The Response Modification Coefficient, R, is set at 3.5. Cyclic testing has shown that CFS-SBMFs have very large ductility capacity and significant hardening. This justifies the use of a value of 3.5 for the R-factor. The derivation of the deflection amplification factor, C_d, can be found in the AISI S110 Commentary, Section D1.3. Furthermore, a capacity design procedure has been provided in Section D1.5 of AISI S110 Commentary so that the designer can explicitly calculate the seismic load effect with overstrength, E_{mh},. at the design story drift level. Alternatively, a conservative system overstrength factor, , is also provided to be compatible with the conventional approach to compute E_{mh} in ASCE 7. Finally the height limitation of 35 feet for all SDCs is based on practical use only and not from any limits on the CFS-SBMF system strength.

Modifications to AISI S110 (2007 edition) were developed primarily in the BSSC's NEHRP process and adopted by ASCE 7 in Chapter 14. Since ASCE 7, Chapter 14 is not adopted in the IBC, these modifications need to be included within this proposal. The reasons for the modifications are as follows:

In Section 2209.3.1, the language was modified to reflect that CFS-SBMF needs to use the same-size beams and same-size columns throughout. In addition, the system needs to engage all primary columns, which support the roof or floor above, and those columns need to be supported on a level floor or foundation.

In Section 2209.3.2, the modifications were made for consistency with the test database.

In Section 2209.3.3, the modifications were made to be consistent with the test database (Uang and Sato, 2007), and limitations on the beam depth, steel grade, and surface treatment are added in Section D1.2.1 of AISI S110.

In Section 2209.3.4 the language was modified to be consistent with the test database (Uang and Sato, 2007), and limitations on column depth, steel grade, and surface treatment are added in Section D1.2.2 of AISI S110. The width-thickness ratio was reduced based upon further review of the test specimens.

In Section 2209.3.5, AISI S110 is intended primarily for industrial platforms; however, the standard is not limited to these non-building structures and does not prohibit architectural attachments (such as partition walls). As approved by the BSSC PUC, Proposal 6-4R reduced the 0.05*h* drift limit in Section D1.3 of AISI S110 to 0.03*h* in order to more closely align with the 0.025*h* drift limit of ASCE 7. Also, the BSSC PUC inserted the sentence, "In no case shall the design story drift exceed 0.05h." to ensure an absolute upper bound on the drift limit. However, the ASCE 7 Seismic Subcommittee did not agree with the BSSC PUC and, instead, requested that ASCE 7, Section 12.12 not be overwritten by AISI S110. Therefore, the 0.05*h* drift limit in Section D1.3 of AISI S110 has been eliminated in deference to the design story drift limits found in ASCE 7, Section 12.12. In addition, the first sentence of the AISI S110, Section D1.3 was deleted because it was considered commentary.

Two additional modifications are presented in this proposal which are not being considered for inclusion in ASCE 7-10, Chapter 14, but were deemed important enough to be included in the IBC. These two items resulted from discussions with SEAOC. First in Section 2209.3.3, a minimum thickness for the beams was added to reflect the test database. Secondly, Section 2209.3.6 clarifies that the approximate fundamental period, T_a, in accordance with ASCE 7 Section 12.8.2.1, should not be used in the design of CFS-SBMF systems. Instead, the fundamental period of the structure, T, needs to be based upon the structural properties and deformational characteristics of the resisting elements. The approximate fundamental period in ASCE 7, Section 12.8.1 simply does not predict the period as accurately as needed for the variety of uses of this framing system.

Cost Impact: There is no anticipated impact on the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, AISI S110-07, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: Manley-S3-2209

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard AISI S110 indicated that, in the opinion of ICC Staff, the standard complies with ICC standards criteria.

Committee Action: Approved as Modified

Modify the proposal as follows:

2209.3.1 AISI S110, Section D1. Modify Section D1 by revising to read as follows.

D1 Cold-Formed Steel Special Bolted Moment Frames (CFS-SBMF)
Cold-formed steel–special bolted moment frames (CFS-SBMF) systems shall withstand significant inelastic deformations through friction and bearing at their bolted connections. Beams, columns, and connections shall satisfy the requirements in this section. CFS-SBMF systems shall be limited to one-story structures, no greater than 35 feet in height, without column splices and satisfying the requirements in this section. The CFS-SBMF shall engage all columns supporting the roof or floor above. The single size beam and single size column with the same bolted moment connection detail shall be used for each frame. The frame ~~is to~~ shall be supported on a level floor or foundation.

…

2209.3.3 AISI S110, Section D1.2.1. Modify Section D1.2.1 by revising to read as follows.

D1.2.1 Beam Limitations
In addition to the requirements of Section D1.2.3, beams in CFS-SBMF systems shall be ASTM A653 galvanized 55 ksi (374 MPa) yield stress cold-formed steel C-sections members with lips, and designed in accordance with Chapter C of AISI S100. The beams

shall have a minimum design thickness of 0.105 inches (2.67 mm). The beam depth shall be not less than 12 in (305 mm) or greater than 20 in (508 mm). The flat depth-to-thickness ratio of the web shall not exceed 6.18 $\sqrt{E/F_y}$.

D1.2.1.1 Single C-Section Beam Limitations
In addition to the requirements of Section D1.2.1, when single C-section beams are used, torsional effects shall be accounted for in the design.

…

~~**2209.3.6 AISI S110, Section D1.5.** Add a new Section D1.5 as follows.~~

~~**D1.5 Period Determination**~~
~~The fundamental period of the structure, T, in the direction under consideration shall be established in accordance with the applicable building code using the structural properties and deformational characteristics of the resisting elements in a properly substantiated analysis. Use of the approximate building period, T_a, as an alternative fundamental period shall not be permitted.~~

(Portions of proposal not shown are unchanged)

Committee Reason: This proposal adds requirements for cold-formed steel special bolted moment frames by reference to AISI S110. The modification coordinates the AISI S110 modifications for consistency with the updated earthquake load provisions in ASCE 7.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bonnie Manley, American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2209.1 General. The design of cold-formed carbon and low-alloy steel structural members shall be in accordance with AISI S100. The design of cold-formed stainless-steel structural members shall be in accordance with ASCE 8. Cold-formed steel light-frame construction shall also comply with Section 2210. Where required, the seismic design of cold-formed steel structures shall be in accordance with the additional provisions of Section 2209.2.

2209.1.1 Steel decks. The design and construction of cold-formed steel decks shall be in accordance with this section.

2209.1.1.1 Composite slabs on steel decks. Composite slabs of concrete and steel deck shall be designed and constructed in accordance with ASCE 3.

2209.1.1.2 Noncomposite steel floor decks. Noncomposite steel floor decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-NC1.0, as modified in Section 2209.1.1.2.1.

2209.1.1.2.1 ANSI/SDI-NC1.0 Section 2.4B1. Replace Section 2.4B1 of ANSI/SDI-NC1.0 with the following:

1. General: The design of the concrete slabs shall be done in accordance with the ACI *Building Code Requirements for Reinforced Concrete*. The minimum concrete thickness above the top of the deck shall be 11/2 inches (38 mm).

2209.1.1.3 Steel roof deck. Steel roof decks shall be permitted to be designed and constructed in accordance with ANSI/SBI-RD1.0.

2209.2 Seismic Requirements for Cold-Formed Steel Structures. Where a response modification coefficient, R, in accordance with ASCE 7, Table 12.2-1 is used for the design of cold-formed steel structures, the structures shall be designed and detailed in accordance with the requirements of AISI S100, ASCE 8, ~~or~~ <u>and, for cold-formed steel special bolted moment frames,</u> AISI S110 ~~as modified in Section 2209.3~~.

~~**2209.3 Modifications to AISI S110.** The text of AISI S110 shall be modified as indicated in Sections 2209.3.1 through 2209.3.5.~~

~~**2209.3.1 AISI S110, Section D1.** Modify AISI S110, Section D1 to read as follows:~~

~~**D1 Cold-Formed Steel Special Bolted Moment Frames (CFS-SBMF).** Cold-formed steel special bolted moment frames (CFS-SBMF) systems shall withstand significant inelastic deformations through friction and bearing at their bolted connections. Beams, columns, and connections shall satisfy the requirements in this section. CFS-SBMF systems shall be limited to one-story structures, no greater than 35 feet in height, without column splices and satisfying the requirements in this section. The CFS-SBMF shall engage all columns supporting the roof or floor above. The single size beam and single size column with the same bolted moment connection detail shall be used for each frame. The frame shall be supported on a level floor or foundation.~~

~~**2209.3.2 AISI S110, Section D1.1.1.** Modify AISI S110, Section D1.1.1 to read as follows.~~

~~**D1.1.1 Connection Limitations.** Beam-to-column connections in CFS-SBMF systems shall be bolted connections with snug-tight high-strength bolts. The bolt spacing and edge distance shall be in accordance with the limits of AISI S100, Section E3. The 8-bolt configuration shown in Table D1-1 shall be used. The faying surfaces of the beam and column in the bolted moment connection region shall be free of lubricants or debris.~~

~~**2209.3.3 AISI S110, Section D1.2.1.** Modify AISI S110, Section D1.2.1 to read as follows.~~

> ~~**D1.2.1 Beam Limitations.** In addition to the requirements of Section D1.2.3, beams in CFS-SBMF systems shall be ASTM A653 galvanized 55 ksi (374 MPa) yield stress cold-formed steel C-sections members with lips, and designed in accordance with Chapter C of AISI S100. The beams shall have a minimum design thickness of 0.105 inches (2.67 mm). The beam depth shall be not less than 12 in (305 mm) or greater than 20 in (508 mm). The flat depth-to-thickness ratio of the web shall not exceed 6.18~~ $\cancel{\sqrt{E/F_y}}$.
>
> ~~**D1.2.1.1 Single C-Section Beam Limitations.** In addition to the requirements of Section D1.2.1, when single C-section beams are used, torsional effects shall be accounted for in the design.~~

~~**2209.3.4 AISI S110, Section D1.2.2.** Modify AISI S110, Section D1.2.2 to read as follows.~~

> ~~**D1.2.2 Column Limitations.** In addition to the requirements of D1.2.3, columns in CFS-SBMF systems shall be ASTM A500 Grade B cold-formed steel hollow structural section (HSS) members painted with a standard industrial finished surface, and designed in accordance with Chapter C of AISI S100. The column depth shall be not less than 8 in (203 mm) or greater than 12 in (305 mm). The flat depth-to-thickness ratio shall not exceed 1.40~~ $\cancel{\sqrt{E/F_y}}$.

~~**2209.3.5 AISI S110, Section D1.3.** Modify AISI S110, Section D1.3 to read as follows.~~

> ~~**D1.3 Design Story Drift.** Where the applicable building code does not contain design coefficients for CSF-SBMF systems, the provisions of Appendix 1 shall apply. For structures having a period less than~~ $\cancel{T_s}$~~, as defined in the applicable building code, alternate methods of computing Δ shall be permitted, provided such alternate methods are acceptable to the authority having jurisdiction~~

AISI
AISI S110-07 Standard for Seismic Design Of Cold-Formed Steel Structural Systems – Special Bolted Moment Frames, with Supplement 1, dated 2009.

Commenter's Reason: The modifications made to AISI S110-07 in Proposal S189-09/10 resulted from the review of the document in the development of the 2009 NEHRP Recommended Provisions (FEMA P-750) and ASCE 7-10. To improve the usability of the IBC, AISI's Committee on Specification recently completed AISI S110-07 Supplement 1-09, which adopts all of the technical changes presented in IBC Section 2209.3 of Proposal S121-09/10. Consequently, this Public Comment recommends the deletion of these modifications to AISI S110-07 from the IBC.
Please note this supplement has been issued by AISI and is available for review at www.steel.org or http://www.steel.org//AM/TemplateRedirect.cfm?Template=/CM/ContentDisplay.cfm&ContentID=36728.

Final Action: AS AM AMPC____ D

S191-09/10
2209.2.1, 2209.2.1.1 (New) Chapter 35

Proposed Change as Submitted

Proponent: Thomas Sputo, Ph.D., PE, SE, Steel Deck Institute, representing Steel Deck Institute

1. Revise as follows:

2209.2.1 Composite slabs on steel decks. Composite slabs of concrete and steel deck shall be permitted to be designed and constructed in accordance with ~~ASCE 3~~ ANSI/SDI-C1.0, as modified in Section 2209.2.1.1.

2. Add new text as follows:

2209.2.1.1 ANSI/SDI-C1.0 Section 2.4B6a. Replace Section 2.4B6a of ANSI/SDI-C1.0 with the following:

a. Temperature and shrinkage reinforcement, consisting of welded wire fabric or reinforcing bars, shall have a minimum area of 0.00075 times the area of the concrete above the deck (per foot or meter of width), but shall not be less than the area provided by 6 x 6 – W1.4 x W1.4 welded wire fabric.

3. Add standard to Chapter 35 as follows:

SDI
C1.0-06 Standard for Composite Steel Floor Deck

Reason: ASCE 3-91 is proposed for deletion because it does not meet the criteria set forth in CP#28-05, revised 2/27/09 for referenced standards. Section 3.6.3.2 requires a reference standard to be maintained. This standard has not been reaffirmed since its approval by ANSI in 1992. The ASCE committee responsible for this standard has been inactive since approximately 1997 and has taken no action on this standard since then. "ASCE Rules for Standards Committees" (2006) require standards to be reaffirmed at intervals not to exceed 5 years (Section 5.8). Additionally, this standard is out-of-print and is therefore not readily available to code officials, designers, or users of the code.

ANSI/SDI C1.0 is proposed for inclusion because it is the current standard for the design of composite steel deck. This standard is readily available to code officials, designers, and other users of the code, both in print form and as a free download from the Steel Deck Institute website. Section 2.4B6a is modified to delete the option for the use of fibers because of lack of complete consensus among all interested parties on proper specification of fibers for the purpose of control of shrinkage and temperature fluctuation effects in concrete on composite steel deck.

Section 2.4B6a – Text as it appears in SDI-C1.0:

a. Temperature and shrinkage reinforcement, consisting of welded wire fabric or reinforcing bars, shall have a minimum area of 0.00075 times the area of the concrete above the deck (per foot or meter of width), but shall not be less than the area provided by 6 x 6 – W1.4 x W1.4 welded wire fabric.

Fibers shall be permitted as a suitable alternative to the welded wire fabric specified for temperature and shrinkage reinforcement. Cold-drawn steel fibers meeting the criteria of ASTM A820, at a minimum addition rate of 25 lb/cu yd (14.8 kg/cu meter), or macro synthetic fibers "Coarse fibers" (per ASTM Subcommittee C09.42), made from virgin polyolefin, shall have an equivalent diameter between 0.4 mm (0.016 in.) and 1.25 mm (0.05 in.), having a minimum aspect ratio (length/equivalent diameter) of 50, at a minimum addition rate of 4 lb./cu yd (2.4 kg/m^3) are suitable to be used as minimum temperature and shrinkage reinforcement.

Cost Impact: The code change proposal will not increase the cost of construction

Analysis: A review of the standard(s) proposed for inclusion in the code, SDI C1.0-06, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: Sputo-S1-2209.2.1

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard SDI-C1.0 indicated that, in the opinion of ICC Staff, the standard complies with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: The proposed reference standard, SDI-C1.0 is still in need of work. Questions have been raised on its treatment of serviceability and wheel loads. The need to exclude fiber reinforcement should be clarified.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas Sputo, Ph.D., PE, SE representing Steel Deck Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2209.2.1 Composite slabs on steel decks. Composite slabs of concrete and steel deck shall be permitted to be designed and constructed to resist loads other than wheel loads in accordance with ANSI/SDI-C1.0, Standard for Composite Steel Floor Deck, as modified in Section 2209.2.1.1.

2209.2.1.1 ANSI/SDI-C1.0 Section 2.4B6a. Replace Section 2.4B6a of ANSI/SDI-C1.0 with the following:

a. Temperature and shrinkage reinforcement, consisting of welded wire fabric or reinforcing bars, shall have a minimum area of 0.00075 times the area of the concrete above the deck (per foot or meter of width), but shall not be less than the area provided by 6 x 6 – W1.4 x W1.4 welded wire fabric.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: ASCE 3-91 was approved for deletion under Proposals S-188 and S-193. The fact that it has not been revised or reaffirmed since 1991 is sufficient reason for this action.

ASCE 3-91 should have been replaced with ANSI/SDI C1.0-2006, which is current, actively supported and today used almost exclusively by designers of composite floor slabs. The ANSI/SDI C1.0-2006 standard is also readily available as a free download by any building official or design professional at the SDI website. However, reasons were cited for not taking this action including serviceability, wheel loads and fibers. These reasons are not sufficient justification to create a void in the building code for the design of composite floor slabs.

SDI C1.0-2006 addresses serviceability of floor slabs in the same empirical manner as does other standards included in the IBC, such as ACI-318. It requires empirically based minimum amounts of reinforcement to control the effects of temperature and shrinkage. No consensus based analytical method exists to further address this issue for any type of temperature and shrinkage reinforcement. It is not a safety issue, and should not have been considered as a valid reason to not include ANSI/SDI C1.0-2006 in the IBC.

Designing for wheel loads is an analytical procedure that is outside the scope of ANSI/SDI C1.0-2006, which is intended to cover typical static loads. A designer following good engineering practice would use rational analysis combined with the requirements of a standard such as ANSI/SDI C1.0-2006 to properly address this rare, atypical condition. However, for clarification, we are proposing to modify S-191 to specifically exclude wheel loads.

Fibers are included in ANSI/SDI C1.0-2006 as an optional means to control the effects of temperature and shrinkage. However, inclusion of fibers in the building code has been controversial. Since this option is not essential to the function of ANSI/SDI C1.0-2006, SDI has most recently proposed to not include it in order to gain incorporation of the remaining parts of a standard that is already accepted by the design community into the IBC. However, S-191 may be modified to include the fiber option by deleting section 2209.2.1.1 from the proposal.

Final Action: AS AM AMPC____ D

S196-09/10
2302.1

<u>Proposed Change as Submitted</u>

Proponent: Edward L. Keith, PE, APA - The Engineered Wood Association

Revise as follows:

STRUCTURAL COMPOSITE LUMBER. Structural members manufactured using wood elements bonded together with exterior adhesives. Examples of structural composite lumber are:

> **Laminated veneer lumber (LVL).** A composite of wood veneer elements with wood fibers primarily oriented along the length of the member. <u>Veneer thickness shall not exceed 0.25 inches (6.4 mm).</u>
>
> **Parallel strand lumber (PSL).** A composite of wood strand elements with wood fibers primarily oriented along the length of the member. <u>The least dimension of the strands shall not exceed 0.25 inches (6.4 mm) and the average length shall be a minimum of 300 times the least dimension.</u>
>
> <u>**Laminated strand lumber (LSL).** A composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 inches (2.54 mm) and the average length shall be a minimum of 150 times the least dimension.</u>
>
> <u>**Oriented strand lumber (OSL).** A composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 inches (2.54 mm) and the average length shall be a minimum of 75 times the least dimension.</u>

Reason: ASTM Standard D5456 recognizes 4 types of structural composite lumber. This proposal adds the two types missing from the existing definition and makes them consistent with ASTM D5456

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: KEITH-S2-2302.1 Definitions

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The added definitions of structural composite lumber types will clear up some confusion with their use. The definitions include some requirements and this should be corrected in the public comment phase.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edward L. Keith, The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

> **STRUCTURAL COMPOSITE LUMBER.** Structural members manufactured using wood elements bonded together with exterior adhesives. Examples of structural composite lumber are:
>
> **Laminated veneer lumber (LVL).** A composite of wood veneer elements with wood fibers primarily oriented along the length of the member~~.~~<u>, where the veneer element</u> ~~Veneer~~ thickness<u>es are</u> 0.25 inches (6.4 mm)<u> or less</u>.
>
> **Parallel strand lumber (PSL).** A composite of wood strand elements with wood fibers primarily oriented along the length of the member~~. The~~<u>, where the</u> least dimension of the <u>wood</u> strand~~s shall not exceed~~ <u>elements is</u> 0.25 in. (6.4 mm)<u> or less</u> and ~~the~~ <u>their</u> average length<u>s</u> ~~shall be a minimum~~ <u>are a minimum</u> of 300 times the least dimension<u> of the wood strand elements.</u>
>
> **Laminated strand lumber (LSL).** A composite of wood strand elements with wood fibers primarily oriented along the length of the member~~. The~~<u>, where the</u> least dimension of the <u>wood</u> strand~~s shall not exceed~~ <u>elements is</u> 0.10 in. (2.54 mm) <u>or less</u> and ~~the~~ <u>their</u> average length<u>s</u> ~~shall be a minimum~~ <u>are a minimum</u> of 150 times the least dimension <u>of the wood strand elements</u>.

Oriented strand lumber (OSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member~~. The~~, where the least dimension of the wood strand~~s shall not exceed~~ elements is 0.10 in. (2.54 mm) or less and ~~the~~ their average lengths ~~shall be a minimum~~ are a minimum of 75 times and less than 150 times the least dimension ~~or more~~ of the wood strand elements.

Commenter's Reason: While the provisions were approved by the Committee as proposed, it was suggested by the Committee that the Public Comment process be used to eliminate mandatory language from the definitions for consistency with the format of other definitions in the code. The above modification does so. With one exception the changes above in this Public Comment are non-technical. In the definition for OSL the further limitation "and less than 150 times" was returned to the definition. It was inadvertently left out of the original proposal but is a part of the definition in the standard. It is a necessary part of the definition to distinguish OSL from LSL.

Final Action: AS AM AMPC____ D

S200-09/10-PART I
2303.1.4

Proposed Change as Submitted

Proponent: Edward L. Keith, PE, APA - The Engineered Wood Association

PART I – IBC STRUCTURAL

Revise as follows:

2303.1.4 Wood structural panels. Wood structural panels, when used structurally (including those used for siding, roof and wall sheathing, subflooring, diaphragms and built-up members), shall conform to the requirements for their type in DOC PS 1 or PS 2. Each panel or member shall be identified for grade, ~~and glue type~~ bond classification, and Performance Class by the trademarks of an *approved* testing and grading agency. The Performance Class value shall be used as the "nominal panel thickness" or "panel thickness" whenever referenced in this code. Wood structural panel components shall be designed and fabricated in accordance with the applicable standards listed in Section 2306.1 and identified by the trademarks of an *approved* testing and inspection agency indicating conformance with the applicable standard. In addition, wood structural panels when permanently exposed in outdoor applications shall be of ~~exterior~~ Exterior type, except that wood structural panel roof sheathing exposed to the outdoors on the underside is permitted to be ~~interior type bonded with exterior glue,~~ Exposure 1 type.

Reason: (IBC & IRC) This is a nomenclature change that reflects the newest versions of National Standards PS 1 and PS 2. Wood structural panels are required to be in conformance to DOC PS 1 and PS 2 in the code. The PS 1 and PS 2 consensus standard committees have revised both standards to include the terminologies of "bond classification" to reference glue type and "Performance Classes" to reference the thicknesses tolerance consistent with the nominal panel thicknesses in the IBC. This change proposal updates the code to the nomenclature that appears on the trademark of wood structural panels in the field in accordance with DOC PS 1 and PS 2. This is not a technical change.

Cost Impact: This will **not** impact the cost of construction.

ICCFILENAME: Keith-S4-2303.1.4

Public Hearing Results

PART I- IBC STRUCTURAL
Committee Action: **Approved as Submitted**

Committee Reason: This proposal adds terminology that coordinates the IBC with the wood structure panel product standards. A public comment is in order to include a definition of the new term "Performance Class".

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edward L. Keith, APA, The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2303.1.4 Wood structural panels. Wood structural panels, when used structurally (including those used for siding, roof and wall sheathing, subflooring, diaphragms and built-up members), shall conform to the requirements for their type in DOC PS 1 or PS 2. Each panel or member shall be identified for grade, bond classification, and Performance ~~Class~~ Category by the trademarks of an *approved* testing and grading agency. The Performance ~~Class~~ Category value shall be used as the "nominal panel thickness" or "panel thickness" whenever referenced in this code. Wood structural panel components shall be designed and fabricated in accordance with the applicable standards listed in Section 2306.1 and identified by the trademarks of an *approved* testing and inspection agency indicating conformance with the applicable standard. In addition, wood structural panels when permanently exposed in outdoor applications shall be of Exterior type, except that wood structural panel roof sheathing exposed to the outdoors on the underside is permitted to be Exposure 1 type.

PERFORMANCE CATEGORY. A designation of wood structural panels as related to the panel performance used in Chapter 23.

Commenter's Reason: At the final ballot process, the PS1 and PS2 update committees changed editorially the term "Performance Class" to "Performance Category" in the standards. Item 1 of Part I and Item 1 of Part II above in this Public Comment make this editorial change to the proposed code change text.

Along with the recommendation for approval by the IBC and IRC Committees, a recommendation was made by one of the committee members at the Code Development Hearing that a definition for the term "Performance Class" (now "Performance Category") be added to the IBC and IRC as the term was new to the building codes. The above definition is proposed for the IBC and IRC in accordance with that committee member's recommendation.

Final Action: AS AM AMPC____ D

S200-09/10-PART II
IRC R503.2.1, R503.2.1.1, R602.3, R803.2.1

Proposed Change as Submitted

Proponent: Edward L. Keith, PE, APA - The Engineered Wood Association

PART II – IRC BUILDING/ENERGY

Revise as follows:

R503.2.1 Identification and grade. Wood structural panel sheathing used for structural purposes shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance Class by a grade mark of certificate or inspection issued by an approved agency. The Performance Class value shall be used as the "nominal panel thickness" or "panel thickness" whenever referenced in this code.

R503.2.1.1 Subfloor and combined subfloor underlayment. Where used as subflooring or combination subfloor underlayment, wood structural panels shall be of one of the grades specified in Table R503.2.1.1(1). When sanded plywood is used as combination subfloor underlayment, the grade, bond classification, and Performance Class shall be as specified in Table R503.2.1.1(2).

R602.3 Design and construction. Exterior walls of wood-frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3.(2) or in accordance with AF&PA's NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(1) through R602.3(4). Structural wall sheathing shall be fastened directly to structural framing members. Exterior wall coverings shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). Wood structural panel sheathing used for exterior walls shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and

Performance Class by a grade mark or certificate of inspection issued by an approved agency and shall conform to the requirements of Table R602.3(3).

R803.2.1 Identification and grade. Wood structural panels shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325, and shall be identified for grade, bond classification, and Performance Class by a grade mark or certificate of inspection issued by an approved agency. Wood structural panels shall comply with the grades specified in Table R503.2.1.1(1).

Reason: (IBC & IRC) This is a nomenclature change that reflects the newest versions of National Standards PS 1 and PS 2. Wood structural panels are required to be in conformance to DOC PS 1 and PS 2 in the code. The PS 1 and PS 2 consensus standard committees have revised both standards to include the terminologies of "bond classification" to reference glue type and "Performance Classes" to reference the thicknesses tolerance consistent with the nominal panel thicknesses in the IBC. This change proposal updates the code to the nomenclature that appears on the trademark of wood structural panels in the field in accordance with DOC PS 1 and PS 2. This is not a technical change.

(IRC)In Section R602.3, the description of wood structural panel was added as it shows up in Chapters 5 and 8 where wood structural panels are also specified. This was done to make the code read consistently between similar sections.

Cost Impact: This will **not** impact the cost of construction.

ICCFILENAME: Keith-S4-2303.1.4

Public Hearing Results

PART II- IRC B/E

Committee Action: **Approved as Submitted**

Committee Reason: This change updates the code for identification requirements for wood structural panels to be consistent with the latest versions of DOC PS1 and DOC PS2. This change is consistent with the IBC.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edward L. Keith, APA, The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows

Part II – IRC BUILDING/ENERGY

R503.2.1 Identification and grade. Wood structural panel sheathing used for structural purposes shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance ~~Class~~ Category by a grade mark of certificate or inspection issued by an approved agency. The Performance ~~Class~~ Category value shall be used as the "nominal panel thickness" or "panel thickness" whenever referenced in this code.

R503.2.1.1 Subfloor and combined subfloor underlayment. Where used as subflooring or combination subfloor underlayment, wood structural panels shall be of one of the grades specified in Table R503.2.1.1(1). When sanded plywood is used as combination subfloor underlayment, the grade, bond classification, and Performance ~~Class~~ Category shall be as specified in Table R503.2.1.1(2).

R602.3 Design and construction. Exterior walls of wood-frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3.(2) or in accordance with AF&PA's NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(1) through R602.3(4). Structural wall sheathing shall be fastened directly to structural framing members. Exterior wall coverings shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). Wood structural panel sheathing used for exterior walls shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance ~~Class~~ Category by a grade mark or certificate of inspection issued by an approved agency and shall conform to the requirements of Table R602.3(3).

R803.2.1 Identification and grade. Wood structural panels shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325, and shall be identified for grade, bond classification, and Performance ~~Class~~ Category by a grade mark or certificate of inspection issued by an approved agency. Wood structural panels shall comply with the grades specified in Table R503.2.1.1(1).

Add definition to Section R202 as follows:

PERFORMANCE CATEGORY. A designation of wood structural panels as related to the panel performance used in Chapters 4, 5, 6, and 8.

Commenter's Reason: At the final ballot process, the PS1 and PS2 update committees changed editorially the term "Performance Class" to "Performance Category" in the standards. Item 1 of Part I and Item 1 of Part II above in this Public Comment make this editorial change to the proposed code change text.

Along with the recommendation for approval by the IBC and IRC Committees, a recommendation was made by one of the committee members at the Code Development Hearing that a definition for the term "Performance Class" (now "Performance Category") be added to the IBC and IRC as the term was new to the building codes. The above definition is proposed for the IBC and IRC in accordance with that committee member's recommendation.

Final Action: AS AM AMPC____ D

S201-09/10, Part I
2303.2, 2303.2.1, 2303.2.2, 2303.2.3

Proposed Change as Submitted

Proponent: Joe Holland and Dave Bueche, representing Hoover Treated Wood Products

PART I- IBC STRUCTURAL

1. Revise as follows:

2303.2 Fire-retardant-treated wood. *Fire-retardant-treated wood* (FRTW) is a pressure treated ~~any~~ wood product ~~which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when~~ tested in accordance with ASTME 84 or UL723~~,~~.FRTW shall have a *listed* flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. ~~Additionally, t~~The flame front shall not progress more than 101/2 feet (3200 mm) beyond the centerline of the burners at any time during the test.

2. Delete without substitution:

~~**2303.2.1 Pressure process.** For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (345 kPa).~~

~~**2303.2.2 Other means during manufacture.** For wood products produced by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product.~~

~~**2303.2.3 Testing.** For wood products produced by other means during manufacture, other than a pressure process, all sides of the wood product shall be tested in accordance with and produce the results required in Section 2303.2. Wood structural panels shall be permitted to test only the front and back faces.~~

(Renumber remaining sections)

Reason: Revision is more concise. Present section is wordy. In the fifty years of recognition of FRTW in the code there is no wood product meeting the requirement of FRTW where adding the fire retardant to the wood is done during manufacture. This provision creates interpretation problems in the field. Revision will improve enforcement of section. "Pressure process" and "other means during manufacturer" are no longer used; delete Sections 2303.2.1 through 2303.2.3.

Cost Impact: The code change proposal will not increase the cost of construction.

FILENAME: Holland-Bueche-S1-2303.2-RB-2-R802.1.3

Public Hearing Results

PART I- IBC STRUCTURAL

Committee Action: **Disapproved**

Committee Reason: The proposal is not editorial as the reason suggests. If accepted, it would no longer allow fire-retardant treated wood products that currently comply with the code. If there are problems, they would appear to accent the need for education. Acceptability should be defined by the products performance not the means or method of manufacture.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche, representing Hoover Treated Wood Products Inc, requests Approval as Submitted.

Commenter's Reason: In the fifty years of recognition of FRTW in the code there is no wood product meeting the requirement of FRTW where adding the fire retardant to the wood is done during manufacture. This provision creates interpretation problems in the field. Revision will improve enforcement of section. "Pressure process" and "other means during manufacturer" are no longer used; delete Sections 2303.2.1 through 2303.2.3 and Section s R802.1.3.1 through R802.1.3.3.

Final Action: AS AM AMPC____ D

S201-09/10, Part II
IRC R802.1.3, R802.1.3.1, R802.1.3.2, R802.1.3.3

Proposed Change as Submitted

Proponent: Joe Holland and Dave Bueche, representing Hoover Treated Wood Products

PART II- IRC BUILDING/ENERGY

1. Revise as follows:

R802.1.3 Fire-retardant-treated wood. *Fire-retardant-treated wood* <u>(FRTW)</u> is <u>a pressure treated</u> ~~any~~ wood product ~~which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when~~ tested in accordance with ASTME 84~~,~~<u>.FRTW shall have</u> a *listed* flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. ~~Additionally, t~~<u>T</u>he flame front shall not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test

2. Delete without substitution:

~~**R802.1.3.1 Pressure process.** For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (345 kPa).~~

~~**R802.1.3.2 Other means during manufacture.** For wood products produced by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product.~~

~~**R802.1.3.3 Testing.** For wood products produced by other means during manufacture, other than a pressure process, all sides of the wood product shall be tested in accordance with and produce the results required in Section R802.1.3. Testing of only the front and back faces of wood structural panels shall be permitted.~~

(Renumber remaining sections)

Reason: Revision is more concise. Present section is wordy. In the fifty years of recognition of FRTW in the code there is no wood product meeting the requirement of FRTW where adding the fire retardant to the wood is done during manufacture. This provision creates interpretation problems in the field. Revision will improve enforcement of section. "Pressure process" and "other means during manufacturer" are no longer used; delete Sections R802.1.3.1 through R802.1.3.3.

Cost Impact: The code change proposal will not increase the cost of construction.

FILENAME: Holland-Bueche-S1-2303.2-RB-2-R802.1.3

Public Hearing Results

PART II- IRC B/E

Committee Action: **Disapproved**

Committee Reason: The proposal would have the effect of being exclusionary. It would provide language that appears to eliminate some products in the market. This proposal would hinder development of new products.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland and Dave Bueche, representing Hoover Treated Wood Products Inc, requests Approval as Submitted

Commenter's Reason: See S201-09/10-Part I

Final Action: AS AM AMPC____ D

S205-09/10
2304.11.6

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, City of San Jose**,** representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay)

Revise as follows:

Section 2304.11.6 Termite protection. In geographical areas where hazard of termite damage is known to be very heavy, wood floor framing <u>exposed to the ground in crawl spaces or unexcavated areas located within the periphery of the building foundation and exposed framing of exterior decks or balconies,</u> shall be of durable species (termite resistant) or preservative treated in accordance with AWPA U1 for the species, product preservative and end use or provided with approved methods of termite protection.

Reason: This change intends to clarify that the wood floor framing that needs to be durable species or preservative treated wood are limited to those interior floors with exposure to soil instead of all floors in the building. In addition exposed exterior decks or balcony framing are specifically added. Other provisions address wood in contact with concrete or close to grade for all termite hazard regions.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: MAIEL-S1-2304.11.6

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The need for this requirement for termite protection is unclear, since Section 2304.11.2.1 already covers wood within 18 inches of exposed earth.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, PE., National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Section 2304.11.6 Termite protection. In geographical areas where hazard of termite damage is known to be very heavy, wood floor framing in the locations specified in Section 2304.11.2.1 ~~exposed to the ground in crawl spaces or unexcavated areas located within the periphery of the building foundation~~ and exposed framing of exterior decks or balconies, shall be of durable species (termite resistant) or preservative treated in accordance with AWPA U1 for the species, product preservative and end use or provided with approved methods of termite protection.

Commenter's Reason: The purpose of this public comment is to further clarify the requirements for termite protection of floor framing. We agree with the proponents' intent that only those interior floors with direct exposure to soil need termite protection. The Structural Committee, in disapproving the proposal, believed that Section 2304.11.2.1 already covered the proponent's intent. However, the charging language of Section 2304.11.2 does not explicitly mention termite resistance. Thus, to clearly make the connection between Section 2304.11.6 and the specific requirements for exposure to ground, a direct reference to Section 2304.11.2.1 needs to be provided in Section 2304.11.6.

Final Action: AS AM AMPC____ D

S207-09/10-PART I
2302.1, 2303.1, 2303.1.12 (New), 2304.13 (New), CHAPTER 35;

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company representing the Composite Lumber Manufacturers Association (CLMA)

PART I – IBC STRUCTURAL

1. Add new definition as follows:

WOOD PLASTIC COMPOSITE. A composite material made primarily from wood or cellulose-based materials, and plastic.

2. Revise as follows:

2303.1 General. Structural sawn lumber; end-jointed lumber; prefabricated wood I-joists; structural glued laminated timber; wood structural panels, fiberboard sheathing (when used structurally); hardboard siding (when used structurally); particleboard; preservative-treated wood; structural log members; structural composite lumber; round timber poles and piles; fire-retardant-treated wood; hardwood plywood; wood trusses; wood plastic composite exterior deck components; joist hangers; nails; and staples shall conform to the applicable provisions of this section.

3. Add new text as follows:

2303.1.12 Wood plastic composite exterior deck, railing, and stairway components. Structural capacities for exterior wood plastic composite deck boards, stair treads, handrails and guardrail systems shall be determined in accordance with ASTM D 7032.

2304.13 Wood plastic composite exterior deck, railing, and stairway components. Exterior wood plastic composite deck boards, deck boards used as stair treads, handrails and guardrail systems shall meet the applicable requirements of ASTM D 7032, and bear a label indicating the required performance levels and demonstrating compliance with ASTM D 7032,

4. Add new standard to Chapter 35 as follows:

ASTM

<u>D 7032-08</u> <u>Standard Specification for Establishing Performance Ratings For Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)</u>

5. Add new text as follows:

<u>**2304.13.1 Labeling.** Labels for deck boards and stair treads shall include the allowable maximum load and span. Labels for handrails and guardrail systems shall indicate the allowable maximum span.</u>

6. Add new text as follows:

<u>**2304.13.2 Installation.** Wood plastic composite deck components shall be installed in accordance with the manufacturer's instructions.</u>

Reason:
(Part I, items 1-4) The IBC is currently silent regarding requirements for wood plastic composite exterior deck components. The Composite Lumber Manufacturers Association (CLMA) seeks to make it easier for code officials to enforce the IBC and to make it easier for deck builders to comply with the code by incorporating requirements for wood plastic composite decking into the IBC.

This code change proposes to include requirements for wood plastic composite exterior deck components in Chapter 23 of the IBC, which is the most appropriate chapter of the IBC for these products. Section 2301.2 refers to elements or systems "constructed partially or wholly of wood or wood-based products". No other IBC chapter incorporates wood-based products of this type.

Wood plastic composite exterior deck components are constructed partially of wood-based material (as are particleboard and composite panels; included in Chapter 23), and partially of resin bonded by heat and pressure (as are several materials included in Chapter 23, such as particleboard). CLMA reviewed Chapter 26, Plastic, but concluded that wood plastic composite exterior deck components are much more closely aligned with the methods of distribution and application to the materials included in Chapter 23 than those in Chapter 26. Moreover, the ASTM standard governing wood plastic composite decking (ASTM D 7032) has been developed by and continues to be maintained by the ASTM D7 committee on wood. For these reasons, this proposal includes revisions to Chapter 23.

This CLMA proposal complements language in the 2009 IRC which defines "wood plastic composite" and requires wood plastic composite deck boards, stair treads, handrails and guardrail systems to bear a label indicating the required performance levels and demonstrating compliance to ASTM D 7032. This labeling requirement, by definition of "label" in the IBC, includes 3rd-party certification and ongoing quality assurance and will help to assure the code official that wood-plastic composite decking will meet the performance provisions in the IBC.

Complying with ASTM D 7032 verifies the wood plastic composite materials are appropriate for use as deck components and includes deck-related performance evaluations such as flexural tests, ultraviolet resistance tests, freeze-thaw resistance tests, bio-deterioration tests, fire performance tests, creep recovery tests, mechanical fastener holding tests, and slip resistance tests. The standard also includes consideration of the effects of temperature and moisture, concentrated loads, and fire propagation tests.

This code change for the IBC will make it faster and easier to verify that a deck constructed of wood plastic composite material complies with the code.

(Part I, item 5) This item adds a new subject matter in 2304.13.1. This new requirement specifies that the load and span information is required on the labels.

This item will make it faster and easier to verify that a deck constructed of wood plastic composite material complies with the code. The wood plastic composite deck boards and stair treads are to have a label indicating the span rating (i.e. 100 lbs/ft^2 at 16" O.C.). Handrails and guardrail systems will be similarly labeled. The load and span information will improve the ability to verify compliance to the code.

(Part I, item 6) This item adds a new subject matter in 2304.13.2 which requires that wood plastic composite deck components be installed per the manufacturer's instructions.

As with most engineered building components, wood plastic composite deck components should be required to be installed per the manufacturer's instructions. It's important that wood plastic composite deck components be installed as intended by the manufacturer.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM D7032-08, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

ICCFILENAME: WOESTMAN-S7-2304.13.2

Public Hearing Results

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard ASTM D 7032 indicated that, in the opinion of ICC Staff, the standard complies with ICC standards criteria.

PART I- IBC STRUCTURAL
Committee Action: **Disapproved**

Committee Reason: Wood plastic composite materials are currently qualified by evaluation reports and including them in the code is not appropriate at this time. It is important to be able to verify design capacities. The proposed term, structural capacities, may not correlate with the proposed reference standard.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Woestman, Kellen Company, representing Composite Lumber Manufacturer's Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

CHAPTER 35
COMPOSITES

SECTION 3501
GENERAL

3501.1 Scope. These provisions shall govern the materials, design, application, construction and installation of composite materials and products.

SECTION 3502
DEFINITIONS

3502.1 General. The following words and terms shall, for the purposes of this chapter have the meanings shown herein.

WOOD PLASTIC COMPOSITE. A composite material made primarily from wood or cellulose-based materials, and plastic.

SECTION 3503
WOOD PLASTIC COMPOSITE EXTERIOR MATERIALS AND PRODUCTS

3503.1 General. The provisions of this section shall govern the requirements and uses of wood plastic composite materials and products for exterior decks, balconies, and porches of buildings and structures.

3503.1.1 Wood plastic composite exterior deck boards, stair treads, handrails, and guardrail systems. Exterior deck boards, stair treads, handrails, and guardrail systems of wood plastic composite shall comply with this section.

3503.1.1.1 Minimum standards and quality. Exterior wood plastic composite deck boards, stair treads, and handrails and guardrail systems shall comply with ASTM D 7032.

3503.1.1.2 Structural. The allowable load and maximum allowable span for exterior wood plastic composite deck boards and stair treads shall be determined in accordance with ASTM D 7032. Testing of handrails and guardrail systems to demonstrate compliance to the structural performance requirements of this code shall be in accordance with ASTM D7032.

3503.1.1.3 Labeling. Deck boards and stair treads shall bear a label that indicates compliance to ASTM D 7032 and includes the allowable load and maximum allowable span. Handrails and guardrail systems or their packaging shall bear a label that indicates compliance to ASTM D 7032 and includes the maximum allowable span.

3503.1.1.4 Installation. Wood plastic composite deck components shall be installed in accordance with the manufacturer's instructions.

Add standard to Chapter 3~~5~~6 as follows:

ASTM

D 7032-08 Standard Specification for Establishing Performance Ratings For Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)

(Renumber existing Chapter 35 Reference Standards)

Commenter's Reason: The proponent, the Composite Lumber Manufacturers Association (CLMA), proposed creating a new chapter in the IBC for composite building products as a floor amendment at the Baltimore committee hearings in Oct. 2009. The committee chair ruled the floor amendment "in order." This public comment follows that ruling and proposes to create a new chapter in the IBC for composite building products. This public comment also addresses testimony and committee concerns in the text of the proposal or in the Reason statements. This public comment replaces the original S207 Part 1 proposal.

Currently, the IBC is silent regarding specific requirements for certain composite building materials. Proposals S207 Part 1 (this proposal) and FS189 (by AF&PA) both sought to introduce into the IBC requirements for a specific type of composite building material, wood plastic composite (WPC), used as exterior deck boards, stair treads, handrails and guardrail systems.

Discussion and debate before and during the committee hearings in Baltimore resulted in the conclusion that, rather than place WPCs in the wood chapter of the IBC (Chapter 23) or in the plastics chapter (Chapter 26), a logical location for this material is in a new chapter titled "Composites." Looking to the future, this new chapter creates a logical location in the IBC for other composites that may be utilized in building construction but fall outside the scopes of Chapter 23 and Chapter 26.

This proposal introduces a definition of wood plastic composite and creates a section for exterior materials and products made from this specific material. Then the proposal limits the scope of the requirements to materials and products for exterior decks, balconies, and porches. Finally, the proposal introduces specific requirements for exterior wood plastic composite deck boards, stair treads, handrails, and guardrail systems.

With this proposal, CLMA seeks to introduce mandatory requirements in the IBC for exterior wood plastic composite deck components while making it easier for builders to comply with the code and for building officials to enforce their code.

Including the labeling requirement in this proposal brings WPCs within the requirements of the definition of "label" in Chapter 2 of the IBC, thus requiring 3rd party certification of these WPCs and ongoing quality assurance. This requirement helps to assure building officials that wood plastic composite decking and guards will meet the performance requirements of the IBC.

As with most engineered building components, wood plastic composite deck components should be required to be installed per the manufacturer's instructions.

Addressing the published committee reasons for disapproval:

Committee reason for disapproval: "Wood plastic composite deck boards and guardrail systems are currently qualified by evaluation reports and including them into the Code is not appropriate at this time."

Proponent response: This proposal adds into the IBC sufficient explicit requirements for these specific products; therefore, no longer requiring them to be qualified by evaluation reports. The mandatory requirements of this proposal – testing and compliance to ASTM D7032, labeling, and installation – are based on and compliment existing requirements in the code.

Committee reason for disapproval: "It is important to be able to verify design capabilities."

Proponent response: WPC deck boards, stair treads, and handrail and guardrail systems are engineered products.

This proposal requires wood plastic composite deck boards, stair treads, handrails and guardrail systems to meet the requirements of ASTM D7032, a standard developed specifically for demonstrating code compliance of WPC exterior deck components. Meeting the requirements of ASTM D7032 verifies the engineered WPC products are appropriate for use as exterior deck components. ASTM D7032 includes deck-related performance evaluations and performance requirements such as flexural tests, bio-degradation tests, fire performance tests, creep recovery tests, mechanical fastener holding tests, and slip resistance tests. The standard also includes consideration of the effects of temperature, moisture, concentrated loads, freeze-thaw resistance tests, UV resistance, and duration of load on WPC deck boards, stair treads, and handrail and guardrail systems.

The design capacity of each WPC deck board, stair tread, handrail, and guardrail system is tested and evaluated according to product specification ASTM D7032. The testing required in D7032 addresses IBC requirements for deck boards, stair treads, handrails, and guardrail systems.

The result of these tests determines an allowable load and span rating for deck boards and a stringer spacing for stair treads. Product labels will show verification of compliance with ASTM D 7032 and provide the appropriate performance information. For example, deck board labels would identify the allowable load and span (e.g., 100 psf load on a 16" span would be expressed as "16/100"). For stair treads, ASTM D7032 requires load and span testing at higher loads (300 psf and 750 lb concentrated load). This concentrated load test for WPC stair treads is 2.5 times what's required in the IBC in Table 1607.1, Footnote f.

Guardrail systems, per ASTM D7032, are required to be subjected to and pass the in-fill load test, the uniform load test, and the concentrated load test at 2.5 times the loads required by the IBC (in Sections 1607.7.1.2; 1607.7.1; and 1607.7.1.1 respectively) with the guardrail system constructed according to the manufacturer's instructions. These tests evaluate the strength and stiffness of all components and their connections.

For designers, specifiers, builders, and for code enforcement, the maximum post spacing (span) for guardrail systems is required to be on the label, as is verifying compliance to ASTM D7032. And, of course, guardrail systems for projects constructed under the IBC must meet the requirements of Section 1012 and 1013.

Assuming WPC deck boards, stair treads, and guardrail systems are selected, specified, and installed according to the manufacturer's instructions – and the manufacturer confirms compliance to ASTM D7032 in their literature and on the product label – designing exterior deck projects which use WPC components is quite straightforward: 1) Select WPC deck boards that meet or exceed the required load (per IBC Table 1607.1) at the desired span of the deck's joists. 2) Plan for stair stringers no farther apart than the maximum allowable span for the desired WPC stair treads. 3) Select a WPC guardrail system that meets the minimum height requirements for the project (i.e. 42" for the IBC) and plan for guardrail supports (posts) no further apart than the maximum spacing (span) allowed by the guardrail system's manufacturer.

CLMA recommends approval of S207 Part 1, as modified by this public comment.

Final Action: AS AM AMPC____ D

S207-09/10-PART II
IRC R317.4.1 (New)

Proposed Change as Submitted

Proponent: John Woestman, The Kellen Company representing the Composite Lumber Manufacturers Association

PART II – IRC BUILDING/ENERGY

1. Add new text as follows:

R317.4.1 Labeling. Labels for deck boards and stair treads shall include the allowable maximum load and span. Labels for handrails and guardrail systems shall indicate the allowable maximum span.

2. Revise as follows:

~~**R317.4.1**~~ **R317.4.2 Installation.** Wood/plastic composites shall be installed in accordance with the manufacturer's instructions.

Reason: **(Part II, IRC)** This CLMA proposal complements language proposed for IBC (see Part I, item 5).

This code change for the IRC will make it faster and easier to verify that a deck constructed of wood plastic composite material complies with the code. The wood plastic composite deck boards and stair treads are to have a label indicating the span rating (i.e. 100 lbs/ft^2 at 16” O.C.) in addition to confirming compliance to ASTM D7032. Handrails and guardrail systems will be similarly labeled with their span rating (distance between support posts).

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: WOESTMAN-S7-2304.13.2

Public Hearing Results

PART II- IRC B/E
Committee Action: Disapproved

Committee Reason: The labeling requirements are unclear and present a problem for inspectors after installation. There are no directions for how to label and the location of the label. The labeling should be similar to sheathing that allows the inspector to visibly, easily and readily verify that the proper material is installed.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rick Davidson, representing self, requests Approval as Submitted.

Commenter’s Reason: Because of the different installation requirements for composite decking, especially when used for stair treads, having this information on the label may eliminate the need for field inspection staff to read through research reports (that may not always be available in the field) in order to approve an installation. It seems that having this additional information would make life easier for both the installer and the field inspector and it should be approved.

Public Comment 2:

John Woestman, Kellen Company, representing Composite Lumber Manufacturer’s Association (CLMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R317.4.1 Labeling. ~~Labels for deck boards and stair treads shall include the allowable maximum load and span. Labels for handrails and guardrail systems shall indicate the allowable maximum span.~~ <u>Deck boards and stair treads shall bear a label that indicates compliance to ASTM D 7032 and includes the allowable load and maximum allowable span. Handrails and guardrail systems or their packaging shall bear a label that indicates compliance to ASTM D 7032 and includes the maximum allowable span.</u>

R317.4.2 Installation. Wood/plastic composites shall be installed in accordance with the manufacturer’s instructions.

Commenter’s Reason: This proposal clarifies mandatory labeling requirements for wood/plastic composites currently in this section of the IRC.

Each deck board and stair tread, similar to pressure-preservative treated wood, is required to have a label. The required label would be applied on an end or on a face (side) of each board. Product labels will show verification of compliance with ASTM D 7032 and provide the appropriate performance information. For example, deck board labels would identify the allowable load and span (e.g., 40 psf load on a 16” span would be expressed as “16/40”).

Handrails and guardrail systems, which are more often supplied as “kits” in packages, require labels on the items or on the packaging. For ease of code enforcement, the maximum span (maximum vertical post spacing) is required to be on the label, as is verifying compliance to ASTM D7032.

In summary, for ease of code enforcement, this code change clarifies / adds items required on the labels to be placed on wood/plastic composite deck boards, stair treads, handrails, and guardrail systems. CLMA recommends approval of S207 Part 2, as modified by this public comment.

Final Action: AS AM AMPC____ D

S211-09/10
2308.3.2, 2308.3.2.1 (New), 2308.3.2.2 (New), 2308.12.6

Proposed Change as Submitted

Proponent: Robert Rice, Grants Pass, representing Josephine County Building Safety and Southern Oregon Chapter International Code Council.

Revise as follows:

2308.3.2 Braced wall line connections. Wind and seismic lateral forces shall be transferred from the roof ~~roofs~~ and floor ~~floors~~ diaphragms to braced wall lines and from the braced wall lines in upper stories to the braced wall lines in the story below in accordance with ~~this section~~ Sections 2308.3.2.1 and 2308.3.2.2.

2308.3.2.1 Bottom plate connection. Braced wall line bottom plates shall be connected to joists or full-depth blocking below in accordance with Table 2304.9.1, Item 6, or to foundations in accordance with Section 2308.3.3.

2308.3.2.2 Top plate connection. Where joists or rafters are used, braced wall line top plates shall be fastened to joists, rafters or full-depth blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. ~~Braced wall line bottom plates shall be connected to joists or blocking below in accordance with Table 2304.9.1, Item 6, or to foundations in accordance with Section 2308.3.3.~~ Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and equal to the depth of the joist or rafter at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

> **Exception:** Blocking at rafters need not be full depth when there are no braced wall lines above but shall extend to within 2 inches (51 mm) from the sheathing above.

At exterior gable end walls braced wall panel sheathing in the top *story* shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15240 mm).

> ~~**Exception:**~~ Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other *approved* methods providing equivalent lateral force transfer. Blocking shall be minimum 2 inch (51 mm) nominal thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11

2308.12.6 Irregular structures. *Conventional light-frame construction* shall not be used in irregular portions of structures in *Seismic Design Category* D or E. Such irregular portions of structures shall be designed to resist the forces specified in Chapter 16 to the extent such irregular features affect the performance of the conventional framing system. A portion of a structure shall be considered to be irregular where one or more of the conditions described in Items 1 through 6 below are present.

1. Where exterior braced wall panels are not in one plane vertically from the foundation to the uppermost *story* in which they are required, the structure shall be considered to be irregular [see Figure 2308.12.6(1)].

   Exception: Floors with cantilevers or setbacks not exceeding four times the nominal depth of the floor joists [see Figure 2308.12.6(2)] are permitted to support braced wall panels provided:

   1. Floor joists are 2 inches by 10 inches (51mm by 254 mm) or larger and spaced not more than 16 inches (406 mm) o.c.
   2. The ratio of the back span to the cantilever is at least 2:1.
   3. Floor joists at ends of braced wall panels are doubled.
   4. A continuous rim joist is connected to the ends of cantilevered joists. The rim joist is less than 0.058 inch (1.47 mm) (16 galvanized gage) and 11/2 inches (38 mm) wide fastened with six 16d common nails on each side. The metal tie shall have a minimum yield of 33,000 psi (227 MPa).
   5. Joists at setbacks or the end of cantilevered joists shall not carry gravity loads from more than a single *story* having uniform wall and roof loads, nor carry the reactions from headers having a span of 8 feet (2438 mm) or more.

2. Where a section of floor or roof is not laterally supported by braced wall lines on all edges <u>and connected in accordance with Section 2308.3.2,</u> the structure shall be considered to be irregular [see Figure 2308.12.6(3)].

    Exception: Portions of roofs or floors that do not support braced wall panels above are permitted to extend up to 6 feet (1829 mm) beyond a braced wall line [see Figure 2308.12.6(4)] <u>provided that the framing members are connected to the braced wall line below in accordance with Section 2308.3.2.</u>

3. Where the end of a required braced wall panel extends more than 1 foot (305 mm)over an opening in the wall below, the structure shall be considered to be irregular. This requirement is applicable to braced wall panels offset in plane and to braced wall panels offset out of plane as permitted by the exception to Item 1 above in this section [see Figure 2308.12.6(5)].

    Exception: Braced wall panels are permitted to extend over an opening not more than 8 feet (2438 mm) in width where the header is a 4-inch by 12-inch (102 mm by 305 mm) or larger member.

4. Where portions of a floor level are vertically offset such that the framing members on either side of the offset cannot be lapped or tied together in an *approved* manner, the structure shall be considered to be irregular [see Figure 2308.12.6(6)].

    Exception: Framing supported directly by foundations need not be lapped or tied directly together.

5. Where braced wall lines are not perpendicular to each other, the structure shall be considered to be irregular [see Figure 2308.12.6(7)].

6. Where openings in floor and roof diaphragms having a maximum dimension greater than 50 percent of the distance between lines of bracing or an area greater than 25 percent of the area between orthogonal pairs of braced wall lines are present, the structure shall be considered to be irregular [see Figure 2308.12.6(8)].

Reason: This code section addresses the connection of braced wall lines to framing above and below to transfer lateral (wind and seismic) forces into the roof and floor diaphragms. This proposal does not add any new requirements. First, in Section 2308.3.2, this proposal separates the top plate connection requirements from the bottom plate connections for clarity. Secondly, in section 2308.12.6, a reference is added to point to the connection requirements in 2308.3.2.

Purpose: As currently written, the text of the code combines top plate and bottom plate connections in the same paragraph. Top plate connection requirements at roofs and ceilings are typically different than connections to floors above. At roofs, rafters or trusses are used and pose different challenges as opposed to flat floor joists. This proposal is intended to make the section read more clearly as well as arrange it to work with another proposal revising this section that will provide prescriptive solutions for connections at the top plate to the roof diaphragm when full-depth, solid blocking will not work or is impractical.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-S1-2308.3.2

<u>Public Hearing Results</u>

Committee Action: **Approved as Modified**

Modify the proposal as follows:

2308.3.2.2 Top plate connection. Where joists <u>and/</u>or rafters are used, braced wall line top plates shall be fastened to joists, rafters<u>, rimboards</u> or ~~full-depth~~ blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. Blocking <u>at joists with walls above</u> ~~shall be a minimum of 2 inches (51 mm) nominal in thickness and~~ <u>shall be</u> equal to the depth of the joist ~~or rafter~~ at the <u>braced</u> wall line ~~and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11~~. ~~**Exception:**~~ Blocking at rafters need not be full depth ~~when there are no braced wall lines above~~ but shall extend to within 2 inches (51 mm) from the <u>roof</u> sheathing above. <u>Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.</u>

At exterior gable end walls braced wall panel sheathing in the top *story* shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other *approved* methods providing equivalent lateral force transfer. Blocking shall be minimum 2 inch (51 mm) nominal thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11

(Portions of proposal not shown are unchanged)

Committee Reason: This code change clarifies what's required for braced wall line connections by breaking out the requirements for top plate and bottom plate. This is often difficult to accommodate while addressing energy code and ventilation issues. There are unresolved issues with the 2 inch gap allowed at rafters, but it is considered acceptable. The modification cleans up the proposed wording and provides an acceptable starting point for getting these clarifications into the code.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Gary J. Ehrlich, PE National Association of Home Builders, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2308.3.2.2 Top plate connection. Where joists and/or rafters are used, braced wall line top plates shall be fastened to joists, rafters, rimboards or blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. Blocking at joists with walls above shall be equal to the depth of the joist at the braced wall line. Blocking at rafters need not be full depth but shall extend to within 2 inches (51 mm) from the roof sheathing above. Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11. <u>Notching or drilling of holes in blocking in accordance with the requirements of Section 2308.8.2 or Section 2308.10.4.2 shall be permitted.</u>

At exterior gable end walls braced wall panel sheathing in the top *story* shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other *approved* methods providing equivalent lateral force transfer. Blocking shall be minimum 2 inch (51 mm) nominal thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11. <u>Notching or drilling of holes in blocking in accordance with the requirements of Section 2308.8.2 or Section 2308.10.4.2 shall be permitted.</u>

(Portions of proposal not shown are unchanged)

Commenter's Reason: The purpose of this public comment is to amend the blocking provisions approved at the Public Hearings in Baltimore. Increased requirements for ventilation of attic and roof spaces are being introduced in the energy codes. These provisions conflict with requirements for solid full-depth blocking, necessitating engineered solutions. Some of these engineered details are quite complex, often involving double rows of blocking. Often, "pre-engineered" blocking with pre-drilled holes is provided. The language proposed here would permit the application of the prescriptive drilling and notching requirements currently allowed for joists and rafters to be used for blocking. A similar change was approved last cycle for Section R802.7.1 of the IRC.

Public Comment 2:

Larry Wainright, Qualtim, Inc, representing Structural Building Components Association, (SBCA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2308.3.2.2 Top plate connection. Where joists and/or rafters are used, braced wall line top plates shall be fastened to joists, rafters, rimboards or blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. Blocking at joists with walls above shall be equal to the depth of the joist at the braced wall line. Blocking at rafters need not be full depth but shall extend to within 2 inches (51 mm) from the roof sheathing above. Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

At exterior gable end walls braced wall panel sheathing in the top *story* shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other *approved* methods providing equivalent lateral force transfer. Blocking shall be minimum 2 inch (51 mm) nominal thickness and ~~equal to the depth of the truss at the wall line~~ <u>shall extend to within 2 inches (51 mm) from the roof sheathing above</u> and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

(Portions of proposal not shown are unchanged)

Commenter's Reason: The purpose of this change is to maintain consistency between differing products used in the same application. The modification that was approved at the code development hearings allow the blocking between rafters to extend to within 2" of the roof sheathing to allow for proper ventilation. This provision was inadvertently left out of the same provision for roof trusses.

Public Comment 3:

Steven Winkel, FAIA, PE, and Kelly Cobeen, PE, SE, representing the Federal Emergency Management Agency/Building Seismic Safety Council Code Resource Support Committee (FEMA/BSSC CRSC); Alan Robinson, representing the Structural Engineers Association of California, request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2308.3.2.2 Top plate connection. Where joists and/or rafters are used, braced wall line top plates shall be fastened <u>over the full length of the braced wall line</u> to joists, rafters, rimboards or blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. Blocking at joists with walls above shall be equal to the depth of the joist at the braced wall line. Blocking at rafters need not be full depth but shall extend to within 2 inches (51 mm) from the roof sheathing above. Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

At exterior gable end walls braced wall panel sheathing in the top *story* shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall <u>over the full length of the braced wall line</u> by blocking of the ends of the trusses or by other *approved* methods providing equivalent lateral force transfer. Blocking shall be minimum 2 inch (51 mm) nominal thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

(Portions of proposal not shown are unchanged)

Commenter's' Reason: This public comment clarifies the required extent of shear transfer connections for braced wall panels. A related public comment to RB 109 clarifies similar construction in the IRC. The purpose of these connections is to transfer seismic and wind loads from the roof to the wall below or from wall above to wall below. This code change as approved by the IBC structural committee permits the addition of a 2-inch gap between the top of blocking and the roof sheathing, which reduces the strength and capacity of the roof system and the shear transfer connection. There is not adequate research available to demonstrate that the reduced strength and stiffness are sufficient when blocking is limited to the length of the braced wall panel. Extension of the blocking over the full braced wall line length replicates common existing construction that has a history of adequate performance.

Final Action: AS AM AMPC____ D

S212-09/10

2308.3.2, Figure 2308.3.2(1) (New), Figure 2308.3.2(2) (New)

<u>Proposed Change as Submitted</u>

Proponent: Robert Rice, Grants Pass, OR, representing Josephine County Building Safety and Southern Oregon Chapter International Code Council.

Revise as follows:

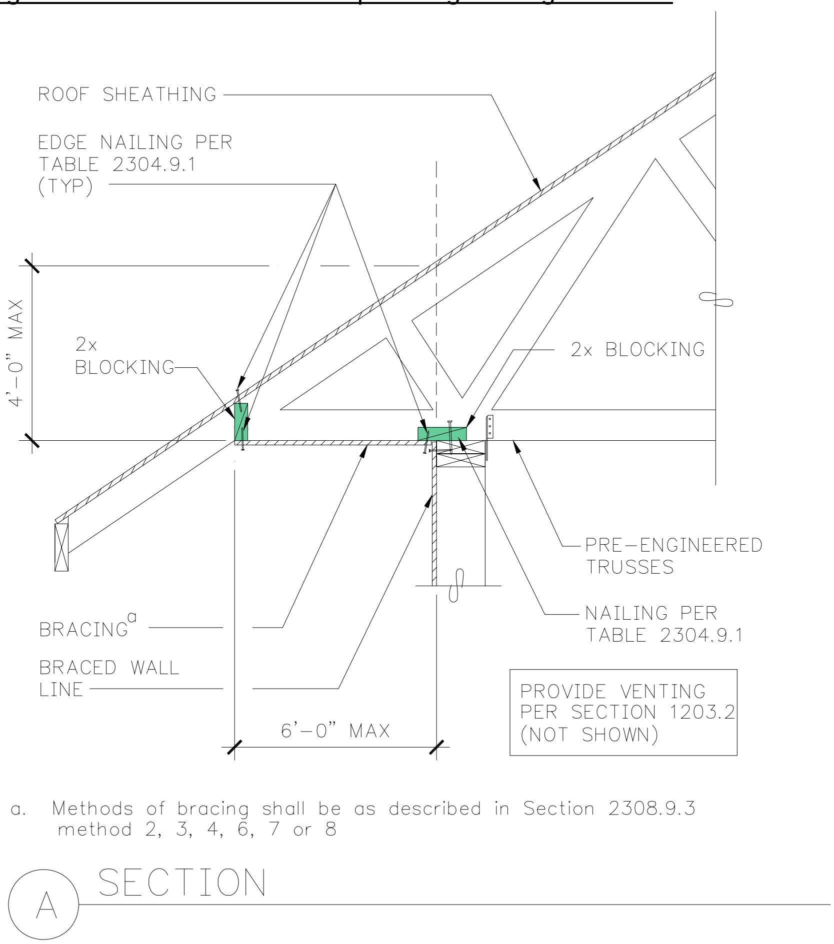
2308.3.2 Braced wall line connections. Wind and seismic lateral forces shall be transferred from the roofs and floors to braced wall lines and from the braced wall lines in upper stories to the braced wall lines in the story below in accordance with is section.

Braced wall line top plates shall be fastened to joists, rafters or full-depth blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. Braced wall line bottom plates shall be connected to joists or blocking below in accordance with Table 2304.9.1, Item 6, or to foundations in accordance with Section 2308.3.3. At exterior gable end walls, braced wall panel sheathing in the top story shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15 240 mm).

~~**Exception:**~~ Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other approved methods providing equivalent lateral force transfer. Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

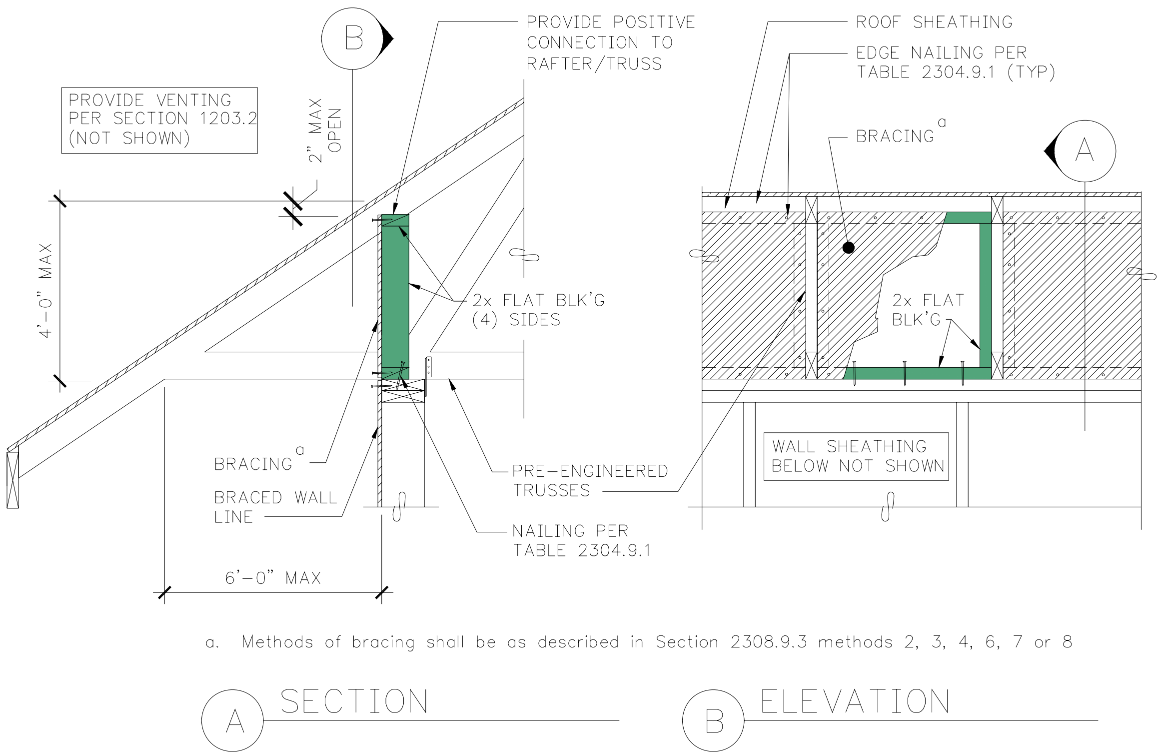
Exceptions:

1. For buildings that are classified as Seismic Design Category A, B or C and the basic wind speed is less than 100 mph (45 m/s) where the framing members are perpendicular to the wall line below and the distance from the top plate to the sheathing above is less than 9 1/4 inches (235 mm) solid blocking need not be provided when the perpendicular framing members or a parallel member such as a continuous rim joist or header is attached to the wall line in accordance with Table 2304.9.1.
2. Where the roof sheathing is greater than 9-1/4 inches (235 mm) above the top plate solid blocking is not required when the framing members are connected in accordance with one of the following methods:
   - 2.1 In accordance with Figure 2308.3.2 (1)
   - 2.2 In accordance with Figure 2308.3.2 (2)
   - 2.3 With full height engineered blocking panels designed for values listed in AF&PA WFCM.
   - 2.4 Designed in accordance with accepted engineering methods.



For SI: 1 inch = 25.4 mm

FIGURE 2308.3.2 (1)
BRACED WALL PANEL TOP PLATE CONNECTION



For SI: 1 inch = 25.4 mm

FIGURE 2308.3.2 (2) BRACED WALL PANEL TOP PLATE CONNECTION

Reason: The 2006 IBC had fairly clear wording that the diaphragms need to be connected to the braced wall lines. With the approval of proposal 2008/2009 S224 the 2009 language was modified to make the purpose even more clear in that the connection is required to resist wind and seismic (lateral) forces. This proposal merely provides prescriptive methods to accomplish the connection whether with solid blocking or when solid blocking doesn't work.

In addition, another proposal that I have submitted rearranges the existing section to separate top plate connections from bottom plate connections since roof connections at the top plate differ from conditions where there is floor framing above. The two proposals are intended to work together and are shown at the end of the purpose statement combined as one.

Purpose: The current text of the IBC states the intention of connecting the braced wall line to the roof or floor diaphragm above in section 2308.3.2. A similar version of this proposal was adopted as an Oregon amendment for the adoption of the 2006 IBC (and the recent adoption of the 2009 IBC) and has worked well. Since then, countless hours have gone into developing proposals for both the IRC and the IBC in the 2009 code development process. The proposal for the IRC (which was the main focus) was successful and was approved for the 2009 IRC. The details for that proposal are the same ones submitted for this proposal. During the process of resolving opposition and developing a consensus two main changes were made to the proposals. First, based on engineering reports and historical data, an exception was made for low heel connections (9 ¼") in lower wind and seismic zones to not require the blocking. Second, the details for the high-heel blocking was modified to allow a 2" gap at the top to allow for venting (again, backed up by engineering data). Following the approval for the 2009 IRC an article was published in the Spring 2009 issue of *Wood Design Focus* addressing the issue. The article, "*When is Roof Eave Blocking Required?", states, Because the 2006 IRC lacks clarity on when roof eave blocking is required for lateral force transfer, IRC users and code officials are forced to interpret its intent on a case by case basis, often with varied results." "Fortunately, Section R602.10.6.2 of the 2009 IRC provides a reasonable solution that addresses the above concerns, places reasonable limits on past successful practices, and avoids the pitfalls of the 2006 IRC…..".*

This proposal does not add additional requirements to the code. This proposal clarifies that the connection needs to occur and provides prescriptive solutions when solid blocking in not possible or is impractical.

Per accepted engineering practice for lateral design loads, the floor and roof diaphragms transmit wind and seismic loads into the braced walls (engineered shearwalls or prescriptive braced panels). The fact that the diaphragm needs to be connected to the braced wall line is often not fully understood by plans examiners, inspectors and contractors. The typical requirement that is intended by the code is that solid blocking occur at this connection with the blocking connected to the top plate of the wall to transfer the diaphragm (plf) force to the wall top plates. This is evidenced in the IBC by the exception to irregular structures stating, *"..lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses.."*. In order for the forces to be transferred there has to be a connection capable of transferring the diaphragm shear evenly to the top plates.

The condition that occurs at an increasing rate that brings this issue up is with cantilevered or high stub-heel trusses. In that construction method solid blocking (either with 2x or engineered wood products) is often not possible due to the height of the diaphragm above the top plate of the wall.

Without this clarification of the text it is a connection that may or may not occur based on what I have seen in the field and have discussed with code officials. The blocking that is called for in the code serves three functions. It provides closure to prevent animals, birds, etc. from entering the attic space, it prevents the trusses or rafters from "rolling over" and it transfers the diaphragm forces to the wall. Most code officials, inspectors and contractors understand the first two objectives. However, the latter is a concept that is often not fully understood. This needs to be perceived, understood and implemented in a uniform way.

In addition, rather than identify a problem without providing a solution, my proposal includes two details to accomplish this connection simply. The solutions are, in principle, fundamentally extending the braced wall sheathing to the roof diaphragm either vertically in the truss bays or horizontally through the soffit. No engineering or testing is required since it is just completing the load path with the already defined sheathing and nailing.

Without prescriptive provisions in the current code this condition would require engineering or, as stated in 2308.3.2, Exception to item 1 "..by other approved methods." would be left up to the Authority Having Jurisdiction to determine what is acceptable without any guidance or uniformity between jurisdictions.

Typically, the engineering solution would provide details similar to those included in this proposal. Therefore, the solution and construction costs would not change. Costs would be reduced by eliminating additional costs for engineering where these prescriptive solutions work.

If approved, the two proposals I have submitted for section 2308.3.2 would read as shown below when combined:

2308.3.2 Braced wall line connections. Wind and seismic lateral forces shall be transferred from the roof and floor diaphragms to braced wall lines and from the braced wall lines in upper stories to the braced wall lines in the story below in accordance with this sections 2308.3.2.1 and 2308.3.2.2.
2308.3.2.1 Bottom plate connection. Braced wall line bottom plates shall be connected to joists or full depth blocking below in accordance with Table 2304.9.1, Item 6, or to foundations in accordance with Section 2308.3.3.
2308.3.2.2 Top plate connection. Where joists or rafters are used, braced wall line top plates shall be fastened to joists, rafters or full-depth blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

Exception: Blocking at rafters need not be full depth when there are no braced wall lines above but shall extend to within 2 inches (51mm) from the sheathing above.

At exterior gable end walls, braced wall panel sheathing in the top story shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15 240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other approved methods providing equivalent lateral force transfer. Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

Exceptions:

1. For Seismic Design Categories C and less and wind speed zones less than 100 mph where the rafters, joists or trusses are perpendicular to the wall line below and the distance from the top plate is less than 9 ¼ inches (235 mm) solid blocking need not be provided when the perpendicular framing members or a parallel member such as a continuous rim joist or header is attached to the wall line per Table 2304.9.1
2. Where the roof sheathing is greater than 9-1/4 inches (235 mm) above the top plate solid blocking is not required when the rafters, joists or trusses are connected in accordance with one of the following methods:

    1. In accordance with Figure 2308.3.2 (1)
    2. In accordance with Figure 2308.3.2 (2)
    3. With full height engineered blocking panels designed for values listed in American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM).
    4. Designed in accordance with accepted engineering methods.

Bibliography: "When is Roof Eave Blocking Required*", by Jay H. Crandell, P.E., Robert Rice, Brian Foley, P.E., and Frank Woeste, PhD, P.E Volume 19, Number 1, Spring 2009 Wood Design Focus, a quarterly publication of Forest Products Society, Madison WI..*

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-S2-2308.3.2

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed prescriptive requirements for braced wall panel top plate connections are not exactly like those in the IRC and there are different triggers. There were concerns expressed with the stability of the remote blocking option.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert Rice, Josephine County, OR, representing Southern Oregon Chapter of ICC requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

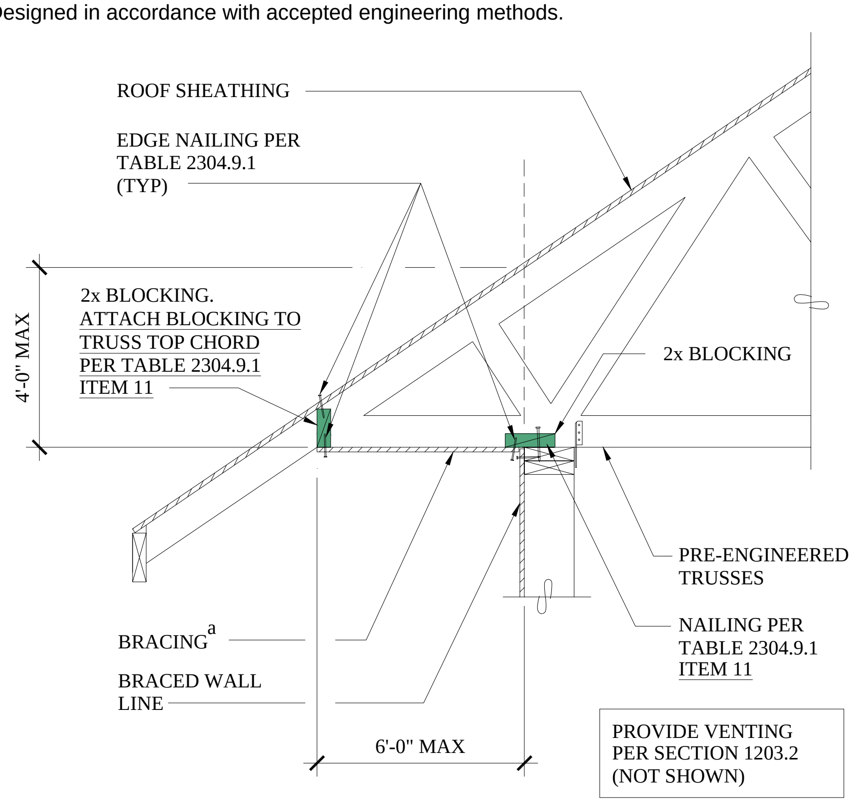
2308.3.2 Braced wall line connections. Wind and seismic lateral forces shall be transferred from the roofs and floors to braced wall lines and from the braced wall lines in upper stories to the braced wall lines in the story below in accordance with is section.

Braced wall line top plates shall be fastened to joists, rafters or full-depth blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. Braced wall line bottom plates shall be connected to joists or blocking below in accordance with Table 2304.9.1, Item 6, or to foundations in accordance with Section 2308.3.3. At exterior gable end walls, braced wall panel sheathing in the top story shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15 240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other approved methods providing equivalent lateral force transfer. Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

Exceptions:

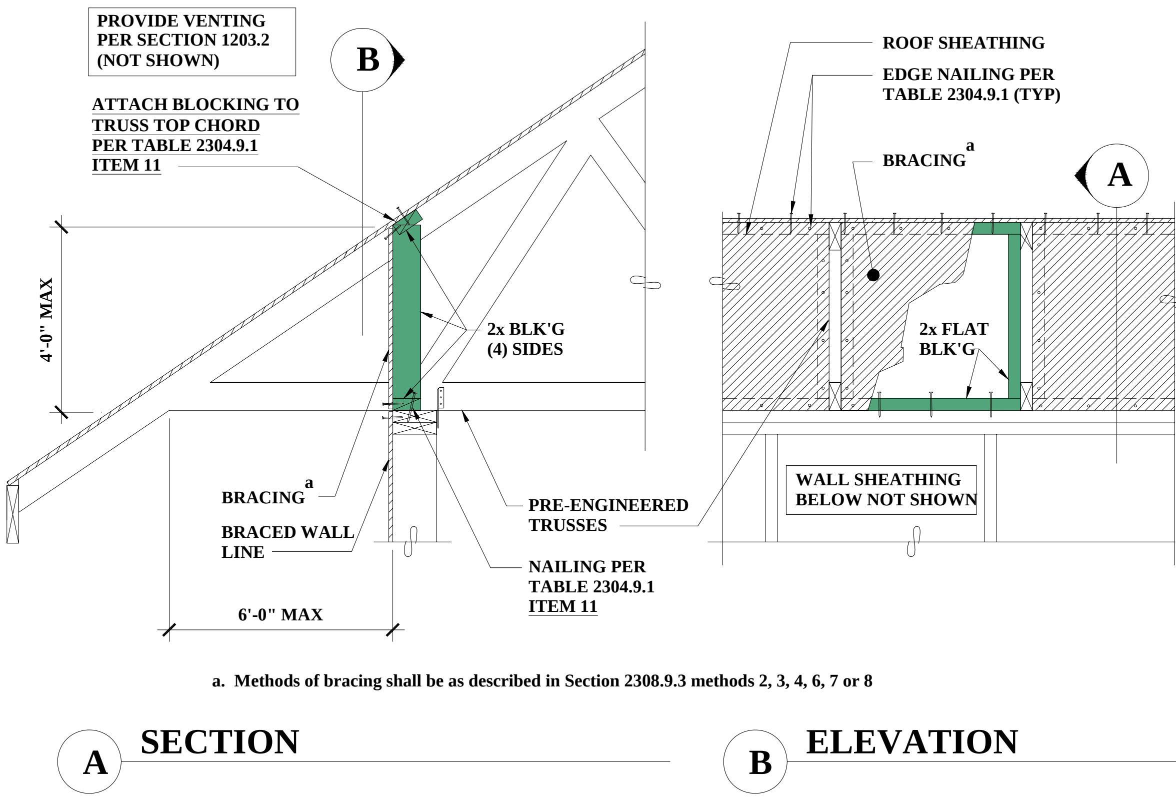
1. For Seismic Design Categories C and less and wind speed zones less than 100 mph ~~For buildings that are classified as Seismic Design Category A, B or C and the basic wind speed is less than 100 mph (45 m/s)~~ where the framing members are perpendicular to the wall line below and the distance from the top plate to the sheathing above is less than 9 1/4 inches (235 mm) full-height ~~solid~~ blocking need not be provided when the perpendicular framing members or a parallel member such as a continuous rim joist or header is attached to the wall line in accordance with Table 2304.9.1.
2. Where the roof sheathing is greater than 9-1/4 inches (235 mm) above the top plate solid full-height blocking is not required when the framing members are connected in accordance with one of the following methods:
   ~~2.1~~ 1. In accordance with Figure 2308.3.2 (1)
   ~~2.2~~ 2. In accordance with Figure 2308.3.2 (2)
   ~~2.3~~ 3. With full height engineered blocking panels designed for values listed in AF&PA WFCM.
   ~~2.4~~ 4. Designed in accordance with accepted engineering methods.



a. Methods of bracing shall be as described in Section 2308.9.3 method 2, 3, 4, 6, 7 or 8

For SI: 1 inch = 25.4 mm

FIGURE 2308.3.2 (1)
BRACED WALL PANEL TOP PLATE CONNECTION.



For SI: 1 inch = 25.4 mm

FIGURE 2308.3.2 (2)
BRACED WALL PANEL TOP PLATE CONNECTION.

TABLE 2304.9.1
FASTENING SCHEDULE

CONNECTION	FASTENING[a],	LOCATION
1. Joist to sill or girder	3 - 8d common (21/2" x 0.131") 3 – 3" x 0.131" nails 3 – 3" 14 gage staples	toenail
2. Bridging to joist	2 - 8d common (21/2" x 0.131") 2 – 3" x 0.131" nails 2 – 3" 14 gage staples	toenail each end
11. Blocking between joists, ~~or~~ rafters or trusses to top plate	3 - 8d common (21/2" x 0.131") 3 – 3" x 0.131" nails 3 – 3" 14 gage staples	toenail
Blocking between rafters or truss chords, not at the wall top plate, to rafter or truss	2 - 8d common (21/2" x 0.131") 2 – 3" x 0.131" nails 2 – 3" 14 gage staples	toenail each end
	2 - 16d common (31/2" x 0.162") 3 – 3" x 0.131" nails 3 – 3" 14 gage staples	endnail

(Portions of table not shown are unchanged)

Commenter's Reason: The 2006 IBC had fairly clear wording that the diaphragms need to be connected to the braced wall line. With the approval of proposal 2008/2009 S224 the 2009 language was changed to make the purpose even more clear in that the connection is required to resist wind and seismic (lateral) forces. In addition, I submitted S211 09/10 and it was approved by committee in Baltimore. S211 09/10 rearranges the existing section 2308.3.2 to separate top plate connections from bottom plate connections since roof connections at the top plate differ from conditions where there is floor framing above. It also allows the blocking at the roof to have a maximum 2 inch gap from the roof sheathing to the blocking to allow venting. S211 09/10 and S212 09/10 are intended to work together and are shown combined at the end of this public comment.

At the code development hearings the committee expressed concern the details provided could be used on large buildings of five, six or more stories and were reluctant to not stay with the “solid full-height” blocking. In reality, the prescriptive provisions of “conventional light-frame construction” as provided for in section 2308 are very limited in scope. In section 2308.2 they are limited to:

1. Three stories max (two stories max in SDC C, one story in SDC D and above)
2. Max floor to floor height of 11’-7”
3. Max dead loads of 15 psf
4. Floor live load of 40 psf max
5. Ground snow 50 psf max
6. Wind speeds 100 max (w/ exception)
7. Roof truss span of 40 feet max between support
8. Occupancy Category IV buildings not allowed in SDC B,C,D,E or F
9. Limited by “irregular structures” definitions in 2308.12.6
10. More restrictive requirements for SDC B and above defined in 2308.11.
11. Braced wall line spacing 35 feet max each direction, each floor. In SDC D and E max spacing is 25 feet. (IRC allow exception up to 50 feet)

In other words, due to the limitations listed above as well as the other limitations in the code not listed here, the structures that are built with the provisions of section 2308 are small, light-framed buildings that do not have the significant lateral loading that other buildings do.

There was item that was raised by the committee regarding figure 2308.3.2(2). It was not specified in the detail how the top blocking is to attach to the truss or rafter. The note, “Nailing per table 2304.9.1” only pointed to the bottom blocking nailing to the top plate. At the hearings I pointed out that the significant load that this detail addresses is in the plane of the wall and that the blocking would be nailed in place by typical construction methods and was not a significant factor. This blocking is similar to 2x bridging that is often installed at the mid-span of joists. Table 2304.9.1 specifies fasteners for bridging in item 2. Item 11 of the table addresses the fasteners for the blocking between joists and rafters to the wall top plate. This public comment adds the same fasteners as bridging in item 2 to item 11 of the table where blocking between joists or rafters is not at the wall top plate. (Note: “trusses” was added to the existing table item but is merely editorial and has no bearing or impact on this proposal)

This proposal merely provides direction to accomplish the connection. It provides three prescriptive options when solid blocking doesn’t work.

Purpose: The current code text (IBC) states the intention of connecting the braced wall line to the roof or floor diaphragm above in section 2308.3.2. A similar version of this proposal was adopted as an Oregon amendment for the adoption of the 2006 IBC and has worked well. Since then, countless hours have gone into developing proposals for both the IRC and the IBC in the 2009 code development process. The IRC proposal was approved in Minneapolis. During the process of resolving concerns and developing a consensus changes were made to the proposal. Based on engineering reports and historical data, an exception was made for low heel connections (9 ¼”) in lower wind and seismic zones to not require the blocking.

This proposal does not add additional requirements to the code. This proposal clarifies that the connection needs to occur and provides prescriptive solutions when solid blocking, per the current text, is not possible or is impractical..

Per accepted engineering practice for lateral design loads, the floor and roof diaphragms transmit wind and seismic loads into the braced walls (engineered shearwalls or prescriptive braced panels). The fact that the diaphragm needs to be connected to the braced wall line to complete the load path is often not fully understood by plans examiners, inspectors and contractors. The typical requirement that is intended by the code is that full height solid blocking occur at this connection with edge nailing to the blocking and the blocking connected to the top plate of the wall to transfer the diaphragm (plf) force to the wall top plates. This is evidenced in the IBC by the exception to irregular structures stating, *“..lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses..”*. In order for the forces to be transferred there has to be a connection capable of transferring the diaphragm shear evenly to the top plates.

The condition that occurs at an increasing rate that brings this issue up is with cantilevered or stub-heel trusses. In that construction method solid blocking (either with 2x or engineered wood products) is often not possible due to the height of the diaphragm above the top plate of the wall.

Without this clarification of the text it is a connection that may or may not occur based on what I have seen in the field and have discussed with code officials. The blocking that is called for in the code serves three functions. It provides closure to prevent animals, birds, etc. from entering the attic space, it prevents the trusses or rafters from “rolling over” and it transfers the diaphragm forces to the wall. Most code officials, inspectors and contractors understand the first two objectives. However, the latter is a concept that is often not fully understood. This needs to be perceived, understood and implemented in a uniform way.

In addition, rather than identify a problem without providing a solution, my proposal includes two details to accomplish this connection simply. The solutions are, in principle, fundamentally extending the roof diaphragm sheathing to the wall top plates either vertically in the truss bays or horizontally through the soffit. No engineering or testing is required since it is just completing the load path with the already defined sheathing and nailing.

Without prescriptive provisions in the current code this condition would require engineering or, as stated in 2308.3.2, Exception to item 1 “..by other approved methods.” would be left up to the Authority Having Jurisdiction to determine what is acceptable without any guidance or uniformity between jurisdictions.

Typically, the engineering solution would provide details similar to those included in this proposal. Therefore, the solution and construction costs would not change. Costs would be reduced by eliminating additional costs for engineering where these prescriptive solutions work.

I had also submitted proposal S211 09/10 for this same code section and it was approved by committee in Baltimore. S211 09/10 reorganizes section 2308.3.2. If this public comment to S212 is approved, section 2308.3.2 would read as shown below when the two are combined:

2308.3.2 Braced wall line connections. *Wind and seismic lateral forces shall be transferred from the roof~~s~~ and floor diaphragms to braced wall lines and from the braced wall lines in upper stories to the braced wall lines in the story below in accordance with this section.*

2308.3.2.1 Bottom plate connection. *Braced wall line bottom plates shall be connected to joists or full-depth blocking below in accordance with Table 2304.9.1, Item 6, or to foundations in accordance with Section 2308.3.3.*

2308.3.2.2 Top plate connection. *Where joists and/or rafters are used, braced wall line top plates shall be fastened to joists, rafters, rimboard or blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19 as applicable based on the orientation of the joists or rafters to the braced wall line. Blocking at joists with walls above shall be equal to the depth of the joist at the braced wall line. Blocking at rafters need not be full depth but shall extend to within 2 inches (51 mm) from the roof sheathing above. Blocking shall be shall be a minimum of 2 inches (51 mm) nominal in thickness and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.*

At exterior gable end walls, braced wall panel sheathing in the top story shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15 240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other approved methods providing equivalent lateral force transfer. Blocking shall be a minimum of 2 inches (51 mm) nominal in thickness and equal to the depth of the truss at the wall line and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11.

Exceptions:

1. For Seismic Design Categories C and less and wind speed zones less than 100 mph where the framing members are perpendicular to the wall line below and the distance from the top plate to the sheathing above is less than 9 1/4 inches (235 mm) solid, full-height blocking need not be provided when the perpendicular framing members or a parallel member such as a continuous rim joist or header is attached to the wall line per Table 2304.9.1
2. Where the roof sheathing is greater than 9-1/4 inches (235 mm) above the top plate solid full-height blocking is not required when the framing members are connected in accordance with one of the following methods:
   1. In accordance with Figure 2308.3.2 (1)
   2. In accordance with Figure 2308.3.2 (2)
   3. With full height engineered blocking panels designed for values listed in American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM).
   4. Designed in accordance with accepted engineering methods.

Final Action: AS AM AMPC____ D

S213-09/10
2308.9.2.3

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Associations- Code Advisory Committee - General Requirements Subcommittee

Revise as follows:

2308.9.2.3 Nonbearing walls and partitions. In nonbearing walls and partitions, studs shall be spaced not more than ~~28~~ 24 inches (~~711~~ 609 mm) o.c. and in interior nonbearing walls and partitions, are permitted to be set with the long dimension parallel to the wall. Interior nonbearing partitions shall be capped with no less than a single top plate installed to provide overlapping at corners and at intersections with other walls and partitions. The plate shall be continuously tied at joints by solid blocking at least 16 inches (406 mm) in length and equal in size to the plate or by 1/2-inch by 11/2-inch (12.7 mm by 38 mm) metal ties with spliced sections fastened with two 16d nails on each side of the joint.

Reason: The ICC Structural Committee liked the idea of Code Change Proposal S228-07/08 but thought it was unclear. NCSEA was not the author of S228-07/08, but is now proposing a change to this section to address what we see as a potential safety concern for wind loading. Section 2308.9.2.3 allows 2x studs to be placed flat wise in a wall and be spaced at up to 28" oc. Table 2308.9.1 limits the height of edge wise studs in such a wall to 14 feet for 2x4 nonbearing walls, for example. Our Code Change Proposal is aimed at limiting this construction to interior walls. Tall flat wise stud construction is not appropriate for exterior walls which are subject to wind loads.

We are also recommending that the 28" spacing in Section 2308.9.2.3 should be changed to 24" oc. Table 2308.9.1 limits the maximum spacing of edge wise studs in all non-bearing walls to 24". Turning the stud and using it flat wise in the wall, should not let the stud spacing increase. We also note that in modern construction almost all wall framing is based on modules which fit within dimensions of 48" or 96". A spacing of 24" oc is a module of 48" and 96" but a spacing of 28" oc is not.

Cost Impact: This code change proposal will not increase the cost of construction.

ICCFILENAME: HUSTON-S1-2308.9.2.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal did not adequately justify reducing stud spacing from 28 to 24 inches. There may be some 28 inch applications currently that would be affected. The remainder of the proposal is acceptable but the proponent should consider an adjustment in a public comment.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2308.9.2.3 Nonbearing walls and partitions. In nonbearing walls and partitions, studs shall be spaced not more than ~~24~~ 28 inches (711 ~~609~~ mm) oc. and in interior nonbearing walls and partitions, are permitted to be set with the long dimension parallel to the wall. Interior nonbearing partitions shall be capped with no less than a single top plate installed to provide overlapping at corners and at intersections with other walls and partitions. The plate shall be continuously tied at joints by solid blocking at least 16 inches (406 mm) in length and equal in size to the plate or by 1/2-inch by 11/2-inch (12.7 mm by 38 mm) metal ties with spliced sections fastened with two 16d nails on each side of the joint

Commenter's Reason: The ICC Structural Committee liked the idea of Code Change Proposal S213-09/10 but there was testimony in opposition to the change from 28" oc. to 24" oc. The ICC Structural Committee urged NCSEA to provide a Public Comment. NCSEA is providing this Public Comment to address what we see as a potential safety concern for wind loading. Section 2308.9.2.3 allows 2x studs to be placed flat wise in a wall and be spaced at up to 28" oc. Table 2308.9.1 limits the height of edge wise studs in such a wall to 14 feet for 2x4 nonbearing walls, for example. S213-09/10 is aimed at limiting this construction to interior walls. Tall flat wise stud construction is not appropriate for exterior walls which are subject to wind loads. Using tall, flat wise studs in an exterior wall, could lead to failure under wind loading.

Due to the testimony about the change in the maximum spacing to 28" this change is not being proposed.

Final Action: AS AM AMPC____ D

S214-09/10-PART I
2308.9.4

Proposed Change as Submitted

Proponent: Robert Rice, Grants Pass, representing Josephine County Building Safety and Southern Oregon Chapter International Code Council.

PART I – IBC STRUCTURAL

Revise as follows:

2308.9.4 Cripple walls. Foundation cripple walls shall ~~be framed of studs~~ not be less in size than the required width of the studding above with a minimum length of 14 inches (356 mm), or the wall shall be framed of solid blocking or other approved method to prevent the studs from splitting. Where exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional story.

Reason: There are situations where the wall above is of studs larger than what would be required for structural reasons. In some cases it is to accommodate increased insulation or for tall walls. Typically, a 2x4 cripple wall is structurally sufficient even though the wall above may be 2x 6 for insulation reasons or 2x 8 for tall studs. The words "..required width…" would clear this up.

Regarding the 14" studs, this code section has been modified in the past by Oregon amendment and perhaps been misunderstood by others. The purpose for "Cripple walls with a stud height less than 14 inches…", to be sheathed does not relate to lateral bracing as the Oregon amendment implies,

For example, the Oregon amendment reads as follows:

> *Cripple walls with a stud height less than 14 inches (356 mm)* ***supporting exterior walls or an interior braced wall line which is supported by a continuous foundation as required by Section 602.10.9*** *shall be sheathed on at least one side with a wood structural panel that is fastened to both the top and bottom plates in accordance with Table R602.3(1), or the cripple walls shall be constructed of solid blocking.*

The intention of this code requirement is to ensure structural stability of walls with studs that are short enough to be susceptible to splitting. The 14" limit is due to the fact that, historically, up to 14" dimensional lumber was available to be used as solid blocking in lieu of the short studs. In addition, the proposal states, "or other approved method" since mechanical anchors are currently available that would allow the studs to be attached to the top and bottom plate without damaging the studs.

With the provision contained in R602.9, studs shorter than 14" can be used as long as sheathing is placed on one side of the wall to maintain the integrity of the studs and plates. The text continues, "...or the cripple walls shall be constructed of solid blocking." which would allow a number of products, now available, to be used such as glue-laminated beams (GLB), laminated veneer lumber beams (LVL) or dimensional lumber such as 4x's and 6x's.

The IRC commentary states, "The minimum length of 14 inches for cripple wall studs provides sufficient clear space for required nailing of the framing". The IBC commentary states, "The minimum stud length of 14 inches is based on the length necessary to properly fasten the studs to the foundation wall plate and the double plate above."

In addition, "Section R602.9 Cripple Walls" appears in the wall "framing" portion of the code. Wall "bracing" begins to be addressed in section R602.10. In Section R602.10.2 "Cripple wall bracing" is addressed specifically.

In summary, section "R602.9 Cripple Walls" has nothing to do with lateral bracing.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-S-2308.9.4

Public Hearing Results

PART I- IBC STRUCTURAL
Committee Action: Disapproved

Committee Reason: The proposed revisions to cripple wall are poorly worded and would not make the code any clearer.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert Rice, Josephine County Oregon, representing Southern Oregon Chapter of ICC, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

PART I –IBC STRUCTURAL

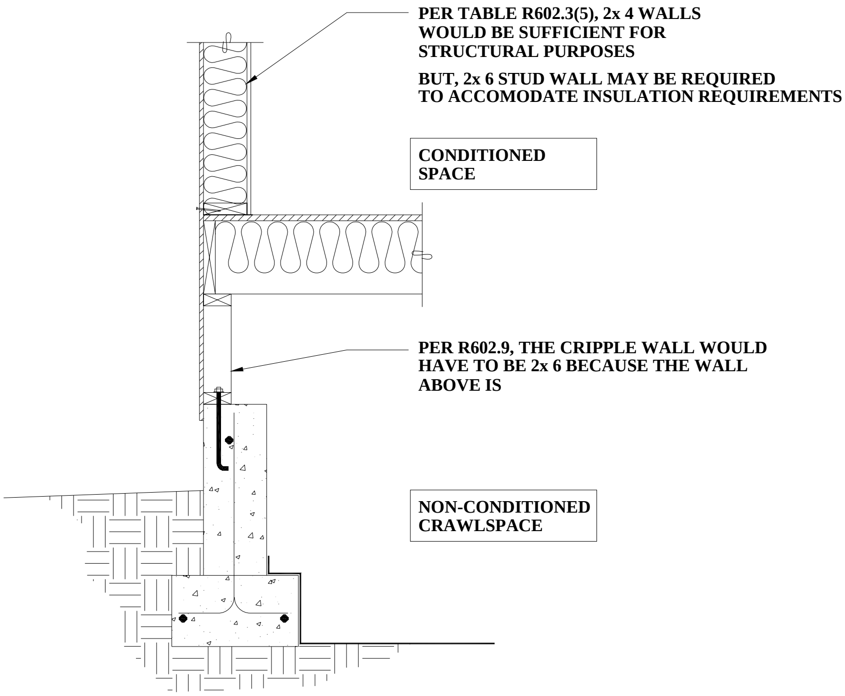
2308.9.4 Cripple walls. Foundation cripple walls shall be framed of studs not less in size than the studding above. ~~with a minimum length of 14 inches (356 mm), or shall be framed of solid blocking.~~

> **Exception:** Cripple wall studs are permitted to be smaller in size than the studding above when the wall above is separated by a floor system that is supported by the cripple wall and the studding in the wall above is larger than required per Table 2308.9.1 provided the cripple wall studs comply with Table 2308.9.1.

Where exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional story. Cripple walls shall be framed with studs not less than 14 inches (356 mm) in height or the wall shall be framed of solid blocking.

> **Exception:** Cripple walls with studs less than 14 inches (356 mm) in height shall be permitted when the cripple wall is continuously sheathed on at least one side with wood structural panels fastened to both the top and bottom plates in accordance with Table 2304.9.1,

Commenter's Reason: The original S214 proposal attempted to address two concerns with cripples walls. First, the existing text has the un-intended consequence of being overly restrictive in certain construction methods. In the case of crawlspace construction it is common to have cripple walls where the site is not level. Tables R602.3(5) and R602.3.1 in the IRC and Table 2308.9.1 in the IBC establish the stud size, height and spacing for vertical gravity, wind and seismic loads. However, there are cases where the studs are larger than necessary per the tables. For instance, to accommodate required wall insulation 2x 6 studs may be used where 2 x 4 would work per the tables. In crawlspace construction when a cripple wall is used to support the floor system the current text would require that the cripple wall be framed of 2x6 as well (see the IRC example below).



Also, the original proposal attempted to clarify that the requirement for sheathing when studs are less than 14 inches had nothing to do with wall bracing requirements. Some code officials, contractors and code adoption committees have misunderstood the intent of this section and apply it only when the cripple wall supports braced wall lines above. The intent is that wall studs less than 14 inches can be difficult to nail to plates without splitting and applying sheathing to one side adds stability to the studs in the wall.

This replacement of the original proposal would make the text more easily understood. The committee had concern about wording in the original proposal where it stated *"…or other approved method to prevent studs form splitting"* That language has been removed Also, the committee noted that RB106 that had been approved just prior to this proposal modified some language in this section. So, to ensure that there is no conflict, this amendment incorporates the approved language from RB106 from the Ad Hoc Wall Bracing Committee which stated, *"….Cripple walls with studs less than 14 inches (356 mm) in height shall be permitted when the cripple wall is <u>continuously</u> sheathed on ~~at least~~ one side with ~~a~~ wood structural panel<u>s</u> fastened to….".* No major changes are made to the current code text. In addition, the language has been rearranged to make the IRC and IBC sections more consistent. This proposal would reduce the cost of construction

Final Action: AS AM AMPC____ D

S214-09/10-PART II
IRC R602.9

<u>*Proposed Change as Submitted*</u>

Proponent: Robert Rice, Grants Pass, representing Josephine County Building Safety and Southern Oregon Chapter International Code Council.

PART II – IRC BUILDING/ENERGY

Revise as follows:

R602.9 Cripple Walls. Foundation cripple walls shall be framed of studs not smaller than <u>required size of</u> the studding above. When exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional story.

Cripple walls with a stud height less than 14 inches (356 mm) shall be sheathed on at least one side with a wood structural panel that is fastened to both the top and bottom plates in accordance with Table R602.3(1) <u>or other approved method to prevent studs from splitting</u> or the cripple walls shall be constructed of solid blocking. Cripple walls shall be braced as required for lateral loads per section R602.10.2 and R602.10.11.4 and supported on continuous foundations~~.~~

Reason: There are situations where the wall above is of studs larger than what would be required for structural reasons. In some cases it is to accommodate increased insulation or for tall walls. Typically, a 2x4 cripple wall is structurally sufficient even though the wall above may be 2x 6 for insulation reasons or 2x 8 for tall studs. The words "..required width…" would clear this up.

Regarding the 14" studs, this code section has been modified in the past by Oregon amendment and perhaps been misunderstood by others. The purpose for "Cripple walls with a stud height less than 14 inches…", to be sheathed does not relate to lateral bracing as the Oregon amendment implies,

For example, the Oregon amendment reads as follows:

> *Cripple walls with a stud height less than 14 inches (356 mm)* ***supporting exterior walls or an interior braced wall line which is supported by a continuous foundation as required by Section 602.10.9*** *shall be sheathed on at least one side with a wood structural panel that is fastened to both the top and bottom plates in accordance with Table R602.3(1), or the cripple walls shall be constructed of solid blocking.*

The intention of this code requirement is to ensure structural stability of walls with studs that are short enough to be susceptible to splitting. The 14" limit is due to the fact that, historically, up to 14" dimensional lumber was available to be used as solid blocking in lieu of the short studs. In addition, the proposal states, "or other approved method" since mechanical anchors are currently available that would allow the studs to be attached to the top and bottom plate without damaging the studs.

With the provision contained in R602.9, studs shorter than 14" can be used as long as sheathing is placed on one side of the wall to maintain the integrity of the studs and plates. The text continues, "...or the cripple walls shall be constructed of solid blocking." which would allow a number of products, now available, to be used such as glue-laminated beams (GLB), laminated veneer lumber beams (LVL) or dimensional lumber such as 4x's and 6x's.

The IRC commentary states, "The minimum length of 14 inches for cripple wall studs provides sufficient clear space for required nailing of the framing". The IBC commentary states, "The minimum stud length of 14 inches is based on the length necessary to properly fasten the studs to the foundation wall plate and the double plate above."

In addition, "Section R602.9 Cripple Walls" appears in the wall "framing" portion of the code. Wall "bracing" begins to be addressed in section R602.10. In Section R602.10.2 "Cripple wall bracing" is addressed specifically.

In summary, section "R602.9 Cripple Walls" has nothing to do with lateral bracing.

Cost Impact: The code change proposal will not increase the cost of construction.

ICCFILENAME: RICE-S-2308.9.4

Public Hearing Results

PART II- IRC B/E
Committee Action: Disapproved

Committee Reason: This proposal needs additional information to define "method to prevent studs from splitting". The added reference sections may create potential problems with other sections of the code in the previously approved RB105-09/10 and RB106-09/10.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert Rice, Josephine County Oregon, representing Southern Oregon Chapter of ICC, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

PART II –IRC BUILDING/ENERGY

R602.9 Cripple walls. Foundation cripple walls shall be framed of studs not smaller than the studding above.

> **Exception:** Cripple wall studs are permitted to be smaller in size than the studding above when the wall above is separated by a floor system that is supported by the cripple wall and the studding in the wall above is larger than required per Tables R602.3(5) and R602.3.1 provided the cripple wall studs comply with Tables R602.3(5) and R602.3.1.

When exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional story. ~~Cripple walls with a stud height less than 14 inches (356 mm) shall be sheathed on at least one side with a wood structural panel that is fastened to both the top and bottom plates in accordance with Table R602.3(1) or the cripple walls shall be constructed of solid blocking.~~ Cripple walls shall be framed with studs not less than 14 inches (356 mm) in height or the wall shall be constructed of solid blocking.

> **Exception:** Cripple walls with studs less than 14 inches (356 mm) in height shall be permitted when the cripple wall is continuously sheathed on one side with ~~a~~ wood structural panels fastened to both the top and bottom plates in accordance with Table R602.3(1).

All cripple walls shall be supported on continuous foundations and braced as required for lateral loads in accordance with Section R602.10.9.

Commenter's Reason: See S214-09/10-Part I

Final Action: AS AM AMPC____ D

S223-09/10
2509.2

Proposed Change as Submitted

Proponent: Jose M. Estrada, representing USG Corporation

1. Revise as follows:

2509.2 Base for Tile. Glass mat water-resistant gypsum backing panel, discrete nonasbestos fiber-cement interior substrate sheets, water-resistant fiber-reinforced gypsum backers or nonasbestos fiber-mat reinforced cement substrate sheets in compliance with ASTM C 1178, C 1288, C 1278 or C 1325 and installed in accordance with manufacturer recommendations shall be used as a base for the wall tile in tub and shower areas and wall and ceiling panels in shower areas. Water-resistant gypsum backing board shall be used as a base for tile in water closet compartment walls when installed in accordance with GA -216 or ASTM C 840 and manufacturers recommendations. Regular gypsum wallboard is permitted under tile or wall panels in other wall and ceiling areas when installed in accordance with GA-216 or ASTM C 840.

Reason: The purpose of this proposal is to include an ASTM material standard for current provisions of the IBC. ASTM C 1278 products are engineered and manufactured specifically for interior water-resistant backing. The proposed ASTM material standard has been recognized by the International Residential Code (IRC) since the 2007 Supplement. The water-resistant products complying with this ASTM standard have a demonstrated track record, which has been documented substantially and historically, in consensus industry publications such as the TCA Handbook for Ceramic Tile Installation, published by the Tile Council of North America, where the ASTM C1278 products have been recognized for use in wet areas, including their use as a base for the wall tile in tub and shower surrounds since 2007. The wall and floor designs for the ASTM C1278 products listed in the TCA Handbook for wet area application are equivalent to those of ASTM C 1178, C 1288 and C 1325 products. The products covered under ASTM C 1278 for use as a base for tile have a proven track record in the field, where hundreds of millions of feet have been installed since its release to the market. The inclusion of this standard will allow for more competitive product bidding in turn reducing overall construction costs.

Bibliography:
The Tile Council of North America. 2009 TCA Handbook for Ceramic Tile Installation. Anderson, SC: TCNA, 2009.

Cost Impact: This code proposal will not increase the cost of construction.

ICCFILENAME: ESTRADA-S1-2509.2

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The documentation provided in the proponent's reason indicated these gypsum backers are not appropriate in the IBC for shower areas.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard P. Goldberg, AIA, CSI, NCARB, Professional Consultants International, LLC, representing United States Gypsum Company, requests Approval as Submitted.

Commenter's Reason: This public comment is written in objection to the disapproval of Code Change Proposal # S223-09/10 at the 09/10 Public Hearing, and in support of Final Action Hearing approval of same Code Change Proposal # S223-09/10 as submitted for the ICC Public Hearing consideration. The # S223-09/10 proposal requested the modification of §2509.2 and Chapter 35 Referenced Standards to include a water-resistant fiber-reinforced gypsum backer board complying with ASTM C1278 as an additional alternative to similar products previously approved for use by that section of the IBC Code in the 2004-05 code cycle.

As an architect and tile industry consultant, it is my opinion that the committee's disapproval action summarily dismissed consideration of the technical merits of the proposal, and was simply based on a misinterpretation of the proprietary product literature documentation provided in the proposal. The reason given for disapproval was that the proponent's documentation indicated that fiber-reinforced gypsum backers were not appropriate for shower areas under the IBC.

Product literature documentation did in fact indicate that the product was not intended for use as a tile backer panel in commercial gang shower areas. However, this situation is a "red herring", as the literature was simply consistent with IBC requirements current at the time of the proposal, and was not intended as an actual physical limitation of an ASTM C1278 compliant product for the purposes of the code change proposal. In other words, the proposal failed to recognize and explain the formality that the literature would be revised if the ASTM C1278 compliant product was approved for use as a tile backer under the IBC.

Our firm, PROCON, has conducted extensive independent laboratory testing comparing ASTM C 1178, ASTM C 1288, and ASTM C1325 compliant tile backers (currently approved for use in IBC §2509.2) with ASTM 1278 compliant water-resistant fiber-reinforced gypsum tile backers. This testing has determined that all four tile backer material standards provide equivalent performance under commercial wet-area conditions. These test results were an important factor in approval of water-resistant fiber-reinforced gypsum as a tile backer in wet areas, as recognized by both the IRC International Residential Code 2007 Supplement, as well as tile industry consensus publication Tile Council of North America (TCNA) 2007 Handbook for Ceramic Tile Installation.

Most important, the water resistance properties of the proposed ASTM C 1278 compliant product and the approved ASTM C1178 products (both gypsum-based) are comparable, including < 5% water absorption after 2 hours water immersion, no water percolation or wicking after 48 hrs., and mold resistance in accordance with ASTM D3273 (see attached supporting document # 1 & 2).

It is important to note that the TCNA tile industry consensus standard has recognized ASTM C 1278 compliant water-resistant fiber-reinforced gypsum as a backer for tile in wet areas, without discrimination as to residential or commercial construction applications (see attached supporting document # 3 & 4). The reason is that comparison of respective product category physical properties, as well as laboratory testing, has proven that ASTM C1278 compliant products meet or exceed the physical properties of ASTM C 1178, ASTM C 1288, and ASTM C1325 compliant tile backers currently approved for use in IBC § 2509.2.

I also call attention to the February 2005 ICC Public Hearing proposal and subsequent approval of proposal # S218-04/05 requiring the use of cement, fiber-cement, and glass mat gypsum backers in compliance with ASTM C1288, C 1325 & C 1178 respectively, to replace previously allowed water-resistant gypsum board ("green board") as a substrate for tile in tubs, showers and water closet compartments. Among other considerations, the premise of that approved code modification was "intended to bring the IBC in line with IRC in this respect", based on IRC approval in the 2003-04 code change cycle.

The modification sought by proposal # S223-09/10 is similar in spirit and in fact. Both IRC and TCNA tile industry consensus standards recognize ASTM C1288, C 1325, C 1178 *and* C 1278 compliant water-resistant fiber-reinforced gypsum as suitable tile backers in wet areas, yet there is no basis in fact for exclusion from the IBC, other than the misinterpretation of the proponent's documentation. The literature is simply a commercial reflection of current IBC requirements, but not reflective of the proponent's technical position.

The fact is that physical properties, testing and a proven history of ASTM C1278 compliant water-resistant fiber-reinforced gypsum as a tile backer in wet areas since release to the market in 2003 indicate that the material is suitable for use as a tile backer in commercial / institutional showers and tub surrounds. Most important (and the sole reason for Public Hearing disapproval), the proponent will revise literature by not limiting such use once that use is recognized by the IBC.

Therefore, I offer this public comment and reasoning in support of Final Action Hearing approval of the code change proposal # S223-09/10, as originally submitted, to modify IBC § 2509.2 and Chapter 35 Referenced Standards to include ASTM 1278 compliant water-resistant fiber-reinforced gypsum tile backer. This action will offer less restrictive, equivalent tile backer material standards, not change the cost of construction, with potential to reduce construction costs through increased competition.

Bibliography of supporting documentation:

1. Independent lab test results- Professional Consultants 2006 – comparison water resistance properties ASTM C1178 vs ASTM C1278 tile backer boards
2. Independent lab test results – TCNA Testing Service 2006 - comparison water percolation properties ASTM C1178 vs ASTM C1278 tile backer boards
3. Tile Council of North America TCNA 2008 Handbook for Ceramic Tile Installation – excerpt indicating 2007 approval of ASTM C 1278 as tile backer for wet area (commercial & residential)
4. Tile Council of North America TCNA 2008 Handbook for Ceramic Tile Installation – excerpt "wet area" definition.
5. Fiberock Aqua-tough Tile Backer Board (ASTM C1278)– USG technical literature – revisions to align with IBC approval.

SUPPORTING DOCUMENT # 1

Test Results Summary
TCA and Independent Lab Product Testing Service
Comparison USG Fiberock and GP DensShield
Laboratory Samples

TESTS	USG FIBEROCK ASTM C1278	GP DENSHIELD ASTM C1178	ANSI 118.9
DRY TILE SHEAR BOND	274 psi	184 psi	50 psi
WET TILE SHEAR BOND	90 psi	49 psi	50 psi
12" WATER PERCOLATION, 48hrs	no visilble water penetration/drops**	no visilble water penetration / drops*	
24" WATER PERCOLATION, 48 hrs	no visilble water penetration/drops**	no visilble water penetration / drops*	
	pass	pass	
WATER WICKING, 48 hrs	0"	0"	
MOLD RESISTANCE ASTM D3273	No growth found		
* product contains membrane coating			
** product has intergral water resistance			
NOTE: THIS IS A SUMMARY OF TEST DATA; REFER TO FULL TCNA SUBMITTAL FOR DETAILED TCNA TEST REPORTS			
TCNA 2006 HANDBOOK SUBMISSION – USG Fiberock® Aqua Tough™ Tile Backerboard & Underlayment			
Professional Consultants International, LLC			
Atlanta, GA * Boston, MA * Hartford, CT 860-673-9529			

TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT TESTING SERVICE

100 Clemson Research Blvd. Anderson, SC 29625 Tel (864) 646-TILE Fax (864) 646-2821

TCA TEST REPORT NUMBER: TCA-308-05 **PAGE: 1 OF 1**

TEST REQUESTED BY:

USG Corporation
Research and Technology Center
Attn: John Ellicson
700 N. Highway 45
Libertyville, IL 60048

TEST SUBJECT MATERIAL: Identified by client as: ½-inch Denshield and Fiberock

TEST DATE: 1/13/06-1/14/06

TEST PROCEDURE:

One two inch diameter tube, twelve inches long, with a square base was bonded to each sample with a silicone sealant. The silicone was allowed to cure for 48 hours before introducing the water. The tubes were filled with water to a height of twelve inches and then covered to minimize evaporation. The samples were placed on a stable surface in the laboratory and held at 74 degrees Fahrenheit and 45-55% R.H. After 48 hours the amount of water percolation (drop in water level) was recorded. The results are detailed below.

TEST RESULTS:

Both samples (one Denshield and one Fiberock) exhibited a **¼-inch** drop in the water level after 48 hours of the above detailed percolation test. The amount of loss that is due to evaporation is not known.

Noah Chitty
Director of Laboratory Services

Date 1/16/06

Testing Services: *testing@tileusa.com* Literature Orders: *literature@tileusa.com* Web Site: www.tileusa.com

WALLS, INTERIOR

Wood or Metal Studs

Continued from previous page.

07 **Materials:**
- coated glass mat, water-resistant gypsum backer board—ASTM C1178.
- 2" alkali-resistant glass fiber mesh tape.
- fasteners—noncorrosive and nonoxidizing.
- dry-set mortar—ANSI A118.1.
- latex-portland cement mortar—ANSI A118.4.
- organic adhesive—ANSI A136.1. Type I for residential wet areas and Type I or Type II for dry areas.
- grout—ANSI A118.3, A118.6, or A118.7

07 **Preparation by Other Trades:**
- maximum variation in the wood or metal studs—not to exceed 1/4" in 10'-0" and 1/16" in 1'-0" from the required plane.

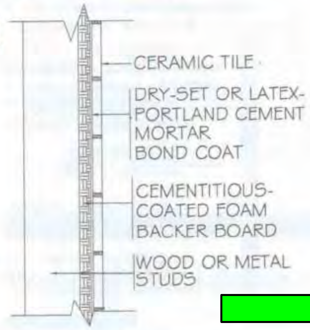
07 **Preparation by Backer Board Installers:**
- 2" alkali-resistant glass fiber mesh tape—embed in a skim coat of dry-set or latex-portland cement mortar over joints and corners.
- caulk or seal penetrations and abutments to dissimilar materials.

Movement Joint (architect must specify type of joint and show location and details on drawings):
- movement joints—mandatory according to Method EJ171, page 79.

Installation Specifications:
- follow manufacturer's instructions.
- tile—ANSI A108.4 or A108.5.
- grout—ANSI A108.6 or A108.10.

07 Cementitious-Coated Foam Backer Board W246-07

07



Recommended Uses:
- in wet or dry areas.
- over dry, well-braced wood studs or furring.
- over well-braced metal studs.
- where waterproof properties are required.

07 **Requirements:**
- set tile in dry-set or latex-portland cement mortar.
- stud spacing—maximum 16" o.c.
- minimum recommended stud depth—3-1/2".
- metal studs—20 gauge (0.039") or heavier.
- Fasten units to studs per manufacturer's recommendations.

Materials:
- cementitious-coated extruded foam backer board.
- waterproofing for seams and fastener heads—ANSI A118.10.
- fasteners—noncorrosive and nonoxidizing.
- dry-set mortar—ANSI A118.1.
- latex-portland cement mortar—ANSI A118.4.
- grout—ANSI A118.3, A118.6, or A118.7.
- metal studs—ASTM C645.

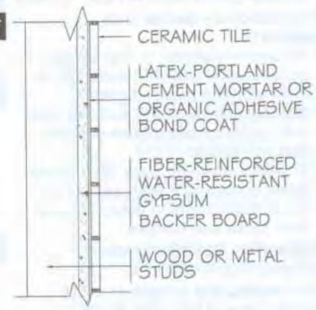
07 **Preparation by Backer Board Installers:**
- maximum variation in the backing surface—1/4" in 10'-0" and 1/16" in 1'-0" from the required plane.
- horizontal and vertical joints and corners—butt tightly together, a exible caul fing) in joints and

Movement Joint (architect must specify type of joint and show location and details on drawings):
- movement joints—mandatory according to Method EJ171, page 79.

Installation Specifications:
- cementitious-coated extruded foam backer board—install according to manufacturer's instructions.
- tile—ANSI A108.5.
- grout—ANSI A108.6 or A108.10.

Fiber-Reinforced Water-Resistant Gypsum Backer Board W247-07

07



07 **Recommended Uses:**
- in wet or dry areas.
- over dry, well-braced wood studs or furring.
- over well-braced metal studs.

07 **Requirements:**
- set tile in latex-portland cement mortar or organic adhesive.
- stud spacing—maximum 16" o.c. or 24" o.c. with blocking at all joints, ends, and edges.
- minimum recommended stud depth—3-1/2".
- metal studs—20 gauge (0.039") or heavier for tile applications.

07 **Materials:**
- fiber-reinforced water-resistant gypsum backer board 1/2" or thicker—ASTM C1278 (Paragraph 6.1).
- 2" alkali-resistant glass fiber mesh tape.
- fasteners—noncorrosive and non-oxidizing.
- latex-portland cement mortar—ANSI A118.4.

Continued on next page.

All specifications for ceramic tile installations must conform to local building codes, ordinances, trade practices, and climatic conditions.

Not all methods are suitable for glass tile installations. Consult glass tile manufacturer for specific recommendations.

Published by
TCNA
TILE COUNCIL OF NORTH AMERICA, INC.

100 Clemson Research Blvd., Anderson, SC 29625
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Web Site: www.tileusa.com

shadows are created from side lighting interior walls and floors when light shines at that angle through windows and doors.

Exterior:

When natural or artificial light shines on exterior walls and floors at a flat angle almost parallel to tile surfaces, normal and acceptable inconsistencies in the tilework are highlighted by shadows that exaggerate these conditions.

07 Wet Area Definition:

Tile surfaces that are either soaked, saturated, or regularly and frequently subjected to moisture or liquids (usually water), such as gang showers, tub enclosures, showers, laundries, saunas, steam rooms, swimming pools, hot tubs, commercial kitchens, and exterior areas.

Limited Water Exposure Area:

Tile surfaces that are subjected to moisture or liquids but do not become soaked or saturated due to the system design or the time exposure.

Examples include: residential bathroom floors and foyers, residential bathroom vertical surfaces including tub surrounds without a shower head, and kitchen countertops.

Mortar Bed Weight:

Typically, a 1" thick mortar bed will weigh 12 lbs. per square foot. A thin-bed typically weighs 0.5 lbs. to 1.5 lbs. per square foot.

Bonding Large-Format Tile for Coverage and Support:

The following installation techniques are required to ensure proper coverage of the bonding surface of larger tiles and provide full support of edges and corners. Large tiles are generally considered to be 8" x 8" and greater. Select a notched trowel sized to facilitate the proper coverage. Key the mortar into the substrate with the flat side of the trowel. Comb with the notched side of the trowel in ONE DIRECTION. Firmly press tiles into the mortar and move them perpendicularly ACROSS the ridges, forward and back approximately 1/8" to 1/4", to flatten the ridges and fill the valleys. This method can produce maximum coverage, with the corners and edges fully supported, without backbuttering or beat-in. Periodically remove and check a tile to assure proper coverage is being attained.

07 Coefficient of Friction:

When coefficient of friction (COF) data are required for a specific project, testing shall conform to ASTM C1028. However, because **area of use and maintenance by the owner of installed tile directly affect coefficient of friction**, the COF of the manufactured product shall be as agreed upon by manufacturer and purchaser.

Water (especially standing water), oil, grease, etc., create slippery conditions. Floor applications with exposure to these elements require extra maintenance and caution in product selection.

Lippage:

Lippage is a condition where one edge of a tile is higher than an adjacent tile, giving the finished surface an uneven appearance. This condition is inherent in all installation methods and may also be unavoidable due to the tile tolerances, in accordance with ANSI A137.1.

Protecting New Tile Work:

To avoid damage to finished tilework, schedule floor installations to begin only after all structural work, building enclosure, and overhead finishing work, such as ceilings, painting, mechanical, and electrical work, are completed. Keep all traffic off finished tile floors until they have fully cured. Builder shall provide up to 3/4"-thick plywood or OSB protection over non-staining kraft paper to protect floors after installation materials have cured. Covering the floor with polyethylene or plywood in direct contact with the floor may adversely affect the curing process of grout and latex/polymer modified portland cement mortar.

07 Maintenance:

All tile installations (especially exterior installations, which include the movement joint sealant) require periodic inspection and maintenance by the owner. Consult material manufacturers and maintenance product manufacturers for recommended procedures.

CAUTION – Wood-based panels such as particle board, composite panels (veneer faces bonded to reconstituted wood cores), non-veneer panels (wafer board, oriented strand board, and other similar boards), lauan plywood, and softwood plywood expand and contract with changes in moisture content and are not recommended as backing materials for direct bonding of ceramic tile. Plywood, however, manufactured with fully waterproof adhesive and with an exposure durability rating of Exposure 1 or Exterior may be used on residential horizontal surfaces when installed in accordance to ANSI Specifications for the Installation of Ceramic Tile (A108.01-3.4).

Submittal Sheet

Fiberock® Aqua-Tough™ Tile Backerboard

Finishing flexibility, strength, and superior water resistance in a single panel

– Superior tile bond for ceramic tile
– Uniform composition provides both strength and water resistance
– Suitable for ceramic tile wall and tub surround applications in intermittently wet and dry areas

Description

FIBEROCK® brand AQUA-TOUGH™ tile backerboard is a unique fiber-reinforced gypsum product that represents a new era in substrate performance for wet or dry areas. This durable panel offers superior performance and tile bond because of its integral water-resistant core.

Unlike traditional water-resistant gypsum board, FIBEROCK tile backerboard derives both strength and water-resistance from its uniform composition. Made of a uniquely engineered gypsum/cellulose-fiber combination, FIBEROCK tile backerboard is strong and water resistant all the way through. With no paper to delaminate, FIBEROCK tile backerboard maintains its integrity even when wet.

Advantages

Abuse Resistant Engineered to provide increased resistance to abrasion, indentation and penetration. Outperforms paper-faced or glass mat faced panels. FIBEROCK tile backerboard has no paper face to tear or scratch.
Water Resistant FIBEROCK tile backerboard is water resistant through the core and intended for use in ~~intermittently~~ wet areas including tub surrounds.
Mold Resistant In independent lab tests per ASTM D3273-00 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber," the score for FIBEROCK tile backerboard was 10 (highest score).
Fire Resistant These panels offer superior fire resistance and demonstrate exceptional surface burning characteristics.
Finishing Flexibility FIBEROCK tile backerboard can be finished with ceramic tile or painted.
Environmentally Friendly Made from 95% recycled materials. Awarded Green Cross Certification from Scientific Certification Systems.

Limitations

1. Maximum stud spacing:

Wall Panel	Frame Spacing	Nails	Screws
1/2″	16″ o.c.	8″ o.c.	12″ o.c

2. For marble and stone applications, consult current TCA guidelines for recommendations.
3. Do not use in areas subject to prolonged exposure to standing water— for instance, in gang showers, saunas, or hot-tub decks.
4. FIBEROCK Tile Backerboard must be tiled or painted, not used as a finish surface.
5. Panels should not be exposed to sustained temperatures above 125 °F (51.6 °C).
6. For fire-resistant or abuse-resistant construction over steel framing, a minimum of 20 gauge steel framing is required.
7. Do not use in areas subject to standing water, such as ~~gang showers, saunas~~ or hot-tub decks.

Product Data

Dimensions: 1/2″ FIBEROCK tile backerboard, 3′ x 5′, 4′ x 4′, 4′ x 5′ and 4′ x 8′, with square-edge configuration
Compliance with standards: Meets ASTM standard C1278

Installation Practices

Environmental Conditions

In cold weather and during FIBEROCK tile backboard installation, joint finishing, and tile application, temperatures within the building shall be maintained within the range of 55-70 ºF. Adequate ventilation shall be provided to carry off excess moisture. Wood framing shall approximate the moisture content it will reach in service prior to the application of the panels. FIBEROCK tile backerboard should be stored in an enclosed shelter providing protection from damage and exposure to the elements. Allow FIBEROCK backerboard to acclimate to the temperature and humidity conditions at the jobsite prior to installation.

Framing

Steel or wood wall framing to receive FIBEROCK tile backerboard shall be structurally sound and in general compliance with local building code requirements. Damaged and excessively bowed studs shall be replaced before installation of FIBEROCK tile backerboard.

Space wood and steel framing a maximum of 24″ o.c. Framing shall be designed to meet L/360 deflection for tile and L/240 for flexible finishes such as paint. For floor applications, framing shall be designed to meet L/360 deflection.

USG

Final Action: AS AM AMPC____ D

S226-09/10, Part II
IRC: R902.1

NOTE: PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART I IS REPRODUCED ONLY FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART II.

Proposed Change as Submitted

Proponent: Craig Thompson, representing Copper Development Assn.

PART II – IRC BUILDING/ENERGY

R902.1 Roofing covering materials. Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in areas designated by law as requiring their use or when the edge of the roof is less than 3 feet (914 mm) from a property line. Classes A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E 108.

Exceptions:

1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on non-combustible decks.
3. <u>Class A roof assemblies include copper sheets installed over combustible decks.</u>

Reason: : The reason the exceptions clause was modified in the last code cycle was primarily due to a test report submitted by the National Association of State Fire Marshalls from Underwriters Laboratories Inc., (UL), dated January 17, 2007. The report references the findings of a fact finding report done by UL to show that the exceptions to the Class A rating are not valid because, as the fact finding report shows, 30 gauge sheet steel, 24 gauge sheet steel, 0.040 aluminum sheet & 14" X 10" wide , 6" exposure slate installed over A-C plywood do not pass fire test requirements under Standards E108 & UL970 for roof coverings used over combustible roof deck. However this same report states that 16 oz. copper sheet does conform to fire test requirements under Standards E108 & UL 970. The report affirms that the copper roof assembly does pass. Therefore there is no viable reason why copper shingles or sheets should not retain their exception as a Class A roof material. In addition, for the UL test to be valid each assembly must pass four consecutive burning brand tests, two consecutive flame spread tests and two consecutive intermittent flame tests as spelled out in ASTM E108 & UL970. Each assembly was tested only once in the Fire Marshall's report, not as per the standard, thus nullifying the report's conclusions.

In addition, as per the attached report from the Southwest Research Institute, (SwRI), a typical standing seam copper roof assembly, over a combustible deck, was tested and passed as per ASTM E108 for Class A roof assemblies. ASTM E108 is the recognized standard by which all Class A roof assemblies are measured. Therefore the typical copper standing seam roof assembly, on a combustible deck, should rightfully be listed as a Class A roof assembly exception as per the SwRI report dated 1/7/09.

Bibliography:

1. Southwest Research Institute; *Evaluation of the External Fire Resistance Characteristics of Roof Covering Systems in Accordance with ASTM E 108-07a, Standard Test Methods for Fire Tests of Roof Coverings: Class A Testing;* San Antonio, TX, January 7, 2009
2. Underwriters Laboratories; *Fact –Finding Investigation of Metal and Slate Prepared Roof Coverings;* National Association of State Fire Marshals, Washington, DC; Northbrook, IL, January 17, 2007

Cost Impact: None given.

ICCFILENAME: THOMPSON, C-S1-1505.2

Public Hearing Results

PART II- IRC B/E
Committee Action: **Approved as Submitted**

Committee Reason: Copper sheets installed on a combustible deck are Class A and was inadvertently omitted last code change cycle as stated in the proponent's published reason. This change brings this roof covering back into the code as Class A and exempt from testing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Bob Eugene, Underwriters Laboratories Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R902.1 Roofing covering materials. Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in areas designated by law as requiring their use or when the edge of the roof is less than 3 feet (914 mm) from a property line. Classes A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E 108.

Exceptions:

1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on non-combustible decks.
3. Class A roof assemblies include minimum 16 oz/ft^2 copper sheets installed over combustible decks.

Commenter's Reason: Added text is consistent with the action of the IBC Fire Safety Committee.

Public Comment 2:

John Woestman, Kellen Company, and Craig Thompson, representing Copper Development Assn., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

R902.1 Roofing covering materials. Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in areas designated by law as requiring their use or when the edge of the roof is less than 3 feet (914 mm) from a property line. Classes A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E 108.

Exceptions:

1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on non-combustible decks.
3. Class A roof assemblies include minimum 16 oz/ft^2 copper sheets installed over combustible decks.

Commenter's Reason: This proposed modification sets minimum copper sheet specifications consistent with the testing performed, as referenced in the original proposal, and is consistent with the language recommended for approval for the IBC in S226 Part I

Final Action: AS AM AMPC____ D

NOTE: PART I REPRODUCED FOR INFORMATIONAL PURPOSES ONLY –SEE ABOVE

S226-09/10-PART I – IBC FIRE SAFETY

Revise as follows:

1505.2 Class A roof assemblies. Class A roof assemblies are those that are effective against severe fire test exposure. Class A roof assemblies and roof coverings shall be listed and identified as Class A by any approved testing agency. Class A roof assemblies shall be permitted for use in buildings or structures of all types of construction.

Exceptions:

1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on non-combustible decks or ferrous, copper or metal sheets installed without a roof deck on noncombustible framing.
3. Class A roof assemblies include copper sheets installed over combustible decks.

Reason: : The reason the exceptions clause was modified in the last code cycle was primarily due to a test report submitted by the National Association of State Fire Marshalls from Underwriters Laboratories Inc., (UL), dated January 17, 2007. The report references the findings of a fact finding report done by UL to show that the exceptions to the Class A rating are not valid because, as the fact finding report shows, 30 gauge sheet steel, 24 gauge sheet steel, 0.040 aluminum sheet & 14" X 10" wide , 6" exposure slate installed over A-C plywood do not pass fire test requirements under Standards E108 & UL970 for roof coverings used over combustible roof deck. However this same report states that

16 oz. copper sheet does conform to fire test requirements under Standards E108 & UL 970. The report affirms that the copper roof assembly does pass. Therefore there is no viable reason why copper shingles or sheets should not retain their exception as a Class A roof material. In addition, for the UL test to be valid each assembly must pass four consecutive burning brand tests, two consecutive flame spread tests and two consecutive intermittent flame tests as spelled out in ASTM E108 & UL970. Each assembly was tested only once in the Fire Marshall's report, not as per the standard, thus nullifying the report's conclusions.

In addition, as per the attached report from the Southwest Research Institute, (SwRI), a typical standing seam copper roof assembly, over a combustible deck, was tested and passed as per ASTM E108 for Class A roof assemblies. ASTM E108 is the recognized standard by which all Class A roof assemblies are measured. Therefore the typical copper standing seam roof assembly, on a combustible deck, should rightfully be listed as a Class A roof assembly exception as per the SwRI report dated 1/7/09.

Bibliography:

1. Southwest Research Institute; *Evaluation of the External Fire Resistance Characteristics of Roof Covering Systems in Accordance with ASTM E 108-07a, Standard Test Methods for Fire Tests of Roof Coverings: Class A Testing;* San Antonio, TX, January 7, 2009
2. Underwriters Laboratories; *Fact –Finding Investigation of Metal and Slate Prepared Roof Coverings;* National Association of State Fire Marshals, Washington, DC; Northbrook, IL, January 17, 2007

Cost Impact: None given

PART I- IBC FIRE SAFETY
Committee Action: **Approved as Modified**

Modify the proposal as follows:

1505.2 Class A roof assemblies. Class A roof assemblies are those that are effective against severe fire test exposure. Class A roof assemblies and roof coverings shall be listed and identified as Class A by any approved testing agency. Class A roof assemblies shall be permitted for use in buildings or structures of all types of construction.

Exceptions:

1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on non-combustible decks or ferrous, copper or metal sheets installed without a roof deck on noncombustible framing.
3. Class A roof assemblies include minimum 16 oz/ft^2 copper sheets installed over combustible decks.

Committee Reason: The committee agreed that copper sheets over combustible decking was appropriate for a prescribed class A roof assembly based on the testing submitted with the proposal. The modification includes the necessary minimum copper sheet specifications that are tied to the testing performed.

Assembly Action: **None**

S229-09/10

2211.1 (New), 2211.2 (New), Chapter 35

Proposed Change as Submitted

Proponent: Victor D. Azzi, PhD, PE, Consulting Structural Engineer, representing the Storage Equipment Manufacturers Association (SMA), a division of the Material Handling Industry of America (MHIA).

1. Add new text as follows:

SECTION 2211
INDUSTRIAL STEEL WORK PLATFORMS

2211.1 General. The design, testing, utilization, application, and maintenance of industrial steel work platforms shall be in accordance with the provisions of ANSI/SMA MH28.3. An industrial steel work platform is herein defined as a pre-engineered, prefabricated, elevated platform, employing a steel framing system, located in an industrial environment. Other structural or nonstructural elements shall be permitted for flooring including but not limited to, concrete, steel, and engineered wood products. Personnel working on such platforms are trained employees, accustomed to a manufacturing environment and dressed accordingly.

2211.2 Materials. Steel shall be in accordance with the ASTM specifications listed in AISI S100 and AISC 360. Steels not listed in the above specifications are not excluded, provided that they conform to the chemical and mechanical properties of one or more of the listed specifications, or of other specifications which establish their properties and structural suitability, and provided that they are subjected by either the producer or the purchaser to analyses, tests, and other controls to the extent and in the manner prescribed by one of the listed specifications, as applicable.

Materials used in the decking structure and surfaces for these work platforms shall be concrete, engineered wood products, plywood or other wood products, steel sheet, steel plate or grating, supported by the steel framing system. Such decking materials shall conform to the applicable provisions of this code and referenced standards appropriate to their use in this application and work environment.

2. Add standard to Chapter 35 as follows:

SMA
MH28.3-08 Specification for the Design, Manufacture and Installation of Industrial Steel Work-Platforms.

Reason: The Engineering committees of the Storage Equipment Manufacturers Association (SMA), have worked to develop standard engineering practices for the design, testing, and utilization of Industrial Steel Work Platforms. The use of this standard permits loading capacities and performance ratings, as well as functional requirements, to be determined and verified by designers and users of these products. The SMA, a Product Section of the Material Handling Industry of America (MHIA), comprises the substantial portion of the companies that design and manufacture the preponderance of industrial steel work platforms as defined by the scope of this standard. The SMA has recognized the need to establish rigorous industry standards, and have supported the development and promulgation of the ANSI/SMA standard for the benefit of the work-platform industry as well as the users of its products. This SMA/ANSI Standard has been developed using the canvassing processes of the MHIA and the ANSI. The ANSI canvass process for this new ANSI MH28.3 Standard was recently completed and the SMA Engineering Committee has resolved several items involving small editorial changes and corrections.

Cost Impact: This addition to the IBC will not increase the cost of construction.

ICCFILENAME: AZZI-S1-2211 (New)

Public Hearing Results

This code change was contained in the errata posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/09-10ProposedChanges.aspx.

Note: The following analysis was not in the Code Change monograph but was published on the ICC website at http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Analysis: Review of proposed new standard SMA MH28.3 indicated that, in the opinion of ICC Staff, the standard did not comply with ICC standards criteria, Section 3.6.3(1) Readily available.

Committee Action: Disapproved

Committee Reason: The code change includes a definition of the term "industrial steel work platform" which is unclear and is more of a description. It also is included within a provision rather than being listed separately in a definitions section. The proposed reference standard does not appear to allow anything that's not already in the code.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Victor D. Azzi, representing Storage Equipment Manufacturers Association (SMA), requests Approval as Modified by this Public Comment.

Modify proposal as follows:

SECTION 2211
INDUSTRIAL STEEL WORK PLATFORMS

2211.1 General. The design, testing, utilization, application, and maintenance of industrial steel work platforms shall be in accordance with the provisions of ANSI/SMA MH28.3. An industrial steel work platform shall be~~is herein~~ defined as a pre-engineered, prefabricated, elevated platform, employing a steel framing system, located in an industrial environment. ~~Other structural or nonstructural elements shall be permitted for flooring including but not limited to, concrete, steel, and engineered wood products. Personnel working on such platforms are trained employees, accustomed to a manufacturing environment and dressed accordingly.~~

~~**2211.2 Materials.** Steel shall be in accordance with the ASTM specifications listed in AISI S100 and AISC 360. Steels not listed in the above specifications are not excluded, provided that they conform to the chemical and mechanical properties of one or more of the listed specifications, or of other specifications which establish their properties and structural suitability, and provided that they are subjected by either the producer or the purchaser to analyses, tests, and other controls to the extent and in the manner prescribed by one of the listed specifications, as applicable.~~

~~Materials used in the decking structure and surfaces for these work platforms shall be concrete, engineered wood products, plywood or other wood products, steel sheet, steel plate or grating, supported by the steel framing system. Such decking materials shall conform to the applicable provisions of this code and referenced standards appropriate to their use in this application and work environment.~~

SMA
ANSI MH28.3-09~~8~~ *Specification for the Design, Manufacture and Installation of Industrial Steel Work-Platforms*

Commenter's Reason: This comment simply eliminates unnecessary language, which was in the original proposal. Please note that the standard is now readily available and, as such, is compliant with ICC rules. Also, the date is corrected from 2008 to 2009; the new edition of this Standard was approved by ANSI on October 27, 2009.

Final Action: AS AM AMPC____ D